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Holistic framework in South African universities for enhancing graduate employability and entrepreneurship: A systematic review

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Orientation: This systematic review investigates global strategies to enhance graduate employability and entrepreneurship, with a focus on developing a holistic support framework for South African universities of technology.

Research purpose: The review addresses four research questions: the nature of support mechanisms, analytical methods employed, university strategies and contextual settings for employability and entrepreneurship initiatives.

Motivation for the study: The study addresses high unemployment rates and limited entrepreneurial participation among graduates in African contexts, highlighting the need for a comprehensive approach to enhance employability and entrepreneurship in technology universities.

Research design: The study adopts a systematic review design guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology, analysing 53 empirical studies from 2019 to 2025, sourced from Scopus, EBSCOhost and ScienceDirect databases through thematic analysis using NVivo software.

Approach and method: A qualitative approach is employed, using PRISMA-guided systematic review and thematic analysis in NVivo to synthesise data from 53 peer-reviewed studies.

Main findings: The findings reveal disparities in institutional capacity and resource availability, particularly in African contexts, in which graduates face high unemployment and limited entrepreneurial participation.

Practical/managerial implications: A proposed holistic support framework integrates curricular and extracurricular initiatives, interdepartmental collaboration and stakeholder engagement to address these gaps.

Contribution/value-add: The study presents a framework that offers practical implementation strategies and addresses resource constraints and stakeholder resistance, providing a scalable and contextually responsive blueprint for enhancing graduate outcomes.

Keywords: graduate employability; entrepreneurship education; holistic framework; systematic review; university strategies; South African universities; PRISMA methodology.

Introduction

There is an urge to reinforce the higher education institutions to adequately prepare graduates for employment and entrepreneurship to combat youth unemployment (African Union 2023; Agogbua & Nzewi 2022; Bodolica, Spraggon & Badi 2021; Kim, Serkova & Jonbekova 2024). Currently, the prevalence of unemployment among youth in Africa is relatively high (Musariwa & Tinonetsana 2023). This phenomenon has been identified in South Africa, where the youth unemployment rate was 63.9% for those aged 15–24 and 42.1% for those aged 25–34 years, while the current official national rate stands at 34.5% (Goddard 2025). The graduate workforce is constantly increasing, which leads to an oversupply of the labour market, and employers continue to raise concerns about two persistent issues: the limited skill sets of graduates and the insufficient number of professional posts available. This situation contributed to an unemployment rate of 11.5% among graduates in 2023 (MacGinty 2024).

Although South African universities have begun to evolve their systems in response, recent studies show that they still operate with fragmented employability structures, weak coordination, limited

industry partnerships and underdeveloped entrepreneurship development mechanisms (Ncube & Lekhanya 2025). These challenges are especially pronounced in universities of technology, in which practical training and industry alignment are central mandates. The absence of structured work-integrated learning (WIL) pipelines, inconsistent career development services and weak entrepreneurship ecosystems widens the gap between graduate capabilities and labour market expectations (Abelha et al. 2020; Hassan 2024; Hooley, Bennett & Knight 2023). These explicit gaps – fragmented institutional support, weak university–industry collaboration, curriculum misalignment and the lack of integrated entrepreneurship hubs – underscore the need for a coordinated, evidence-based framework tailored to South African realities.

Against this backdrop, the rationale for this study is to identify and synthesise the most effective employability and entrepreneurship interventions used in developed countries and translate them into a holistic model suitable for South African universities. Specifically, the systematic review reported in this study maps the existing nature of support mechanisms, evaluates methodological approaches used to assess graduate outcomes, reviews university-led initiatives and situates these practices within their empirical contexts. The review's findings informed the development of the proposed holistic student support framework. This paper ensures that each research question guides the systematic review, which aims to identify innovative strategies and frameworks for enhancing employment and entrepreneurship support systems at South African Universities of Technology. Consequently, the study examines:

- What is the nature of support provided by enhancing graduate employability and entrepreneurship skills?
- What methods have been used to analyse university graduates' employability and entrepreneurship, and to what extent do these methods capture both quantitative outcomes and qualitative experiences?
- What strategies do universities use to produce employable and entrepreneurial graduates?
- What are the specific contexts of employability and entrepreneurship in which universities have been empirically investigated?

This systematic review combines data from developed and emerging countries by using questions and UNESCO's (2020) and Uddin et al.'s (2022) suggestions for new higher education policies. These questions guide the extraction of data to create a strong model that fits different situations for improving job opportunities and entrepreneurship for graduates.

The following section provides comprehensive details of the research methodology, including a thorough explanation of the data-gathering and analysis techniques.

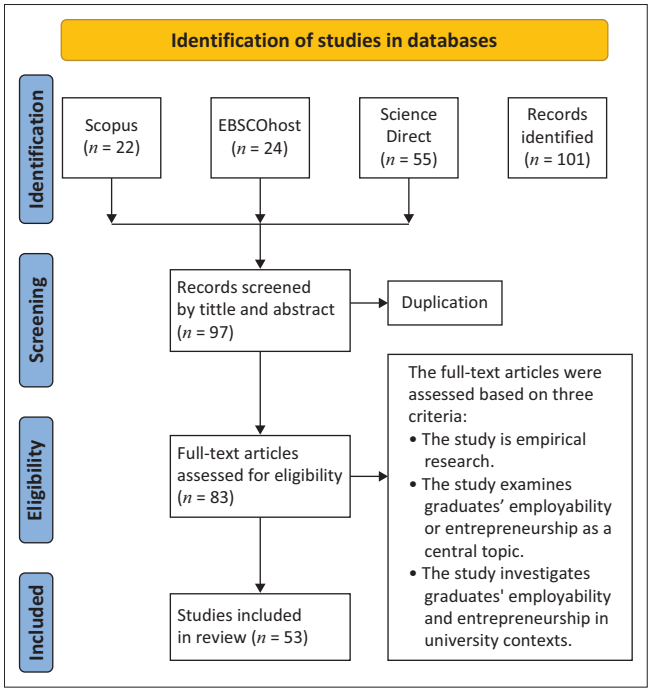
Research methods and design

Research methodology

This study is conducted by a systematic review, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) standards to ensure a transparent, rigorous and replicable review process. The PRISMA approach comprises three stages: doing a keyword database search (identification); applying academic filtration, manual screening and coding (screening); and employing snowball sampling to choose the final sample of articles for study (included) (Sarker & Bartok 2024; Venesz, Dőry & Raišienė 2022). Figure 1 displays a flowchart illustrating the process of searching and selecting.

Data sources and search strategies

A comprehensive search was conducted across three academic databases: Scopus, EBSCOhost and ScienceDirect. These databases were selected because they index high-quality, peer-reviewed journals that are accredited by the Department of Higher Education and Training (DHET) and widely recognised by international bodies such as the United Nations Educational, Scientific, and Cultural Organisation (UNESCO) and the Organisation for Economic Co-operation and Development (OECD) and aligned with the Sustainable Development Goals (SDGs). ScienceDirect covers studies on the social sciences and humanities. EBSCOhost shelters high-quality articles licensed from reputable publishers recognised by library professionals, and Scopus is a comprehensive, multidisciplinary and trusted academic database. Thorough the application of (Table 2), the search was limited to works published between January 2019 and March 2025, to capture recent developments in university-led employability and entrepreneurship support activities. The EndNote software was used to organise and track eligible studies for systematic analysis.



