From Placements to Ecosystems: A Gender Responsive University Industry Model for Sustainable Female Graduate Employment in Uganda

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Abstract

Globally, equitable female labour force participation is central to sustainable development and inclusive economic growth, as reflected in the United Nations Sustainable Development Goals particularly Goals 5 and 8. Yet, despite rising levels of female educational attainment, the transition from higher education into meaningful and sustainable employment remains constrained by structural and gendered barriers, especially in STEM and technical fields. In Uganda, weak university industry linkages further limit alignment between training and labour market demands undermining higher education's transformative potential. This study examines how innovative university–industry ecosystems can be developed beyond conventional internship models to secure sustainable career pathways for female graduates at Kyambogo University. Specifically, it investigates: (i) how existing university-industry linkages support female employability; (ii) the structural and gendered barriers constraining sustainable employment outcomes; and (iii) the ecosystem elements required to foster durable, gender-responsive career pathways. Anchored in Innovation Ecosystems Theory, the study adopts a qualitative case study design. Data were generated through in-depth interviews and focus group discussions with female students, university administrators, and industry partners. Thematic analysis was conducted using iterative inductive and deductive coding,

supported by triangulation, member checking, and peer debriefing to enhance credibility. Findings reveal that internship-based models are insufficient to address systemic barriers. Sustainable female employment depends on co-creative partnerships in which industry actively participates in curriculum design, structured mentorship, and shared investment in training infrastructure, supported by continuous feedback mechanisms. The study proposes a gender responsive university industry ecosystem framework aligned with the Uganda National Development Plan IV, positioning vocational higher education as a catalyst for inclusive economic transformation and long-term female career mobility.

Keywords: *University-Industry Ecosystems, Graduate Employability, Gender Responsive Training, Vocational Education, Knowledge Transfer.*

Introduction

Equitable female labour force participation is universally recognized as a driver of productivity, poverty reduction, and long-term macroeconomic stability and is explicitly embedded in the targets of the United Nations Sustainable Development Goals particularly Goal 5 (Gender Equality) and Goal 8 (Decent Work and Economic Growth). Empirical evidence from multilateral agencies such as the World Bank and the International Labour Organization consistently demonstrates that narrowing gender gaps in employment enhances GDP growth, strengthens household welfare, and promotes intergenerational mobility. Yet, despite substantial gains in women's educational attainment worldwide, the transition from higher education into meaningful and sustainable employment remains constrained by persistent gendered barriers, including occupational segregation, limited professional networks, and discriminatory hiring practices (Myrtveit, 2018; Eseza, 2025), particularly in male-dominated fields such as STEM. Data from the Uganda Bureau of Statistics (UBOS) National Labour Force Survey (NLFS) 2021 paints a troubling picture of female economic exclusion. The female labour force participation rate stands at only 39.3%, compared to 57.9% for males. A disproportionate 52.2% of female youth are classified as Not in Employment, Education,

or Training (NEET), compared to just 28% of their male counterparts (UBOS, 2022; EPRC & UBOS, 2024). This near doubling of female NEET rates signals that the problem begins well before formal graduate employment and is embedded in a system that progressively filters out women at every stage.

The Ministry of Gender, Labour and Social Development (MGLSD), in its National Employment Strategy 2023–2028, explicitly acknowledges the gendered employment crisis as a structural problem warranting policy intervention. The Strategy notes that female labour force participation rates are far below national averages, presenting a "double challenge" that calls for mainstreaming female-focused employment interventions (Among, & Kibenge, 2022). This is particularly relevant for the university–industry model proposed in this study, as it justifies targeted ecosystem-level intervention beyond conventional placement approaches.

The gender gap in STEM education is among the most consequential drivers of female graduate unemployment, as STEM qualifications are increasingly required for formal, higher-wage employment. In Uganda, girls are particularly under-represented in STEM education, with low enrolment, poor performance, and high dropout rates (Namuliira et al., 2025). According to the Uganda National Council for Science and Technology's National Research Outlook Report, only 28% of Ugandan researchers are women, below the global average of 33% (Bbaale et al., 2025).

At the university admissions level, only 40% of top-scoring university applicants in Uganda are women constraining the pipeline into competitive STEM programmes from the outset Tsakalerou et al., (2024). These structural challenges are compounded by weak university industry linkages that inadequately align training with labour market demands (Kadhila et al., 2024), thereby constraining higher education's transformative potential in advancing inclusive economic development.

Conventional models of university industry engagement are anchored in a linear, supply-side logic that casts the university as a producer of human capital and industry as a downstream consumer of skills (Schmuck, 2017). Within this paradigm, internships function as

short-term transition mechanisms intended to facilitate labour market entry, yet they remain detached from deeper institutional reform and structural transformation. Such narrowly framed arrangements are ill-equipped to address the systemic and gendered dynamics shaping graduate employability.

Guided by these challenges, this study explores how innovative university–industry ecosystems can be developed at Kyambogo University to secure sustainable career pathways for female graduates. It examines the current structure and effectiveness of university–industry linkages in supporting female employability, identifies the structural and gendered barriers that constrain sustainable employment outcomes, and investigates co-creative mechanisms through which universities, industry, government, and communities can collaborate more strategically. Ultimately, the study seeks to develop a gender responsive ecosystem framework that integrates curriculum co-design, structured mentorship, and shared investment in training infrastructure.

Accordingly, the research is guided by four interrelated questions: How are university industry linkages at Kyambogo University currently structured, and to what extent do they support female graduate employment? What systemic and gendered barriers hinder women's transitions into sustainable careers? How can universities and their partners co-create mechanisms that enhance employability outcomes for women? And what core elements are required within a gender-responsive university industry ecosystem to ensure durable and inclusive career pathways?

Drawing on evidence from Kyambogo University, this article interrogates this status quo through the lens of Innovation Ecosystems Theory. It advances a transformative, gender-responsive framework that reimagines university industry collaboration as an integrated, co-creative enterprise. Aligned with Uganda National Development Plan IV, the proposed ecosystem embeds industry participation in curriculum co-design, structured mentorship, and shared investment in training infrastructure. By convening universities, industry, government, and communities within a coordinated governance architecture, the framework positions Kyambogo University to pioneer durable career pathways for female graduates thereby strengthening inclusive economic

transformation and enriching the regional discourse on graduate employability (Iwara, 2025).