Source: Adapted from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement

FIGURE 1: Method of study selection.

'Graduates' employability' and 'entrepreneurship' strategies were gathered from reputable sources and published research. The initial search yielded 101 publications; the researcher established a protocol to select relevant studies, reducing the count to 97 journal articles after filtration. After the duplicates were removed, 83 articles were reviewed for relevance to graduates' employability and entrepreneurship support in universities. Consequently, 30 articles were excluded, leading to a final selection of 53 relevant studies for analysis, demonstrating consensus among the examined studies.

Finally, 53 full-text publications were retrieved and assessed for suitability based on three criteria: they must be empirical, focus on graduates' employability or entrepreneurship, and examine these aspects within academic settings. Publications not meeting at least one criterion were disqualified. Ultimately, 53 publications met the criteria for analysis (see Figure 1).

Data analysis and quality assurance

The coding process was conducted by using NVivo (version 15) to enhance rigour and transparency. After finalising our codebook through initial manual piloting, all 53 full-text articles were imported into NVivo as source documents. Codes defined and refined during the codebook development were created as 'nodes' in NVivo, and each document was systematically coded against these nodes. NVivo's query tools (e.g. text search and coding comparison) were then used for verifying coding consistency, uncovering co-occurrence patterns and ensuring that no relevant passages were overlooked. An export of the NVivo coding matrix provided a comprehensive audit trail of every coding decision, including source references and coding frequencies.

Bias was minimised through a multicoder, blinded approach. Documents were coded in a randomised order, and coders were 'blind' to author names and publication outlets. Intercoder reliability was assessed via NVivo's coding comparison feature, yielding a Cohen's κ of 0.82; discrepancies were discussed during consensus meetings and resolved by a third reviewer (co-author). All codebook revisions, adjudication notes and NVivo query outputs were logged to maintain an audit trail. Finally, a 20% subsample of NVivo-coded documents was rechecked by all authors against the original texts to confirm fidelity, and no systematic deviations were found, thereby underpinning the validity and reliability of our synthesis.

Limitations and strengths of Preferred Reporting Items for Systematic reviews and Meta-Analyses

This systematic review uses the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) approach to identify pertinent studies (Figure 1). The search criteria and databases were expanded to encompass the worldwide aspect of the following the research protocol depicted in Table 1. The search was confined to three databases recognised for their quality and commitment to science, to ensure the rigour and quality of the papers included in the review. The quality assurance of the selected papers was upheld through a comprehensive examination, yet this resulted in the selection of only 53 papers from six continents.

Ethical considerations

Ethical clearance to conduct this study was obtained from the Durban University of Technology Institutional Research Ethics Committee on 01 July 2025. The ethical clearance number is IREC 057/25.

Results

This section examines the various forms of support that universities in developed and developing nations employ to improve graduate employability and promote entrepreneurship. The analysis identified several key domains of support: curricular initiatives, extracurricular activities, university–industry collaborations, and institutional structures. The results show that there is no one-size-fits-all support system, pointing out that different institutions respond in various ways to help with employability and entrepreneurial growth.

TABLE 1: Steps for finding literature.

Research protocol	Description of details
Research databases	Scopus; EBSCOhost; ScienceDirect
Search box	Abstracts, titles and Keywords
Keywords used in the search	'Employability' AND 'higher education' AND 'developed countries' OR 'entrepreneurship education' AND 'OECD countries' OR 'industry partnerships' AND 'graduate employability' AND 'developed countries' OR 'graduate entrepreneurship' AND 'developing countries' AND 'university strategies' OR 'employability' AND 'higher education' AND 'developing countries' OR 'entrepreneurship support' AND 'Global South' OR 'industry partnerships' AND 'graduate employability' AND 'developing countries.'

Source: Tran, T.T.S., Nemeth, N. & Sarker, S.L., 2024, 'Digital marketing in community-based enterprises: A systematic literature review and research agenda', *Journal of Open Innovation: Technology, Market, and Complexity* 10(4), 100414. https://doi.org/10.1016/j.joitmc.2024.100414

TABLE 2: Inclusion and exclusion criteria.

Criteria	Inclusion	Exclusion
Academic filtration	Only journal articles.	Other than journal articles, such as systematic reviews, book chapters, conference papers, etc.
Language filtration	The articles were published in English.	The articles were not published in English.
Focus	The articles should examine the research focused on university-led graduates' employability and entrepreneurship support in developed and developing countries.	The articles' titles, abstracts and keywords are not related to the employability and entrepreneurship support provided to university-led and industry graduates.
Time frame	Published from January 2019 to March 2025.	Published before January 2019 and after 31 March 2025.
Document Type	The full-text articles were assessed based on three criteria, namely, the study: • Is empirical research. • Examines graduates' employability or entrepreneurship as a central topic. • Investigates graduates' employability and entrepreneurship in university and industry contexts.	Other than original articles, such as review papers, conference proceedings and book chapters.

The nature of support utilised in enhancing graduates' employability and entrepreneurship

The findings highlight the key domains utilised by universities in developed and developing countries. This helps to consider the various perspectives explaining the impacts of university support on graduates' employability and the context of entrepreneurship. Given the diversity of support, it can be concluded that the mechanisms for applying these supports are pretty fragmented. No single form of support dominates the research for popularity in academic papers. Table 3 illustrates the types of support that were cited as reasons for the research on graduates' employability and entrepreneurship support.

In the sample, the most frequently cited form of support for explaining how universities impact graduates' employability and entrepreneurship was the curriculum (n = 21). This curriculum approach accounts for 39% of the samples, and the 21 universities in our sample have implemented it only in developing countries. Curriculum transformation involves embedding employability support and integrating entrepreneurship education into the curriculum (Koseda et al. 2024; Oyinlola et al. 2024; Santos-Jaén et al. 2022). The second-most cited forms of support are extracurricular activities (n = 10) and university–industry collaboration (n = 9), and the universities are from developed countries and utilise extracurricular activities to enhance entrepreneurship competencies and employability skills (Bodolica et al. 2021; Surendran et al. 2023). Six studies from developing countries represented support structures, while four of the articles from these identified policy and institutional support as a means to promote employability skills and an entrepreneurial mindset (Al-Abri et al. 2024; Langseth, Jacobsen & Haugsbakken 2022; Ncanywa 2024). Lastly, two studies from developed countries emphasised community engagement (Medina-Bueno et al. 2025), while 3.3% of studies from developing countries addressed the resource provision necessary to support employability and entrepreneurship (Borah et al. 2021).

TABLE 3: Nature of support employed in graduates' employability and entrepreneurship.

Nature of support	Number of studies	Valuable studies
Curriculum	21	Damoah, Peprah and Brefo (2021), Moqokama and Van der Westhuizen (2024), Ubogu (2020), Dai and Pham (2024), Sierra-Huedo and Foucar (2022), Malika and Badr (2024), Rodrigues et al. (2024), Ouni and Boujelbene (2023), Lundqvist and Williams-Middleton (2024), Srivastava et al. (2025), Amalu et al. (2023), Uddin et al. (2022), Jackson (2024), Tiberius, Weyland and Mahto (2023), Feola, Crudele and Celenta (2024), Song and Lu (2024), Shen et al. (2025), Liu et al. (2025), Mirhabibi, Shayan and Sahraei (2025), Mustafa et al. (2023), Santos-Jaén, Iglesias-Sánchez and Jambrino-Maldonado (2022), Oyinlola et al. (2024), Khodeir and Nessim (2020).
Community engagement	1	Tam et al. (2024).
Extracurricular activities	10	Arranz, Arroyabe and De Arroyabe (2019), Khurumova and Pinto (2024), Alaref, Brodmann and Premand (2020), Da Costa & Miragaia (2024), Kim et al. (2024), Bodolica et al. (2021), Abreu and Grinevich (2024), Surendran et al. (2023), Kang and Xiong (2021), Pantaruk et al. (2025).
University–industry collaboration	9	Marijani et al. (2023), Husain et al. (2024), Al-Saadi et al. (2024), Al-Abri et al. (2024), Arthur and Koomson (2024), Borah, Malik and Massini (2021), Herbert et al. (2020), Patrício and Ferreira (2023), Arsenis et al. (2021), Agogbua and Nzewi (2022)
Support structures	6	Hooley et al. (2023), Chowdhury (2020), Panakaje et al. (2024), Chen, Zhang and Liu (2024).
Policy and institutional support	4	Joensuu-Salo, Peltonen and Hämäläinen (2023), Zheng and Zhang (2024), Koseda et al. (2024), Dal-Soto, De Souza and Benner (2021)
Resources provision	2	Okolie, Nwosu and Mlanga (2020) and Ramadani et al. (2022).

Source: Tran, T.T.S., Nemeth, N. & Sarker, S.L., 2024, 'Digital marketing in community-based enterprises: A systematic literature review and research agenda', *Journal of Open Innovation: Technology, Market, and Complexity* 10(4), 100414. https://doi.org/10.1016/j.joitmc.2024.100414

Methods and data collection procedures in university graduates' employability and entrepreneurship

Most research utilised quantitative methods, with 38 out of 53 studies employing exclusively quantitative designs, primarily through questionnaire surveys (n = 38). In contrast, a smaller group used secondary data (n = 13) for their analysis (Figure 2). The advantages of these methods include the ability to collect data from a large number of individuals, resulting in robust outcomes that can make broad assertions about graduates' job prospects and business success. Standard tools allow for easy comparisons across different situations and times, and statistical tests can help identify connections among factors (like how curricular support affects entrepreneurial intentions). However, they have drawbacks, as they heavily depend on self-reported answers, which can lead to biased responses (such as wanting to appear favourable), and they typically capture only a single point in time, making it challenging to determine cause and effect. Moreover, survey items may oversimplify complex phenomena, overlooking individual students' nuanced motivations and experiences.

In contrast, 17 studies employed qualitative methods, primarily using interviews (n = 22) and, to a lesser extent, focus groups (n = 7). The advantages of qualitative methods are that they can deeply explore and understand how students and stakeholders view employability and entrepreneurship support, as well as highlighting specific challenges, like those faced by female graduates in particular

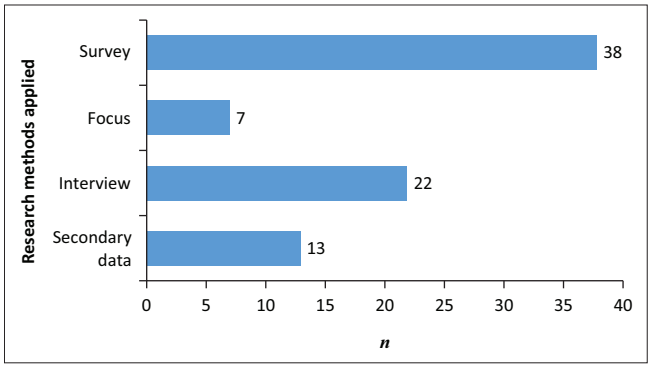


FIGURE 2: Data collection techniques used in university employability and entrepreneurship studies.

cultural settings. Rich textual data allow for the emergence of unanticipated themes and the generation of theory grounded in participants' lived experiences. However, smaller, often purposive samples limit these approaches by hindering broad generalisability. They also require significant interpretive skills from researchers and are vulnerable to subjectivity and potential confirmation biases during coding and analysis.

Mixed methods designs, employed by 17 papers, combine quantitative and qualitative data, offering benefits such as using different methods concurrently and enhancing result validation. For example, a survey might measure the effectiveness of standard mentorship programmes. At the same time, follow-up interviews elucidate how those programmes function in real-life scenarios and why they succeed or fail in various circumstances. Yet mixed methods studies encounter practical challenges: they require additional resources, time and expertise to design and integrate diverse data streams effectively. Balancing the rigour of each component and weaving them into coherent conclusions can be complex, and publication venues may favour one method over the other, leading to uneven reporting of methods and results.

Strategies universities use to promote employability and entrepreneurship among graduates in developing countries

Employability strategies in developed countries

Figure 3 displays data (frequently used words) organised in blocks. The larger block represents strategies primarily employed by universities in developed countries to prepare graduates for employment. The tree map provides a comprehensive view of how data from studies are categorised by the size of the reference.

The data presented here are drawn from studies on the strategies utilised to support graduates' employability in developed countries. Figure 3 illustrates the findings of the studies on strategies designed to enhance graduates'

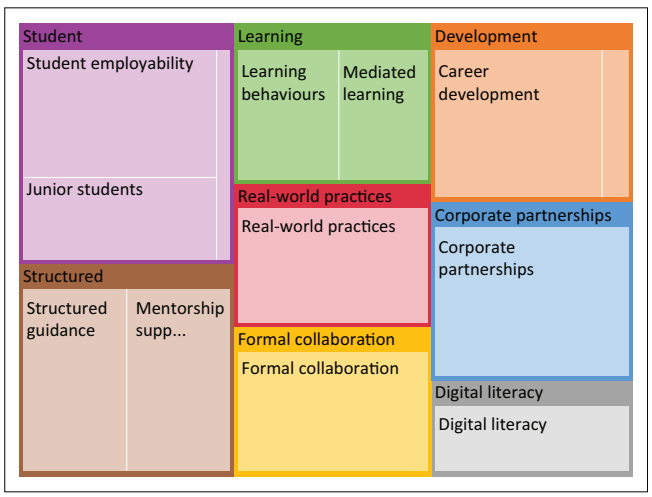


FIGURE 3: Strategies to support the employability of university graduates in developed countries.

employment prospects. The purpose of university education is not just to prepare students for their first job but also to develop the skills needed for lifelong participation in the labour market. The development of student employability skills is achieved through the effective implementation of support strategies that positively influence the employment trajectory of the students.

A review of 10 studies from developed countries identified various methods to enhance employment opportunities for graduates. Eleven references highlighted these strategies, resulting in a coding coverage of 3.47%.

Figure 3 presents a tree map illustrating the frequency of keywords, emphasising the prevalence of central themes, including student employability, learning, digital literacy, development, structure, real-world practice and cooperative partnership, which together indicate a comprehensive perspective on employability. Corporate partnerships emerged as the most frequently coded intervention, with a coverage of 0.63%. This underscores the importance of real-world engagement and the alignment between universities and industries in fostering workforce preparedness.