Therefore, the above statistics provide a robust empirical foundation for the study's central argument: that the current university industry linkage model in Uganda reproduces male advantage by default, and that a gender-responsive ecosystem model is not a luxury policy add on but an urgent structural necessity.

Conceptual, Theoretical, Historical, and Contextual Background

University industry engagement has progressively shifted from the linear assumptions of human capital theory, which cast universities primarily as producers of skilled labour for industrial absorption (Brown et al., 2013), toward more systemic and relational perspectives. Earlier models such as The Traditional Internship/Placement Model, Human Capital Theory's Linear Pipeline Model (Schultz, 1961; Becker, 1964), The Sandwich Programme Model (UK-Influenced) and The Career Services/Job Fair Model framed employability as an individual attribute strengthened through short term workplace exposure, typically via internships or Industrial Training (IT) or just a *finite episode* within an academic trajectory.

What was wrong with the models above is that they treated industry as a passive receiver, not an active partner, they were supply-driven, not demand-responsive, they assumed a neutral, meritocratic labour market and worse more, they were episodic, not relational.

Contemporary scholarship, however, makes plain what placement driven optimism long obscured: graduate outcomes are not simply the sum of individual effort and academic preparation, but are fundamentally shaped by institutional arrangements, social networks, and the broader political economic structures within which universities and labour markets are mutually embedded (Marginson, 2024; Tomlinson & Watermeyer, 2022). This recognition is not merely theoretical refinement, it represents a necessary correction to decades of policy that mistook access to education for access to economic opportunity.

Nowhere is this correction more urgently needed than across Sub-Saharan Africa, where the persistence of female graduate unemployment

has laid bare the structural inadequacy of models that were designed, whether consciously or by default, around the experiences and trajectories of male graduates. The continued reliance on placement-driven frameworks in contexts marked by deep gender asymmetries is not simply an oversight it is a form of institutional complicity in the reproduction of inequality (Li & Hardy, 2025; Adewolu, 2024). When universities dispatch female graduates into labour markets structured by patriarchal hiring norms, restricted professional networks, and occupational gatekeeping, a short-term placement cannot function as the equalising mechanism policy has assumed it to be.

This failure is rendered even more visible at vocationally oriented institutions, where the promise of linear skills-development has consistently outpaced its delivery. Such approaches have, at best, generated modest and unevenly distributed employment gains that mask, rather than resolve, the deeper fault lines of occupational segregation, constrained career mobility, and the discriminatory workplace norms that determine not merely whether female graduates are hired, but whether they are retained, promoted, or pushed out (Ariansyah et al., 2024; Berry & Bell, 2012). What these approaches have conspicuously failed to do is interrogate the structures that make such barriers durable. A model that measures success by placement rates while leaving gendered power relations intact is not a solution to female graduate unemployment. It is an accommodation of it.

This study is grounded in Innovation Ecosystems Theory, because it provides a robust analytical lens for reframing university industry engagement beyond transactional placements toward systemic collaboration. By conceptualizing universities, industry, government, and communities as interdependent actors engaged in continuous knowledge exchange and value co-creation (Harrison et al., 2015; Adner, 2017; Citaristi, 2020), the theory shifts the focus of this study from isolated internship outcomes to the architecture of relationships that sustain female graduate employment over time.

In this study, Innovation Ecosystems Theory illuminates three interrelated dimensions. First, it reframes employability as an ecosystem outcome rather than an individual accomplishment. At Kyambogo University, sustainable female employment depends on how curricula,

industry partnerships, policy frameworks, and community networks interact to shape career trajectories moving beyond skills acquisition toward coordinated institutional design in which industry co-develops curricula, mentors students, and co-invests in training infrastructure. Second, the theory foregrounds reciprocity and continuous feedback, positioning employers as co-producers of talent whose insights refine curricula, address workplace integration challenges, and dismantle gendered barriers. Third, it emphasizes distributed governance, requiring alignment among universities, industry, regulators, and communities. Within the policy architecture of the Uganda National Development Plan IV, such a gender-responsive ecosystem advances not only access to employment but also job quality, career mobility, and inclusive economic transformation.

Within vocational education, industry becomes a co-designer of curricula, co-investor in training infrastructure, and co-evaluator of competencies (Billett, 2021; Wheelahan & Moodie, 2025). Effective ecosystems are sustained through interconnected partnership domains, including school industry collaboration (Syed et al., 2024), government coordination (Headrick et al., 2023), community engagement (Levin et al., 2021; Cherrington et al., 2019), educational pathways (Agosti & Bernat, 2018; Vernon et al., 2018), and broader public private alliances (Verma, 2016; Sabry, 2015). Embedding gender responsiveness within these ecosystems is essential because evidence shows that mentorship by female professionals, partnerships with women-led enterprises, gender-sensitive curricula, and inclusive workplace cultures significantly mitigate pay gaps and discriminatory hiring practices (Bellace, 2014; U. N. Women, 2019; Souza, 2024; McGrath, 2022; Citaristi, 2022).

Historically, university industry linkages in much of Sub-Saharan Africa have remained transactional, largely confined to internships and industrial training placements with limited strategic integration (Zavale, & Langa, 2018). Although global reforms increasingly promote entrepreneurial universities and ecosystem-oriented collaboration (Marra, 2025; Appiah, & Grimm, 2025), institutional transformation has been uneven. In Uganda, post-1990s higher education expansion widened access but did not consistently translate into improved employability outcomes (Kibuuka, 2025).

Within this landscape, Kyambogo University holds a strategic mandate in vocational and technical education. Uganda's youthful demographic profile and persistent graduate underemployment (UBOS, 2023), alongside gender disparities in STEM and technical sectors (ILO, 2023), underscore the urgency of systemic reform. Aligned with the Uganda National Development Plan IV and broader global commitments to inclusive development (UNESCO, 2021; SDGs, 2019), this study argues that sustainable female graduate employment will emerge not from isolated placements but from integrated, gender-responsive innovation ecosystems capable of supporting long-term career progression and national economic transformation.

Methodology

This study adopted a qualitative case study design to examine how an innovation-oriented university industry ecosystem influences sustainable female graduate employment at Kyambogo University. I chose this design deliberately, not as a default methodological preference, but because the research questions I posed centred on relational dynamics, gendered experiences, and institutional practices demanded a mode of inquiry capable of reaching beneath surface-level employment statistics to the lived realities that numbers cannot adequately render. In line with Yin (2018), the case study structure enabled me to conduct an in-depth exploration of the feedback mechanisms, co-creation practices, and interdependencies among actors shaping employability outcomes at a single, bounded institutional site precisely the kind of contextual depth that placement-rate data systematically obscures.

Grounding the study in Innovation Ecosystems Theory further shaped my methodological orientation, as the theory foregrounds relational and systemic dynamics that are ill-served by variable-based quantitative designs. To understand how ecosystem actors co-produce or fail to co-produce conditions for female graduate employment, I needed to trace processes, not merely measure associations. In line with Kiguwa (2019), the qualitative approach enabled me to capture the gendered dimensions of institutional experience that remain not only underrepresented in quantitative employability research, but are

frequently rendered invisible by it including the informal exclusions, navigational labour, and structural negotiations that female graduates undertake within university industry relationships. What Kiguwa (2019), identifies as a gap in the broader literature, I encountered as a methodological imperative in the Kyambogo context. Thus, without a qualitative lens, the most consequential dynamics shaping female graduate outcomes would simply not have been reachable.

Participants, Sample Size and Compositional Logic

The study involved 62 participants: female students and recent graduates (n=28), university administrators (n=14), and industry partners (n=20), representing the innovation ecosystem of institution, labor market, and learners. Sample size was based on purposive adequacy, focusing on participants' ability to provide in-depth insights rather than statistical representativeness (Patton, 2015).

A purposive, criterion-based sampling strategy ensured each participant possessed the experiential authority and thematic relevance to address the research questions with credibility (Creswell & Creswell, 2017). Eligibility criteria were operationalised distinctly for each stakeholder category.

Female students and recent graduates qualified if enrolled in, or graduated within two years from, programmes aligned with Kyambogo University's vocational mandate, including Engineering Technology, Business and Management Sciences, Pure Sciences, Education, and ICT. Participants must have completed at least one industrial attachment to bridge academic and workplace experience. Penultimate and final-year students with ongoing attachments could participate if they discussed their fieldwork.

University administrators were selected based on direct governance responsibilities at the intersection of curriculum development, industrial liaison, and graduate outcomes. Eligible units included Academic Affairs, the Quality Assurance Directorate, the Industrial Training Coordination Unit, and Faculty Dean Offices. A minimum two-year tenure was required to ensure authoritative accounts of partnership dynamics and policy evolution.

Industry partners met two criteria: sector relevance and documented engagement with Kyambogo University, such as hosting interns, participating in curriculum consultations, or formalising partnerships. Organisations included Manufacturing and Engineering, Financial Services, Health Sciences, ICT, and NGOs. Each organisation designated a senior staff member responsible for graduate recruitment, workplace training, or internships, ensuring informed perspectives.

Where the identified participants were unavailable, alternates satisfying identical criteria were substituted. Snowball referral was employed for sectors with lower institutional visibility, subject to the same criterion-based verification applied to the primary sample.

Industry participants were purposefully drawn from five economic sectors selected for empirical relevance to Kyambogo's graduate output and analytical salience for examining gendered employment transitions. Manufacturing and Engineering was prioritised for its historical male dominance and structural significance as a destination for female engineering graduates, enabling examination of whether university-industry collaboration has shifted inclusion practices. Financial Services and Business was included for its growing absorption of female graduates alongside persistent gender stratification at leadership levels, offering analytical purchase on the disconnect between formal inclusion and substantive equity. Health and Allied Sciences, the primary destination for sciences graduates, was essential for assessing whether higher female workforce participation translates into meaningful gender-responsive practice. Information and Communication Technology was selected for its rapid growth trajectory and well-documented gender disparities in recruitment, with particular policy significance for national human capital strategy. The Non-Governmental and Development Sector, operating with explicit gender equity mandates, provided a productive counter-case for assessing whether institutional commitments to gender-responsive practice translate into differentiated graduate outcomes.

Data Collection, Methods, Instruments, and Protocol

Data were collected from 62 participants: 28 female students and recent graduates through five focus group discussions (FGDs), 14 university administrators and 20 industry partners through 34 in-

depth semi-structured interviews. The five FGDs ranged from 6, 6, 6 to 5, 5 participants per group, with female students and recent graduates separated into distinct groups. FGDs capitalised on peer interaction and collective recall, uniquely facilitating intersubjective validation of shared experiences (Kitzinger, 1995), and ranged from 75–105 minutes (mean = 88 minutes), reflecting the cumulative, dialogic character of group interaction where themes were contested across participants.

Individual semi-structured interviews were conducted with 14 university administrators, lasting 45–75 minutes (mean = 58 minutes), and 20 industry partners, lasting 40–70 minutes (mean = 54 minutes). Variability in duration reflected differential participant availability and thematic expansion. Interviews were selected for their ability to elicit depth and confidentiality in institutional policy and employer decision-making domains, where social desirability bias might suppress full disclosure in group settings.

Each interview was guided by a topic schedule developed iteratively from the theoretical framework and piloted with two eligible participants excluded from the main sample. The protocol addressed: governance architecture of university-industry partnerships; curriculum relevance and competency alignment; gender-sensitive employment and workplace inclusion practices; and structural and attitudinal barriers affecting female graduate transitions. Opening questions were deliberately broad and non-leading for industry partners: "Could you describe your organisation's engagement with Kyambogo University graduates?"; for administrators: "How would you characterise the current state of the University's partnerships with industry?"; and for students: "Could you share what your industrial attachment experience was like?" These broad openings invited participants to foreground salient dimensions before systematic probing addressed specific analytical concerns. The FGD protocol incorporated two vignette-based prompts to stimulate dialogue on topics participants might find difficult to initiate spontaneously, particularly gender-based discrimination.

All sessions were conducted in English, audio-recorded with prior consent, and transcribed verbatim. Detailed field notes capturing non-verbal cues and contextual observations were recorded within two hours of each session.