Numerous studies underscore the value of WIL through internships and practical experiences, which are vital for advancing vocational training and enhancing human capital. New career-oriented courses (0.44%) and dedicated career support offices offering psychological, vocational and social counselling (0.19%) were identified as crucial for bridging the gap between education and employment. The review emphasised the importance of mentorship, noting that students acquire knowledge through observing peers or seniors (0.10%). Additionally, the review highlighted the growing focus on digital skills, cultural awareness, resilience and intercultural learning programs, with each aspect representing between 0.09% and 0.06% of the findings. Collaboration between universities and student organisations contributed to the development of employability programmes tailored to students' needs.

Entrepreneurship support in developed countries

Figure 4 reflects the size of the codes about the support strategies for developing entrepreneurial skills in students attending universities in developed countries. The larger the size, the greater the concentration of studies focused on that strategy. The studies relevant to entrepreneurship support (Abreu & Grinevich 2024; Alaref et al. 2020; Arranz et al. 2019; Da Costa & Miragaia 2024; Feola et al. 2024; Joensuu-Salo et al. 2023; Kang and Xiong 2021; Khurumova & Pinto 2024; Lundqvist & Williams-Middleton 2024; Mustafa et al. 2023; Patrício & Ferreira 2023; Tam et al. 2024; Tiberius et al. 2023; Ver Steeg 2022) indicate that student entrepreneurship development represents a new way of thinking or a significant change that impacts the economic activity of graduates, rather than merely being an addition to existing academic systems.

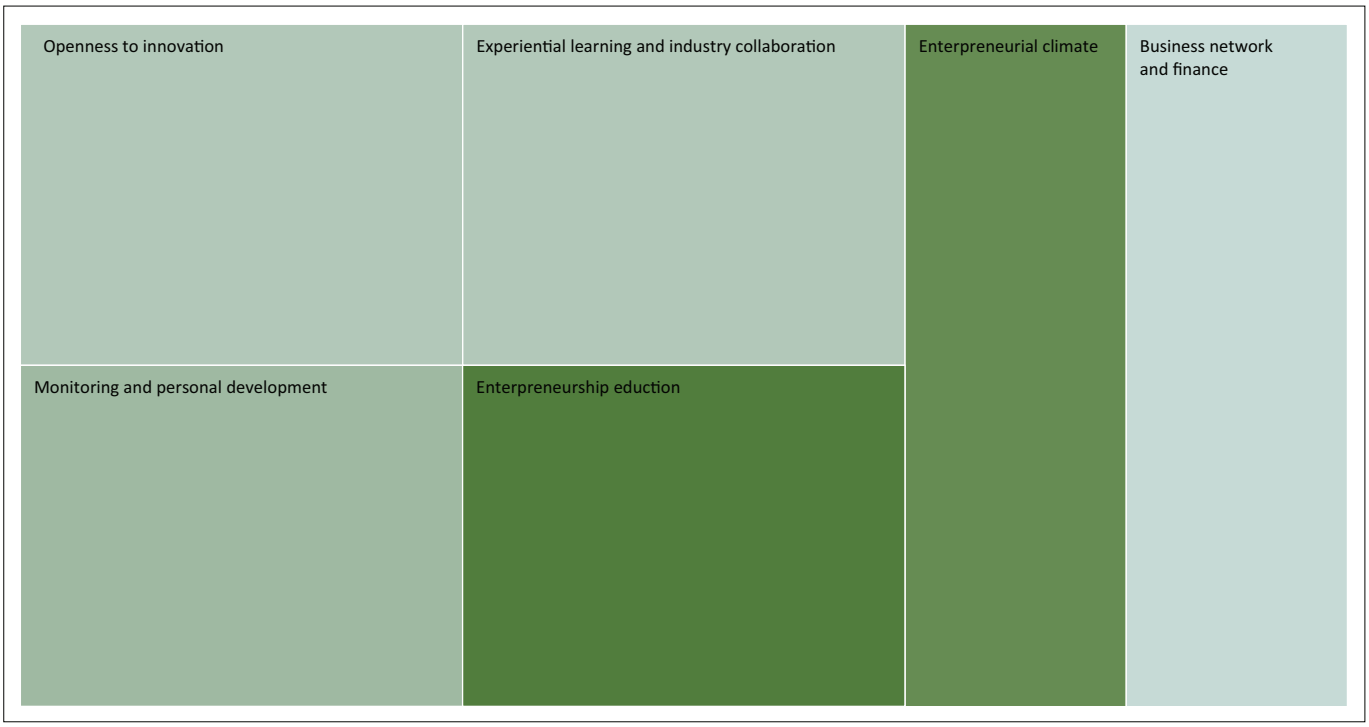


FIGURE 4: Entrepreneurship support strategies in developed countries.

Figure 4 illustrates the impressions of these studies regarding the measures employed by universities in developed countries to promote student entrepreneurship skills. Most studies identified entrepreneurship education, a supportive entrepreneurship climate and experiential learning as the most influential factors in encouraging entrepreneurship participation among students and graduates. The findings concur with the study of Ramadani et al. (2022), which suggests that leveraging resources is focal for graduates' entrepreneurship development.

The approaches used to develop students' entrepreneurship wisdom accounted for 7.81% of the total. Entrepreneurship education, delivered through courses and innovative teaching methods that support concept and business development, leads to venture creation (2.43% coverage). The entrepreneurship climate (2.1% coverage) is fostered through university policies and the establishment of Incubation and Entrepreneurship Offices that facilitate business training, coaching and social entrepreneurship programmes.

Progress checks and monitoring are strategies to encourage risk-taking, creativity, self-confidence, the ability to handle pressure, leadership and management skills, communication, teamwork and analytical and problem-solving abilities (0.85% coverage). Opportunities for business networks, including access to finance provided by banks (0.45% coverage), and the cultural aspect of entrepreneurship (0.57% coverage), also play important roles. Experiential learning and collaboration between industry and academia expose students to entrepreneurial experiences (54% coverage) involving various departments and stakeholders from the local entrepreneurial ecosystem. Lastly, the reference includes technical mechanisms for openness to new ideas (0.16% coverage).

Employability support strategies in developing countries

Figure 5 displays the main approaches resulting from the study's analysis. Universities in developing countries use these mechanisms to impart traits to students, which will make them employable. As depicted in Figure 5, strategies such as critical skills training, practical learning, partnerships between universities and employers, networking, mentorship, cultural funding and career support services effectively promote employment among graduates in developing countries.

The findings regarding enhancing graduates' employability accounted for 6% of the overall data. The Critical Skills Development (2% coverage) findings emphasise that educating students with the skill sets demanded by industries is of fundamental importance. Collaboration among universities, companies and governments, with a coverage rate of 0.69%, emphasises that soft skills such as communication, leadership, time management and problem-solving are essential for graduates' long-term employment success. Practical learning, which includes exposure to internships, WIL and experiential learning, accounted for 1.28% of the outcomes, effectively bridging the gap between theoretical knowledge and industry practice. These forms of exposure also foster graduates' confidence, accountability and professional networking, which are critical for successful transitions into the labour market. The research suggests that graduates participating in these activities are more equipped to meet employment needs, rendering them more appealing to prospective employers.

Networking emerges as a critical strategy that enables students to cultivate robust professional relationships

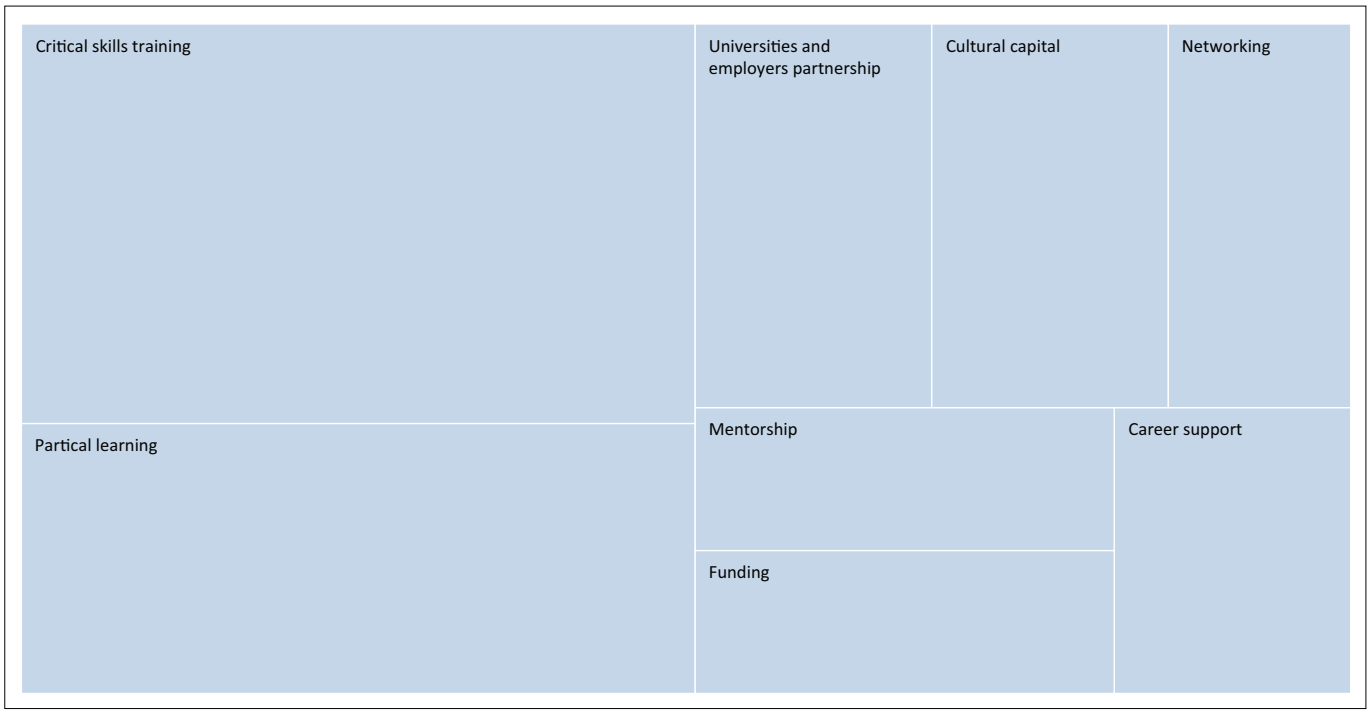


FIGURE 5: Employability support strategies in developing countries.

to enhance employability, assisted by alumni relations. Mentoring has a coverage rate of 0.12%, indicating that it has improved student confidence and provided career guidance. Cultural capital has a 0.45% coverage rate. Intercultural competence and digital skills are vital in the capabilities required for today's globalised labour market. Funding accounted for 0.9%. Access to financing and financial assistance is essential for students to acquire practical experience. Career services, with 0.10% coverage, facilitate formal career assistance. These services provide crucial assistance in career advancement and job placement, aiding students in transitioning from education to employment.

Entrepreneurship support strategies in developing countries

Millman and Li (2024) assert that student entrepreneurship cannot flourish in volatile business environments without the necessary expertise. The findings presented the relationship between entrepreneurship support and the graduates' entrepreneurship activities in developing countries. The findings classified entrepreneurial support into two overarching themes: entrepreneurship programmes and social skills learning.

Figure 6 presents the prominent initiatives universities use in developing countries to support graduates' entrepreneurship. These strategies are listed according to the order of frequency: Creative entrepreneurship programmes across universities were used to impart entrepreneurial knowledge, including financial literacy, strategic planning, resource mobilisation and team assemblies for students. The social entrepreneurship skills were instilled to encourage good entrepreneurship networking. Training on digital entrepreneurship was held to equip students with the practical skills necessary for business implementation. Moreover, extracurricular activities were indicated to increase individual students' entrepreneurship interests and activities.

Contexts for investigating university graduates' employability and entrepreneurship

Sectors for investigating graduate employability and entrepreneurship support research: The study included 53 articles on employability and entrepreneurship, focusing on university interventions. Understanding the sectors on which these studies are based was necessary. Amalu et al. (2023), Shen et al. (2025) and Marijani et al. (2023) pointed out that each industry has its own skills required for individuals to thrive in both entrepreneurial and employment contexts.

The analysis results illustrated that these phenomena were examined in multiple sectors within higher education and various contextual settings (Figure 7). Most reviewed studies on entrepreneurship support were in the higher education sector (n = 20), while n = 11 were published on developing countries and n = 9 on developed countries. Moreover, social entrepreneurship was the second dominant sector in which graduate entrepreneurship was examined, with n = 4 from developed countries and n = 2 from developing countries. Sport entrepreneurship was considered in developed countries (n = 1), while the agriculture sector had n = 1 from developing countries, and the technology sector (n = 2) was investigated in developing countries.

The sectors of articles on employability were analysed Figure 8. The findings revealed that employability support in universities of developing countries spans many sectors, while in developed countries, only a few sectors are

FIGURE 6: Entrepreneurship support strategies in developing countries.

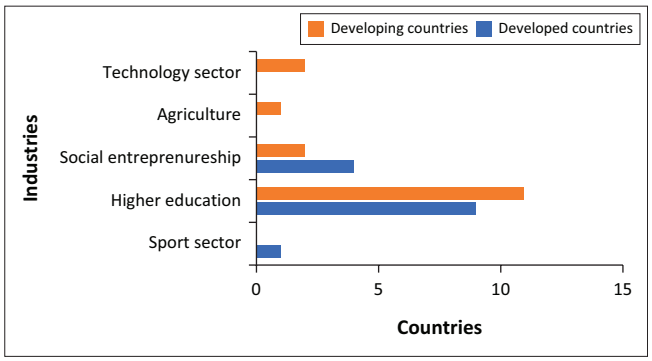


FIGURE 7: Context of sectors for investigating graduate entrepreneurship.