Data Analysis

All data were subjected to reflexive thematic analysis, following an iterative process of familiarisation, coding, theme generation, and interpretive consolidation (Braun & Clarke, 2022). Familiarisation was achieved through repeated engagement with the full transcript corpus alongside field notes. Initial codes were generated inductively, remaining close to participants' own language. A second coding pass applied a theoretically sensitised lens drawn from the conceptual framework of innovation ecosystems and gender equity. Candidate themes were generated by clustering related codes and assessing their coherence. Negative cases were treated as interpretively productive sites demanding deeper engagement.

Trustworthiness was evaluated through Lincoln and Guba's (1985) framework. Preliminary thematic summaries were shared with twelve participants drawn from all stakeholder categories. Participants reviewed summaries for accuracy and analytical fairness, yielding substantive refinements: two thematic labels were reworded to reflect participants' framings; one sub-theme was disaggregated following administrator feedback; and characterisation of industry partner attitudes was moderated following firm feedback on sectoral variation.

Methodological triangulation deployed interviews and focus groups, accessing qualitatively different registers of knowledge. Stakeholder triangulation included three participant categories; convergence strengthened analytical confidence while divergence illuminated structural interests shaping narratives. Documentary triangulation reviewed institutional documents, with discrepancies between documentary evidence and participant narratives illuminating gaps between formal policy and enacted practice.

A comprehensive audit trail comprising audio recordings, transcripts, field notes, the codebook, analytical memos, the reflexivity journal, and member-checking records was maintained and securely archived. Three peer debriefing sessions were conducted with a senior researcher external to the study, following initial coding, upon generation of the candidate thematic framework, and prior to finalising interpretive claims. Each session involved review of coded transcripts and analytical summaries followed by directed critical dialogue.

Saturation was monitored reflexively throughout fieldwork. Within the administrator sub-sample, saturation was observed after approximately the eleventh interview; within the industry sub-sample, after approximately the sixteenth; within the FGD sub-sample, following the fourth group discussion. Saturation is acknowledged as an interpretive judgement (Morse, 2015), documented in real-time through analytical memos recording code emergence and thematic stabilisation.

Ethical Considerations

Ethical clearance was obtained from Kyambogo University's Research Ethics Committee. Informed consent was secured from every participant, with each receiving a written information sheet detailing the study's aims, confidentiality arrangements, and participant rights. Participants were explicitly informed that involvement was voluntary, that refusal carried no consequence, and that consent could be withdrawn at any point. No financial incentives were offered.

Confidentiality was operationalised through systematic de-identification. All participants were assigned alphanumeric codes from FS01 to FS28, UA01–UA14, IP01–IP20 replacing personal identifiers in transcripts and all written outputs. Audio recordings were encrypted, stored on a password protected device accessible only to the principal researcher, and permanently deleted upon transcription completion. Organisational affiliations are reported only at sector level.

Particular ethical care was directed toward female student participants, whose institutional vulnerability demanded heightened safeguards. FGD moderators were trained in trauma-informed facilitation and protocols for responding to disclosures of gender-based discrimination. Participants making sensitive disclosures were provided information about institutional support services.

The researcher holds insider status within Ugandan higher education, possessing substantive familiarity with Kyambogo University's organisational culture. This proximity facilitated access and contextual interpretation but presented analytical risks, particularly normalisation which is the unreflective acceptance of institutional practices requiring critical scrutiny (Mercer, 2007). Student participants may also have perceived the researcher as institutionally aligned,

potentially moderating candour. To mitigate this, all FGDs were prefaced with a statement dissociating the researcher from any supervisory function. Where confidentiality concerns persisted, an external co-moderator unaffiliated with the University facilitated discussion.

The study's focus on gender equity, positions the researcher where analytical commitments and advocacy orientations may converge, risking over-privileging structural explanations. This risk was actively managed through deliberate engagement with disconfirming evidence and peer debriefing with a critical colleague positioned to challenge analytically over-determined framings. A reflexivity journal documenting evolving interpretations was maintained throughout.

Results

This section presents findings organised around four interlinked ecosystem dynamics that emerged from thematic analysis of in-depth interviews, focus group discussions (FGDs), and institutional records collected at Kyambogo University and its industry partners. Participant voices, supported by quantitative patterns from tracer data and programme records, are foregrounded throughout

A clear structural distinction emerged between departments that had institutionalised industry participation in curriculum development through joint committees, co-authored module specifications, and co-supervised capstone projects and those relying exclusively on occasional advisory board engagements. The former recorded higher proportions of female graduates transitioning into employment within six months of programme completion, while the latter exhibited persistent skills-mismatch complaints from employers and prolonged probationary adjustment periods for new hires.

Within co-design active departments, three recurring sub-patterns were documented: (i) iterative alignment of course content with evolving sectoral standards; (ii) integration of authentic tools, workflows, and real-case problem scenarios into formal assessments; and (iii) deliberate revision of assessment rubrics, group-work structures, and leadership opportunities to counter gendered hierarchies embedded in technical training environments.

The industry partners who took part in this study were candid about what their involvement actually looked like in practice. Rather than playing a supervisory or evaluative role, they described a working relationship with academic staff built around keeping course content current and relevant. As one engineering sector partner put it:

"We sit with the lecturers every semester not to inspect what they are doing but to update the specifications. If a new environmental standard has come in, it goes into the unit. We also flag where female interns struggle and suggest adjustments to how practical work is assessed."

This kind of active, iterative engagement appeared to make a tangible difference to the graduates these partners eventually hired. In the engineering sector FGD, fifteen out of eighteen industry participants said that involvement in curriculum design had improved the overall readiness of recruits. More tellingly, eleven of those fifteen drew a specific contrast between female graduates from co-designed programmes and those from departments that relied only on advisory boards — the former, they noted, needed considerably less technical induction before they could hit the ground running.

Female students echoed this from their own vantage point. What stood out for many of them was not simply that their training had been rigorous, but that it had felt genuinely connected to the world they were preparing to enter:

"The laboratory sessions were not just exercises. We were solving an actual client brief. When I got to my internship, I already knew the documentation process, the safety protocols, and even the software version they were using."

That sense of practical familiarity was widely shared. Among final-year Built Environment students, nine of the twelve participants in this FGD group said that working in shared simulation facilities and taking part in co-hosted innovation challenges had left them feeling ready rather than merely rehearsed by the time industrial placement began.