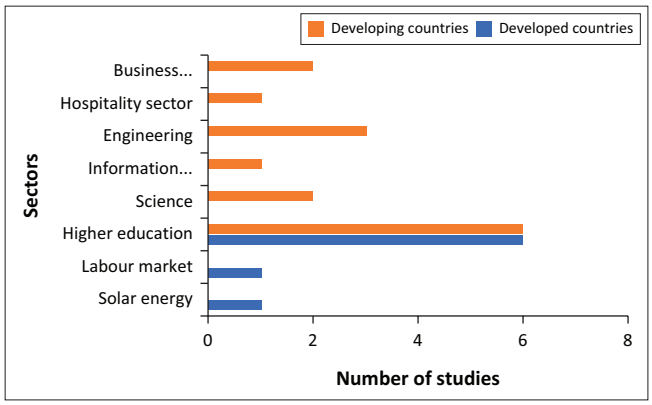


FIGURE 8: Context of sectors for investigating graduates' employability.

emphasised. Graduate employability is researched equally between developing countries (n = 6) and developed countries (n = 6). In developing countries, the second largest group of reviewed articles (n = 3) examined the engineering sector, n = 2 investigated the business administration sector, n = 1 focused on information technology, and n = 1 addressed the hospitality sector. In developed countries, the majority of studies (n = 2) examined the science sector, n = 1 focused on the solar energy sector, and n = 1 was on the labour market.

Continents analysed in graduate employability and entrepreneurship support research: The context of the studies was examined in the 53 evaluated articles. Due to the high number of studies that were discussed, the articles were further filtered down into continents to maintain an appealing visual presentation in the pie chart below. It was discovered that the studies covered a wide range of continents. Figure 9, presents the information regarding the leading continents in graduates' employability and entrepreneurship research.

Europe had the majority of these empirical studies, with 37% coverage. This section presents 20 articles from a total of 53 studies; the second continent with a significant number of studies was Asia, with 17 studies, accounting for 34.7% of the total studies analysed. Africa was the third continent, with 11 studies covering 22% of the sample. North America accounted for 4%, consisting of three studies, while South America had one study, and multicultural contexts had two studies, each representing 2%.

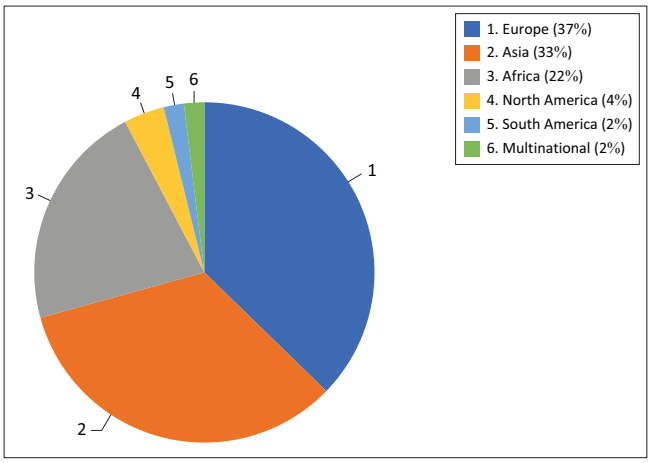


FIGURE 9: The dominant continents in graduate employability and entrepreneurship support studies.

The findings indicate that, in developing regions, the majority of the reviewed studies (39%, n = 21) focused on curriculum-based approaches to employability and entrepreneurship development, whereas in developed regions greater emphasis was placed on extracurricular activities (n = 10) and university–industry partnerships (n = 9). This divergence likely reflects differences in institutional capacity and resource endowments; universities in resource-constrained settings often lack the funding and external partnerships required to establish dedicated incubators or career centres and therefore embed employability and entrepreneurship competencies directly in formal curricula (Damoah et al. 2021; Ubogu 2020).

Conversely, institutions in developed countries benefit from more robust budgets and mature innovation ecosystems, enabling them to offer specialist extracurricular programmes such as hackathons, student competitions and industry-sponsored mentorship schemes, as evidenced in Spain and the United Arab Emirates (Arranz et al. 2019; Bodolica et al. 2021). National policy frameworks further accentuate these patterns: in high-income nations, UNESCO and OECD guidelines incentivise work-integrated learning and formal university–industry partnerships, whereas in many emerging economies, accreditation and funding mandates emphasise curricular reform as the primary quality-assurance lever (UNESCO 2020; Zheng & Zhang 2024). Finally, the prevailing educational traditions shape stakeholder expectations: in developing contexts, the classroom remains the central and legitimate site for skill development, making curricular interventions more culturally acceptable, while in many Western settings, extracurricular engagement is deeply embedded in the higher-education ethos (Da Costa & Miragaia 2024).

Analysis of the implications of fragmented support mechanisms

The reviewed studies reveal a striking diversity of support mechanisms, ranging from curriculum integration and extracurricular activities to industry partnerships and policy initiatives. However, they also indicate a lack of coherence and coordination across these approaches. No single form of support dominates: curricula account for roughly 39% of interventions, while extracurricular initiatives, university–industry collaborations, support structures, policy efforts, community engagement and resource provisions each occupy much smaller niches. This fragmentation suggests that universities often implement discrete, siloed programmes rather than a coordinated strategy, undermining potential synergies (e.g. embedding entrepreneurship courses alongside WIL and mentorship) and risking patchy student experiences.

Such fragmentation has significant methodological and evaluative implications. Because interventions are unevenly distributed across contexts, with curriculum-driven support in developing countries versus extracurricular and collaboration models in wealthier settings, it becomes difficult to compare outcomes or build cumulative evidence on 'what works' for graduate employability and entrepreneurship. Moreover, fragmented mechanisms may foster piecemeal data collection and reporting, complicating meta-analysis and hindering policymakers and practitioners from identifying best practices that are both scalable and adaptable across diverse institutional environments.

From a strategic standpoint, the observed fragmentation points to missed opportunities for holistic support. When career services, academic curricula, incubator centres and industry partnerships operate in isolation, universities risk duplicating their efforts, misallocating scarce resources and failing to engage key stakeholders collaboratively. This siloed approach is especially problematic for female graduates, who already face systemic barriers, as it limits tailored, wrap-around support that could bridge gaps among academic learning, professional networks and entrepreneurial ecosystems. Addressing these shortcomings requires moving beyond isolated interventions towards an integrated model, such as the holistic support framework proposed in this study, which aligns curricular, extracurricular, structural and stakeholder-driven initiatives into a coherent institutional strategy.

Such fragmentation has significant methodological and evaluative implications. Because support programmes vary significantly between different areas, developing countries focus on curriculum-based help. In contrast, richer countries use extracurricular activities and collaboration, making it hard to compare results or gather solid evidence on what improves graduate employability and entrepreneurship. Moreover, these fragmented arrangements can result in uneven documentation practices, complicating meta-analysis and hindering the ability of policymakers and practitioners to identify best practices that are both scalable and adaptable across diverse institutional environments.

From a strategic standpoint, the observed fragmentation points to missed opportunities for holistic support. When career services, academic curricula, incubation centres and industry partnerships operate in isolation, Arthur and Koomson (2024) argue that universities risk duplicating their efforts, misallocating scarce resources and failing to engage

key stakeholders collaboratively. This siloed approach is especially problematic for female graduates, who already face systemic barriers (Al-Saadi et al. 2024). According to Aldhaheri (2023), it limits tailored, wrap-around support that could bridge gaps among academic learning, professional networks and entrepreneurial ecosystems. Addressing these shortcomings requires moving beyond isolated interventions towards an integrated model, such as the holistic support framework proposed in this study, that aligns curricular, extracurricular, structural and stakeholder-driven initiatives into a coherent institutional strategy.