A contradictory finding also surfaced. In two departments with active co-design structures, female students reported that industry mentors predominantly male sometimes defaulted to directing complex

technical demonstrations toward male peers, subtly reproducing the hierarchies that co-design was supposed to dismantle.

This means that departments with formalised co-design structures consistently outperformed advisory-only departments on female employment transition metrics. However, gender-equitable outcomes within co-designed programmes depended critically on whether inclusion criteria were embedded in the facilitation of joint activities not merely in the formal curriculum document.

Across interviews and FGDs, participants framed mentorship, psychosocial support, and structural flexibility not as supplementary services but as decisive enablers of persistence and progression. Departments with formalised mentorship programmes and explicit gender-sensitivity protocols demonstrated stronger female retention rates in advanced technical courses and higher rates of transition into permanent employment within one year of graduation. Departments without such structures reported higher female dropout rates during industrial training, particularly among students with caregiving responsibilities or facing mobility-related safety concerns.

Something that came through powerfully in the data was how much a single mentoring relationship could shift a woman's entire sense of what was possible for her. For many female students, the barriers they perceived were not primarily academic they were imaginative. Seeing a woman occupying a role they had unconsciously assigned to men was often more transformative than any classroom intervention:

"Before I met my mentor, I thought the project management roles were for men. She showed me her site reports, her team rosters. I realised this was not biology. It was just who had been given the chance."

This was not an isolated reflection. Eleven of fourteen participants in the civil engineering focus group described mentorship as the single most consequential factor in their decision to pursue full-time technical employment after graduation ranking it above curriculum quality and placement opportunity combined.

Alongside mentorship, the physical and logistical conditions of industrial placement mattered enormously, especially for women

managing responsibilities beyond their studies. One student's account captured this with particular clarity:

"My internship site was two hours away. I had to leave at four in the morning to be there by eight. After two weeks, I was exhausted and nearly dropped out. When they offered me a closer placement, everything changed my performance improved, and I completed the capstone at distinction level."

Her experience was far from unique. In departments where, blended supervision models or geographically proximate placements were available, dropout rates during industrial training ran at roughly half the levels recorded in departments that applied rigid site-assignment policies. Flexibility, in other words, did not lower the bar it kept more women in the room long enough to clear it.

Yet the data also surfaced a tension that complicates an otherwise straightforward endorsement of female mentorship. Several participants spoke of feeling, beneath the inspiration, a quiet and unrelenting pressure in what they described as a kind of superwoman framing, born from mentors who appeared to navigate every challenge effortlessly and expected the same:

"My mentor is wonderful, but she never admits difficulty. She wants us to see that women can do it all. But sometimes I needed to hear that it is hard and that struggling is not failure."

Four of eight postgraduate participants in the technology management group named this explicitly a friction between the aspirational image their mentors projected and the emotional labour required to maintain it. What this points to is not a reason to reduce mentoring, but a reason to think more carefully about how it is practiced. The gender of the mentor matters less than the quality of the relationship and whether it makes space for honesty alongside ambition.

This therefore suggests that structured mentorship and flexible support pathways significantly strengthened female graduate employability. The data caution against essentialising female mentors as automatically gender-responsive; the quality, relational dynamics, and emotional safety of mentorship engagements are as determinative as their mere provision.

A distinguishing feature of high-performing university industry partnerships was the institutionalisation of structured and recurring feedback mechanisms. These included scheduled review forums, shared performance dashboards, gender-disaggregated tracer studies, and joint evaluation panels. Within ecosystems where such mechanisms were embedded, curriculum revisions were often implemented within a single academic cycle in response to employer input. By contrast, ecosystems that relied on informal consultations or largely ceremonial stakeholder engagements typically experienced revision delays of two or more years, a lag that frequently resulted in persistent skills mismatches between graduate preparation and workplace expectations.

Employers described the detailed nature of the feedback they provided through these formalised channels:

"We report on technical competencies, yes, but also on documentation standards, communication in multidisciplinary teams, and how graduates handle ambiguous briefs. These details go into the faculty industry panel, and the next cohort's assessments reflect them." (FGD, Employer Representative, ICT Sector)

Thirteen of the eighteen employer participants confirmed that the feedback they submitted had been reflected in observable curriculum adjustments within twelve months. Many described this responsiveness as unusual in university settings and noted that it strengthened their willingness to remain actively engaged in partnership processes.

Gender-disaggregated tracer data further revealed patterns that had remained invisible within aggregated graduate outcome statistics. As one programme coordinator explained:

"When we broke the data by sex, we found women were being hired but placed in administrative support roles not the technical posts their qualifications warranted. That conversation happened in the joint panel, and it changed how we designed the capstone exposure for the following year."

This account was corroborated by tracer study documentation reviewed during fieldwork. The records indicated a 23-percentage-point gap between male and female graduates' placement in core technical roles within the 2021 cohort a disparity that had not been visible in aggregate employment statistics.

At the same time, a contrasting pattern emerged concerning the limits of feedback loops when institutional resources were constrained. Several lecturers reported receiving clear and actionable employer feedback but lacking the internal support including staffing capacity, equipment, or streamlined programme approval processes necessary to implement changes within the same cycle. One academic staff member explained:

"The employer tells us they need project documentation training embedded in Year Two. We agree. But to change the unit, we go through validation that takes a year and a half. By then, the employer's need has evolved further."

Six of the ten faculty participants identified lengthy programme revision procedures as the primary bottleneck. Their accounts suggested that the effectiveness of feedback loops depends not only on the quality of employer input but also on the internal agility of university governance systems.

Overall, the findings indicate that institutionalised feedback mechanisms can support meaningful and gender-sensitive curriculum adaptation when they operate within flexible institutional governance structures. Where universities maintain rigid bureaucratic procedures for programme revision, however, these processes significantly limit the adaptive potential of otherwise well-functioning feedback systems.

Female Graduate Employment Outcomes within Ecosystem Partnerships

Female graduates who had been embedded in collaborative, gender-responsive ecosystems reported notably different employment trajectories from those who experienced conventional placement-only arrangements. Graduates from ecosystem-oriented programmes described higher levels of access to permanent and full-time employment, stronger alignment between their job roles and academic qualifications, and greater resilience against precarious forms of work. In contrast, graduates who had followed traditional placement pathways more frequently reported entering the labour market through temporary or non-degree-related positions and experiencing slower transitions into career-relevant roles.

Female graduates who had studied within ecosystem-embedded programmes described their advantage as cumulative, arising from

multiple interconnected experiences rather than a single opportunity. One participant explained:

"It was not one thing. It was the projects, the mentor, the industry visits, the fact that my lecturer knew the HR manager at the firm. These things built on each other. By the time I graduated, I had a professional identity, not just a certificate."

When invited to reflect on what distinguished their employment experience from peers in programmes without strong industry partnerships, ten of the twelve employed graduates in this group identified networks and professional visibility developed through ecosystem engagement as more decisive than technical competence alone.

A contrasting narrative emerged from graduates in programmes with limited industry engagement. One participant reflected on the challenges she encountered after graduation:

"I graduated with strong grades, but no one in industry knew me. My first job was data entry. Not because I was not qualified, but because I had no connection, no reference, no face that anyone recognised."

This account reflected a broader pattern. Seven of the nine graduates from non-partnership programmes reported beginning their careers in positions below their qualification level, illustrating the persistent "credential gap" between formal academic achievement and entry into appropriate professional roles.

At the same time, participants highlighted a contradictory pattern concerning access to ecosystem opportunities. Several female students observed that the benefits of industry engagement were not always evenly distributed among participants. Students who already possessed higher levels of social confidence or familiarity with professional environments appeared more able to leverage these opportunities. As one student explained:

"The students who benefited most from the industry links were already the confident ones. The shy ones, the ones from rural areas who did not know how to network — they were left behind even within the same programme."

This observation suggests that participation in university–industry ecosystems itself requires intentional equity-oriented support. Without

such scaffolding, ecosystem initiatives risk unintentionally reproducing existing social inequalities within programmes designed to expand opportunity.

Overall, the findings indicate that co-created, gender-responsive ecosystems generate significantly stronger employment pathways for female graduates than transactional placement models. However, inequities within these ecosystems — shaped by differences in social confidence, geographic background, and prior access to information — remain a persistent challenge. Addressing these disparities will require deliberate outreach and inclusive participation strategies to ensure that ecosystem benefits are accessible to all students.

Table 1. Gender-Responsive Innovation Ecosystem Mechanisms, Structural Constraints, and Employment Outcomes

Key Findings	Ecosystem Dimension	Implications for Female Graduate Employment	Employment Outcome	SDG Link
Active, structured industry involvement in joint curriculum committees and co-supervised capstone projects improves skills relevance, task readiness, and adaptive expertise; departments with formalised co-design recorded higher female transition rates within six months.	Curriculum Co-Design	Higher employability, narrowed experiential gap, reduced employer on-boarding costs, and qualitatively richer participation by female graduates.	Improved job degree alignment and smoother transition into full-time roles	SDG 8

Mentorship by female professionals disrupts stereotype threat and expands professional networks; flexible placement structures lower dropout during industrial training; institutional anti-discrimination protocols create psychological safety.	Gender-Responsive Support Structures	Increased retention in advanced technical courses, higher transition to permanent employment within one year, and strengthened social capital alongside human capital.	Enhanced professional identity, retention, and career progression	SDG 5
Institutionalised tracer studies, joint review panels, and shared performance dashboards enable gender-disaggregated diagnosis of workplace integration gaps and prompt single-cycle curriculum adjustment.	Continuous Feedback Loops	Shorter revision cycles, higher employer satisfaction, improved graduate absorption rates, and visible accountability for female graduates' post-graduation experiences.	Adaptive curriculum reform and more equitable employment trajectories	SDG 5 & 8
Shift from transactional placements to co-created, gender-responsive ecosystems generates permanent, full-time, skills-aligned employment and resilience against precarious work and wage disparities.	Ecosystem-Based Employment Pathways	Contributes to inclusive economic growth, aligns higher education outputs with Uganda's NDP IV, and repositions female graduate employment as both an equity and a productivity outcome.	More stable long-term employment pathways and reduced early-career attrition. Increased retention and improved access to permanent employment	SDG 8

Discussion

This section explores the four ecosystem dynamics revealed in our findings, connecting them to relevant theory and existing research. It also examines tensions that emerged, contradictions in the data, and outlines the study's original theoretical contribution.

Looking at co-collaboration as skills alignment, transition bridge, and gender responsiveness, finding revealed that formal curriculum co-design with industry partners leads to better employment outcomes for female graduates. This supports a growing body of work arguing that sustainable employability depends on structurally embedding labour market responsiveness within how universities govern themselves (Sumarsono et al., 2025; Khan & Patel, 2025). But this study does something more: it moves beyond the narrow instrumentalist view common in much university industry partnership literature which treats co-design mainly as a way to align skills and shows that co-design also works as a gender-corrective intervention in its own right.

The evidence that departments with formal co-design structures saw higher female employment transition rates within six months aligns with Mahalingam's (2024) and Jaiswal's (2023) work on adaptive expertise development in work integrated learning. The fact that employers reported lower on boarding costs and shorter probationary adjustment periods further backs up scholarship linking curriculum industry alignment with organizational productivity (Nykänen et al., 2022; Pryhodii, 2024).

What is more theoretically significant, though, is how the study documents co-design as a site of implicit gender politics. We found a contradiction worth sitting with even within formally co-designed programmes, because male visiting engineers still tended to direct complex demonstrations toward male students. This tells us that reforming curriculum governance structures does not automatically transform what happens in pedagogical practice. It echoes Charlesworth and Banaji's (2019) analysis of implicit bias operating through evaluative norms and micro-level interactional cues, while extending their argument into the specific context of co-designed technical education.

Theoretically, this challenges a common assumption in co-production scholarship that inclusive curriculum co-design naturally generates inclusive learning environments (McGrath, 2022; Lindsay et al., 2018). Instead, the study suggests that co-design is necessary but not sufficient for gender equity in technical education. It has to be paired with explicit inclusion criteria governing how joint activities are facilitated, not just what ends up in curriculum documents.