Proposed model of graduate employability and entrepreneurship

This study's findings indicate that higher education institutions across various global contexts have adopted various best practices to enhance graduate employability and foster entrepreneurial capabilities. However, these practices often appear fragmented in the literature. Moqokama and Van der Westhuizen (2024) argued that many institutions concentrate exclusively on either employability skills development or entrepreneurial education, rather than adopting an integrated, systemic approach. In response, this section proposes a holistic framework displayed in (Figure 10) that brings together these elements in a cohesive model to guide universities in designing effective, contextually responsive interventions.

Foundations of the holistic support framework

The proposed framework draws from empirical evidence and established practices observed in both developed and developing countries, reflecting contextual differences across Europe, Asia and Africa. European institutions are noted for their structured and institutionalised employability systems (Guerrero, Heaton & Urbano 2020; Succi & Canovi 2019), while Asian universities demonstrate a strong emphasis on digital innovation and government-backed entrepreneurial initiatives (Khan et al. 2024; Song & Lu 2024). In contrast, African institutions often focus on grassroots entrepreneurship and internship expansion (Shenkoya, Hwang & Sung 2023).

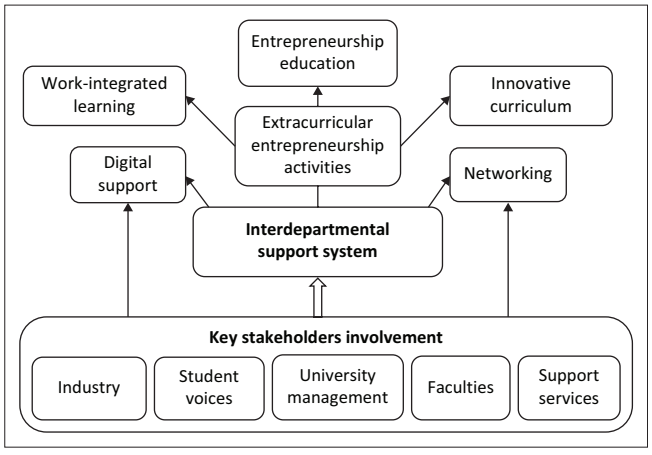


FIGURE 10: Holistic support framework.

This framework addresses the gap raised by UNESCO (2020) and Srivastava et al. (2025) when arguing that there is inequality in students' development strategies between developed and developing countries. This model intertwines the best practices from these economies into one structure that guides universities when developing their graduates. The main idea of this model is to create a comprehensive system that involves different departments and incorporates input from various stakeholders. This system aligns with the research of Shen et al. (2025) and Santos-Jaén et al. (2022), as it is designed to prepare graduates with the skills, experiences and connections they need to succeed in a rapidly evolving, knowledge-driven economy. The model integrates institutional strategies, academic programming and stakeholder collaboration to provide all-encompassing support for graduate development.

Components of the proposed framework

Entrepreneurship education

Entrepreneurial education is a foundational pillar that empowers students with the knowledge, mindset and competencies necessary for venture creation and innovation. Studies emphasise that effective entrepreneurship education fosters risk-taking, creativity and resilience among students (Eesley & Lee 2020; Guerrero et al. 2020; Jackson 2024; Khan et al. 2024; Towers et al. 2020).

Entrepreneurship incubators and extracurricular support

Incubators and accelerators within universities play a vital role in offering technical support, mentorship, access to funding and real-world experience to aspiring entrepreneurs (Bazan et al. 2020; Shenkoya et al. 2023; Wagner et al. 2021; Wenninger 2019). These initiatives support the practical application of entrepreneurial education.

Networking, mentorship and student competitions

Building social capital through mentorship and professional networks is critical in facilitating career and entrepreneurial advancement. University-organised competitions, networking events and structured mentorship programmes significantly enhance students' exposure to real-world opportunities and industry connections (Bazan et al. 2020; Lu, Song & Pan 2021; Pardo-Garcia & Barac 2020; Wagner et al. 2021).

Engagement with key stakeholders

Universities must actively collaborate with industry partners, government bodies, alumni and internal units to design responsive curricula and support systems. Stakeholder involvement ensures that graduate training aligns with the current labour market and entrepreneurial demands (Ma'dan, Imail & Daud 2020; Okolie et al. 2020; Underdahl et al. 2023).

Curricular and extracurricular initiatives

An innovative and interdisciplinary curriculum complemented by well-structured extracurricular activities promotes the

development of both hard and soft skills essential for graduate success (Mirhabibi et al. 2025; Pouratashi & Zamani 2019; Succi & Canovi 2019; Underdahl et al. 2023).

Work-integrated learning

Work-integrated learning, such as internships, industry projects and cooperative education programmes, offers students real-world experience and facilitates a smoother transition into the labour market (Arsenis, Flores & Petropoulou 2021; Mitchell et al. 2021).

Career planning and development workshops

Structured career services, including workshops, career fairs and personalised coaching, are essential for helping students understand their career paths and develop action plans aligned with their skills and aspirations (Al-Abri et al. 2024; Mitchell et al. 2021).

Structural components of the framework

The framework consists of two interconnected structural components:

Interdepartmental support system

This system encourages collaboration across multiple university departments, including career services, academic faculties, entrepreneurship centres and external relations units. The approach is aligned with the Panakaje et al. (2024) study, which advocates for supportive policies to be enhanced to reduce silo-operative behaviour among stakeholders.

Stakeholder integration mechanism

Meaningful engagement with key stakeholders is essential for enhancing the relevance and impact of university interventions. Stakeholders include:

- Industry representatives.
- University leadership and faculty.
- Student bodies and alumni.
- Government and funding agencies.
- Innovation ecosystems and incubators.

By fostering synergies among these entities, the framework advocates a multi-stakeholder approach that prioritises both employment and entrepreneurial competencies, thereby enhancing the versatility and agency of graduates in increasingly uncertain labour markets.

Practical implementation and potential challenges of the proposed framework

The proposed framework directly addresses the identified gaps and challenges by integrating various support mechanisms into a cohesive model. This integration is crucial for overcoming the fragmentation observed in current practices. The framework aligns curricular, extracurricular, structural and stakeholder-driven initiatives, ensuring that all aspects of graduate support are interconnected and mutually reinforcing.

Curricular and extracurricular integration

The framework emphasises embedding employability and entrepreneurship education in the curriculum. This approach connects with Chowdhury (2020), who found that students' participation in extracurricular activities is lower and that they prioritise their involvement in the educational curriculum. The framework addresses the gap in which some students might miss out on essential skills as a result of limited access to extracurricular programmes by infusing these components into the core academic experience. Additionally, the inclusion of extracurricular activities such as incubators, accelerators and student competitions provides practical, hands-on experiences that complement theoretical knowledge. This dual approach helps bridge the gap between academic learning and real-world application, enhancing students' readiness for both employment and entrepreneurial ventures.