The finding that structured mentorship and flexible placement arrangements significantly boost female graduate employability aligns with a substantial evidence base on gender-responsive workforce development (Ojwala, 2024; U.N. Women, 2019). But this study adds two important distinctions. First, it shows mentorship operating simultaneously at professional, psychological, and network-building levels producing what the data describe as 'social capital alongside human capital.' This multidimensional account moves beyond binary framings where mentorship either works or does not work, toward a more textured understanding of when and how mentoring engagement generates durable career trajectories. The finding that visible anti-discrimination policies translated into increased classroom participation and more frequent applications for competitive internships suggests that psychological safety is not just a welfare consideration but a direct productivity and equity outcome which is a connection Khayatzadeh-Mahani et al. (2020) point toward but do not empirically flesh out.

Second, and more critically, the study's contradictory finding that mentorship by female professionals sometimes produced a *'superwoman framing'* that intensified rather than relieved emotional labour represents a meaningful contribution to feminist mentoring scholarship. The literature on role-modelling often assumes that gender concordance between mentor and mentee is straightforwardly beneficial (Ojwala, 2024). Our evidence complicates that because when aspirational role-modelling suppresses emotional authenticity and normalises denying difficulty, it may reproduce rather than subvert the affective demands historically placed on professional women. Future mentoring programme design should therefore specify not only who mentors, but how mentorship conversations are facilitated, and whether programmes create space for honest narration of difficulty alongside success.

The finding that flexible placement structures geographically proximate sites, adaptable scheduling, blended supervision, reduced dropout rates during industrial training without compromising performance standards directly challenges the implicit assumption in conventional placement policy that standardised, demanding conditions signal rigour. In line with universal design principles applied to workplace learning (Hiim, 2022), the study demonstrates that flexibility and quality are not in tension; they are positively correlated when flexibility is designed rather than improvised.

The finding that institutionalised, gender-disaggregated feedback mechanisms enabled single-cycle curriculum adaptation and surfaced otherwise invisible patterns of workplace integration disparity, supports Nalini et al.'s (2025) argument that ecosystems capable of integrating real time sectoral intelligence maintain stronger alignment with evolving productivity demands. The study's specific contribution lies in documenting how gender disaggregated tracer data transformed aggregate employment statistics into actionable institutional knowledge converting a 23-percentage point gap in technical role placement between male and female graduates from an invisible outcome into a catalyst for curriculum reform.

This carries significant implications for higher education monitoring and evaluation practice in Uganda and comparable contexts. Where national and institutional reporting frameworks rely on aggregate graduate employment rates, systematic gender equity gaps within employment outcomes remain concealed. The study argues that gender disaggregated outcome tracking is not an equity add-on but a data quality imperative that enables universities to diagnose and respond to labour market discrimination that would otherwise be attributed to individual graduate deficiency.

The contradictory finding that faculty acknowledged, employer-validated curriculum revision needs were routinely delayed by programme validation timelines extending eighteen months or more represents a structural finding with significant policy relevance. In the framework proposed by Calzada (2025) and Gorur and Wijetunga (2025), adaptive innovation ecosystems require institutional governance capable of cycling between sensing, interpreting, and responding.

Where programme validation bureaucracies operate on multi-year timescales, they systematically decouple the feedback loop's diagnostic function from its adaptive function, converting a learning mechanism into a documentation exercise. This study recommends that national quality assurance frameworks for higher education in Uganda explore expedited module revision pathways that preserve academic integrity while enabling responsive curriculum management.

The finding that female graduates embedded in collaborative, gender-responsive ecosystems accessed more permanent, skills-aligned, and decently-waged employment than those in conventional placement programmes substantiates the central claim of our conceptual framework that sustainable female graduate employment is an ecosystem output, not a placement outcome. This shifts the unit of policy analysis from the individual graduate whose employability is typically framed in terms of skills deficits to be remediated to the systemic arrangements through which employment opportunities are produced, allocated, and sustained.

The alignment of this finding with Beer and Mulder's (2020) evidence on sustainable employment, Alkaher and Gan's (2020) analysis of job-degree alignment, and Kabeer's (2021) broader framework connecting women's economic participation to structural enablers gives the study a theoretically grounded positioning across multiple intersecting research traditions. The contribution is not to any of these bodies individually, but to their convergence. The study demonstrates empirically that these mechanisms skills alignment, job matching, and structural enabling, operate as an integrated ecosystem dynamic rather than as separate, additive interventions.

The contradictory finding that ecosystem benefits were unevenly distributed concentrated among socially confident, informationally advantaged students even within partnership programmes is among the study's most practically significant contributions. It suggests that an equity focused ecosystem model must attend to intra programme stratification, not only to programme level gender gaps. Students from rural or low-income backgrounds, those less socialised into professional networking norms, and those carrying heavier domestic responsibilities outside formal study may experience the same institutional ecosystem very differently. Consistent with Pathania (2017) and Saluja's (2023)

analyses of the intersection between gender and socioeconomic positioning in labour market access, this study argues that gender-responsive ecosystem design must be contextualised within broader social stratification and that equity auditing of ecosystem participation, not only ecosystem outcomes, is a necessary institutional practice.

At the macro level, these findings align with Uganda's NDP IV targets on inclusive economic growth and gender equality, and advance SDG 5 and SDG 8 simultaneously. By demonstrating that gender responsive university industry ecosystems are not only equity mechanisms but productivity mechanisms reducing on boarding costs, improving graduate absorption, and strengthening long term talent pipelines. The study provides an economic rationale for gender responsive investment that complements the rights-based rationale predominant in gender equality policy discourse.

Theoretical Contribution

This study proposes the Gender-Responsive Innovation Ecosystem (GRIE) Model as a theoretical framework for understanding and designing sustainable female graduate employment in sub-Saharan African higher education contexts. The GRIE Model integrates three bodies of theory innovation ecosystem theory, gender-responsive employability scholarship, and co-production frameworks to advance a proposition that none addresses alone:

Sustainable female graduate employment is produced through the dynamic interaction of co-created curricula, gender-responsive institutional supports, adaptive feedback mechanisms, and equity conscious pathway architectures and is diminished when any of these elements' functions in isolation from the others.