Stakeholder engagement and structural components

Moreover, the framework advocates for active collaboration with industry partners, government bodies, alumni and internal university units. This multi-stakeholder approach ensures that the support provided is relevant to current market demands and leverages external expertise and resources. The framework addresses the challenge of aligning academic programmes with industry needs and across different university departments and external entities by fostering these partnerships. This holistic structure mitigates the risk of isolated interventions and ensures that all support mechanisms are aligned and coordinated. The framework's structural components, such as interdepartmental support systems and stakeholder integration mechanisms, promote coordination and continuous work synergistically. Furthermore, the framework is designed to be adaptable to various institutional and cultural contexts. By drawing on best practices from developed and developing countries, the framework provides a flexible model that can be tailored to specific regional needs and constraints. This adaptability tackles the challenge of implementing a uniform approach in diverse educational environments.

Practical implementation and potential challenges

Implementing the proposed holistic support framework involves several practical steps and considerations. Successful implementation requires a strong commitment from university leadership. Institutions must prioritise employability and entrepreneurship as core components of their strategic plans and allocate sufficient resources to support these initiatives. Pantaruk et al. (2025) argue that establishing effective interdepartmental collaboration is crucial. Husain et al. (2024) point out that universities need to create platforms for regular communication and coordination among different stakeholders, such as career services, academic faculties and entrepreneurship centres. This collaboration ensures that all support mechanisms are

aligned and mutually reinforcing, and building and maintaining partnerships with industry, government and alumni is essential (Herbert et al. 2020). Universities should establish formal agreements and regular engagement activities to ensure that these partnerships are productive and sustainable. This policy may involve creating advisory boards, hosting industry events and facilitating internships and mentorship programmes. Integrating employability and entrepreneurship education into the curriculum requires careful planning and design. Dal-Soto et al. (2021) contend that universities should establish clear metrics for success and regularly collect data on student outcomes. This data can inform continuous improvement efforts and demonstrate the impact of the support mechanisms.

However, implementing the framework may encounter several challenges. Resource constraints are a significant concern, particularly for universities in developing countries. Creative solutions such as leveraging technology and forming strategic partnerships can help mitigate these constraints. Introducing new initiatives may encounter resistance from faculty, students or other stakeholders who are accustomed to traditional approaches. Effective communication and change management strategies are essential to address this resistance and build buy-in for the new framework. While the framework is designed to be adaptable, scaling it across different departments and campuses can be complex. Universities need to pilot the framework in specific areas, gather feedback and make necessary adjustments before full-scale implementation. Ensuring the long-term sustainability of the framework requires ongoing commitment and investment. Universities must continuously seek funding opportunities, engage stakeholders and adapt to changing market demands to maintain the relevance and effectiveness of the support mechanisms. By addressing these practical considerations and potential challenges, universities can effectively implement the holistic support framework, enhancing graduate employability and entrepreneurship in alignment with global best practices and local needs.

Discussion

This study examines the most effective strategies worldwide for helping graduates secure jobs and establish businesses. However, a closer examination of the research reveals that the results can vary significantly in their depth, longevity and practicality. Many studies focus on short-term benefits, such as improved job prospects or a desire to start a business, without examining whether these benefits persist after graduation. Critically, the findings emphasise short-term impacts, such as improved perceptions of employability or entrepreneurial intentions, without assessing whether these gains persist or decline post-graduation. For instance, Alaref et al. (2020) conducted a rare 4-year follow-up of Tunisian graduates, revealing that early entrepreneurial activity fostered by university training quickly declined. Dai and Pham (2024) argue that the lack of long-term self-employment or venture sustainability was attributed to inadequate access to financing and weak post-training support systems. This underscores a critical gap in intervention design: entrepreneurship education, while necessary, is insufficient unless combined with structural enablers such as financial access, alumni networks and postgraduate mentorship.

Similarly, Rodrigues et al. (2024) found that employability is not a static condition acquired at graduation but rather a dynamic, evolving capability that requires sustained development. The longitudinal research by Sierra-Huedo and Foucart (2022) demonstrated that perceived employability may decline over time, particularly among graduates facing intersectional challenges like gender or ethnic disadvantage. Although internships and coaching are widely endorsed, the study critiques institutions for failing to tailor support to students' post-graduation contexts, thus limiting long-term career success. These findings reveal the need for universities to provide extended, personalised employability services that span beyond the academic calendar and account for real-world barriers.

In contrast, Tiberius et al. (2023) and Malika and Badr (2024) offer a more optimistic outlook, suggesting that structured MBA programmes with integrated entrepreneurial content can foster durable outcomes, such as increased business creation and entrepreneurial mindset development. Yet, this study also notes that long-term success is often bolstered not solely by curriculum design but also by informal factors, such as alumni networks and institutional prestige, which may not be replicable in less-resourced institutions. Consequently, there remains a question of scalability and equity in entrepreneurship education, particularly when evaluating its impact across varying socio-economic contexts.

The study by Zhu, Wang and Eesley (2019) also raises concerns about the unintended consequences of entrepreneurship education. Their findings suggest that some programmes, rather than empowering students, may lead to disillusionment by revealing structural limitations and personal constraints, thus reducing students' entrepreneurial intentions. Khodeir and Nessim (2020) made a critique of 'one-size-fits-all' pedagogies and underscored the importance of aligning educational interventions with students' socio-cultural realities and psychological readiness.

Taken together, these studies highlight that while interventions may generate promising short-term results, their long-term efficacy remains under-evaluated and highly contingent on contextual factors. Few interventions explicitly track graduates beyond the first year of employment or venture creation, and even fewer incorporate alumni feedback loops to inform iterative programme improvements. Pantaruk et al. (2025) suggest that sustained impact depends not only on individual skills acquisition but also on

ecosystem-level factors, such as mentorship, access to capital and institutional support structures that continue beyond graduation. Therefore, future policy and programmatic efforts must move towards longitudinal, ecosystem-based approaches that connect curricular interventions with post-graduation realities and enduring forms of support.

Conclusion

This study has addressed the research gap by developing and presenting a comprehensive and systematic synthesis of global strategies that enhance graduate employability and entrepreneurship. The findings confirm that while considerable efforts exist across the higher education landscape, there is a notable fragmentation and lack of integration between employability and entrepreneurship interventions. These results therefore underscore the need for a holistic and integrated support framework, firmly grounded in empirical evidence, to coherently align and strengthen institutional responses to graduate employability and entrepreneurial development.

The proposed framework not only bridges theoretical gaps but also provides a practical model for institutional implementation. It underscores the necessity of moving beyond isolated interventions towards a systemic approach that incorporates curricular, extracurricular, structural and stakeholder-driven initiatives. The central argument is that universities must cultivate environments in which graduates are equipped not just for employment but also for innovation, adaptability and self-directed enterprise.

Ultimately, the framework advances a strategic and actionable path for universities to enhance graduate outcomes and contribute meaningfully to national development goals, including SDG 8 (Decent Work and Economic Growth) and SDG 4 (Quality Education). In doing so, the framework lays a foundation for the operationalisation of student support structures that are contextually informed, evidence-based and future-ready.

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CRediT authorship contribution

Hlanganani S. Shange: Conceptualisation, Investigation, Project administration, Validation, Visualisation, Writing – original draft. Luther-King Jnr. Zogli: Methodology, Writing – original draft, Writing – review & editing. Bongani I. Dlamini: Funding acquisition, Resources, Supervision, Writing – original draft. All authors reviewed the article, contributed to the discussion of results, approved the final version for submission and publication, and take responsibility for the integrity of its findings.

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Data availability

The authors confirm that the data supporting this study and its findings are available within the article and its listed references.

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