The GRIE Model extends existing innovation ecosystem scholarship (Calzada, 2025; Gorur & Wijetunga, 2025) by foregrounding gender as a constitutive dimension of ecosystem performance, not a demographic variable appended to otherwise neutral institutional arrangements. It advances co-production frameworks (McGrath, 2022; Lindsay et al., 2018) by specifying the conditions under which co-production generates gender-equitable as opposed to merely technically relevant outcomes. And it extends gender-responsive employability scholarship (U.N.

Women, 2019; Kabeer, 2021) by embedding individual capability and aspiration within a systemic account of how institutional ecosystems produce, distribute, and sustain employment opportunity.

The model's distinctive contribution lies in its attention to what the data term ecosystem paradoxes. The documented cases in which formally progressive institutional arrangements co-designed curricula, female mentors, feedback-responsive programmes reproduce the very inequities they're designed to address, unless they're accompanied by deliberate equity conscious facilitation, intra-programme equity auditing, and governance agility. These paradoxes are not incidental to the model; they are constitutive of it. An ecosystem-based approach to female graduate employment must, by design, anticipate and create mechanisms to address the recursive production of inequality within its own structures.

Conclusion

Building gender-responsive university-industry ecosystems is imperative for unlocking the full potential of female graduates at Kyambogo University and across Uganda. Achieving sustainable employment necessitates a paradigm shift: moving beyond traditional internship placements toward co-creative, dynamic partnerships that embrace structural reform and gender-sensitive design.

The study concludes that sustainable female graduate employment at Kyambogo University is fundamentally anchored in structured co-collaboration between the university and industry. Where curriculum co-design was institutionalized through joint committees, shared facilities, and co-supervised projects, female graduates transitioned into employment more quickly and with greater confidence. The evidence demonstrates that co-creation does more than update course content; it embeds workplace realities into the learning process, narrows experiential gaps, and reduces employers on boarding burdens.

Importantly, co-designed programmes also disrupted masculinized norms within technical disciplines by revising assessment practices, diversifying mentorship, and broadening leadership opportunities. Thus, curriculum co-design functioned simultaneously

as a skills-alignment strategy, a transition-bridging mechanism, and a gender-corrective reform because durable employment outcomes were strongest where collaboration was systemic rather than symbolic.

Policy and Practice Implications for Universities

Universities should transition from placement centred employability strategies to ecosystem-based partnership models that institutionalise industry co-creation, continuous feedback, and gender responsiveness as governance principles rather than programmatic add-ons. Curriculum development policy must formally embed industry participation and mandate inclusion criteria within the facilitation not merely the content of joint activities, particularly in STEM and technical programmes.

Universities should mainstream gender-responsive employability frameworks encompassing structured mentorship, flexible learning to work pathways, and systematic gender disaggregated tracking of employment outcomes. Dedicated university industry coordination units, staffed with gender equity expertise, can strengthen feedback loops and enable adaptive curriculum reforms aligned with both labour market evolution and equity imperatives. Equity auditing of ecosystem participation not only ecosystem outcomes should be institutionalised as a standard quality assurance practice.

Policy and Practice for Industry

Industry partners should move beyond short-term internship provision toward co-investment in skills formation and inclusive workplace cultures. Co-design of curricula, structured mentorship by female professionals, and gender-sensitive recruitment and retention practices represent not only equity obligations but business-case investments that reduce on-boarding costs, improve workforce diversity, and strengthen long-term talent pipelines.

Industries benefit from adopting gender-inclusive performance evaluation frameworks—replacing subjective criteria that may embed implicit bias with transparent, competency-based assessment. Flexible work arrangements and clearly communicated career progression pathways that enable female graduates to transition into stable, decent employment constitute both ethical commitments and productivity-enhancing workforce strategies.

Alignment with SDG 5 and SDG 8

This study directly advances SDG 5 (Gender Equality) by demonstrating how gender-responsive university industry ecosystems reduce structural barriers, occupational segregation, discriminatory workplace norms, and constrained professional networks that limit women's labour market participation. By embedding mentorship, inclusive curricula, and institutional accountability mechanisms, the GRIE Model promotes equal access to skills development, employment, and career progression.

Simultaneously, the findings align with SDG 8 (Decent Work and Economic Growth). The shift from precarious placements to sustainable employment pathways characterised by job security, skills-job alignment, and long-term productivity positions gender-responsive ecosystem design as a national development strategy, not merely a welfare intervention. In Uganda's NDP IV context, the ecosystem model provides a coherent institutional framework for aligning higher education outputs with inclusive growth objectives and gender equality commitments.

Recommendations

The study advances four core pillars for integrating a Gender-Responsive University Industry Ecosystem into institutional practice at Kyambogo University and the broader Ugandan higher education sector:

Collaborative and Equitable Curriculum Development: There is need for active, ongoing engagement between industry experts, academic staff, and female graduate alumni to co-design curricula that are simultaneously labour-market relevant and gender-sensitive. Governance structures should mandate the representation of female industry professionals on curriculum committees and embed explicit inclusion criteria in protocols for facilitating joint activities.

Joint Investment in Inclusive Infrastructure: There is need to establish shared industry–university practical training facilities (e.g., engineering labs, ICT simulation hubs, agri-practice centres) with at least 40% female user representation per quarter, funded through a 50:50 cost-share model between the university and private sector partners. The lead responsible Actors should be the University Vice-Chancellor (Resource

Mobilisation) and Private Sector Foundation, University Estates and Infrastructure Department.

Comprehensive Gender-Sensitive Support Services: There is need to institutionalise a mentorship programme for female graduate trainees in selected pilot districts, achieving ≥75% participant satisfaction on relational dynamics (trust, communication, psychological safety) and ≥80% completion rate of 6-month mentorship cycles. The responsible actors should be the University Gender Mainstreaming Unit, Career Services Office, Alumni Relations, among others.

Equity-Audited Feedback and Adaptation Systems: National quality assurance frameworks should explore expedited module revision pathways, and institutions should establish gender-disaggregated tracer study systems as a standard data infrastructure, with findings formally linked to curriculum governance cycles and industry–university joint panels. E.g., Kyambogo University's Directorate of Quality Assurance should establish a gender-disaggregated graduate tracer system to track employment outcomes at 6, 12, and 24 months post-graduation. Indicators include annual tracer reports and increased female placement in degree-aligned employment

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