






Investigating the efficacy of university-led business incubators on graduate unemployment



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Orientation: Graduate unemployment remains a significant socio-economic issue in South Africa, despite the growth of higher education. University-led business incubators (ULBIs) have emerged as tools to foster entrepreneurship and reduce unemployment among graduates.

Research purpose: This study examines the effectiveness of ULBIs in tackling graduate unemployment by pinpointing structural, strategic and institutional obstacles that affect their functionality within South Africa's higher education fraternity.

Motivation for the study: With youth unemployment remaining high at 46.1% in early 2025, it is crucial to assess the effectiveness of university incubation frameworks in converting academic knowledge into feasible entrepreneurial results that support national development objectives.

Research design, approach and method: A qualitative secondary data methodology was utilised through a systematic thematic analysis of academic literature, institutional reports, and incubator documentation for the period 2019 to 2025. Four example cases, University of Cape Town (UCT) Solution Space, Stellenbosch LaunchLab, University of Pretoria (UP) TuksNovation, and UMP CFERI were employed for triangulation within an institutional theory framework.

Main findings: The examination highlights five persistent limitations: inconsistent institutional missions, financial constraints, weak connections with industries, undeveloped entrepreneurial attitudes and inadequate scalability after incubation. These difficulties primarily arise from inflexible structures and cultural norms within universities.

Practical/managerial implications: Universities must incorporate incubation into their plans, establish in-house seed funds, strengthen ties with industry, and implement effective monitoring and evaluation.

Contribution/value-add: The study highlights the impact of institutional factors on incubator performance and provides evidence-based suggestions to enhance graduate entrepreneurship.

Keywords: graduate unemployment; university-led business incubators; institutional theory; entrepreneurship; South Africa.

Introduction

The growth of higher education in South Africa has not resulted in a corresponding increase in job opportunities for new graduates, leading to a continuous structural challenge of graduate unemployment. Statistics South Africa indicates that youth unemployment (ages 15–34 years old) hit 46.1% in the first quarter of 2025, highlighting the importance of institutional measures designed to promote graduate employability and entrepreneurship (StatsSA 2025). University-led business incubators (ULBIs) have emerged as a policy and institutional tool aimed at closing the gap between universities and the labour market by providing infrastructure, guidance and connections to the market. Although they are spreading quickly, evidence from South African universities indicates diversity in goals, available resources and integration within the ecosystem, which subsequently affects the results of incubators. This study evaluates the structural, strategic and institutional barriers that hinder the effectiveness of ULBIs and suggests evidence-based policy and institutional changes to enhance employment results for graduates. According to O'Brien and Cooney (2025), the growing disconnect between academic qualifications and labour market integration has intensified calls for higher education institutions to be more proactive in fostering entrepreneurship and economic inclusion.

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Numerous South African universities have implemented business incubation to address graduate unemployment and encourage entrepreneurial initiatives (Enebe et al. 2025). According to Jones, Meckel and Taylor (2021), business incubators led by universities aim to support entrepreneurs who are students or recent graduates by offering physical infrastructure, mentorship, initial funding and business development services. These incubators aim to foster the development of innovative, scalable businesses that offer livelihoods for their creators and help in wider job creation (Ravichandran & Dixit 2024). This aligns with the 2030 vision of the National Development Plan (NDP), emphasising youth empowerment and innovation-led growth as essential cornerstones for South Africa's development trajectory.

The increase of the entrepreneurial university model in South Africa indicates a change in the perception of higher education institutions, evolving past their traditional functions of teaching and research to become proactive players in socio-economic transformation (Iwara & Kilonzo 2022). Nonetheless, despite the increase in university incubation initiatives, there is rising concern that their effect on graduate unemployment continues to be minimal (Hassan 2024). Numerous initiatives encounter ongoing difficulties, including insufficient industry collaborations, restricted scalability for supported start-ups, and a deficiency in continuous support after incubation (Inamdar & Afroze 2025). Additionally, research by Klutse (2024) highlights the fact that student entrepreneurs frequently have difficulty managing their academic duties alongside the challenges of business growth, resulting in diminished dedication and decreased survival rates for their businesses.

Research by Musendekwa (2025) emphasises that university incubators in South Africa frequently function in isolation, experiencing minimal collaboration among institutions and sectors. It identifies problems such as limited access to venture capital, a shortage of skilled mentors and insufficient incorporation of entrepreneurial education into academic programmes.

These obstacles bring about doubts about the sustained effectiveness of university-run incubators as answers to structural unemployment (Hassan et al. 2024). In light of this context, the proposed research seeks to examine the effectiveness of university-run business incubators in tackling graduate unemployment in South Africa. The main goal is to investigate the difficulties these incubators face in fostering sustainable entrepreneurship among graduates. Despite the increasing body of literature on university entrepreneurship worldwide, a significant research gap persists in South Africa, especially regarding the assessment of incubators' operations within the country's distinct socio-economic and institutional context. This research aims to address that gap and provide evidence-driven insights to guide more effective, inclusive and adaptive incubation models that align with South Africa's developmental objectives.

The article is structured as follows: the next section presents a review of the literature, followed by the research methodology applied in the study. Then follows the findings with discussion. The final section offers policy recommendations derived from the study's findings.

Literature review

The literature review combines current studies on University-Led Business Incubators (UBIs) in relation to the broader concern of graduate unemployment. It thoroughly examines theoretical viewpoints, especially institutional theory, along with empirical evidence from developed and developing economies. The review highlights the structural, cultural and policy-related elements impacting UBI effectiveness by mapping both global and South African research. This part also emphasises gaps in knowledge, methodological constraints in previous research and the distinct context of the South African higher education and job market environment.

Theoretical foundations

Institutional theory as an analytical insight

Institutional theory offers a valuable lens to help examine the underlying structures and constraints shaping the effectiveness of university-led incubators. The theory focuses on how formal and informal rules, norms and organisational structures influence behaviour and outcomes within institutions (eds. Greenwood et al. 2011; Scott 2001). Regarding UBIs, institutional theory illuminates how universities, as established institutions, function within broader regulatory, cognitive and normative frameworks that can both facilitate and limit entrepreneurial activities.

The main idea in institutional theory is institutional isomorphism, which indicates that organisations often align with accepted norms and practices in their industry (eds. Greenwood et al. 2011). In the case of UBIs, this could lead to a duplication of academic criteria that emphasise theoretical understanding rather than entrepreneurial activity, which diminishes the effectiveness of these incubators. Likewise, institutional logics (Thornton, Ocasio & Lounsbury 2012) emphasise how conflicting priorities, like the clash between academic objectives and entrepreneurial results, can lead to organisational stagnation, hindering innovation.

Institutional settings similarly influence resource access, decision-making behaviours and legitimacy. For example, universities often lack institutional incentives to prioritise entrepreneurship unless mandated by policy or supported by funding (Bruton, Ahlstrom & Li 2010). This can limit the extent to which UBIs can forge industry partnerships or attract venture capital. Furthermore, the theory allows us to explore how social expectations within academic institutions can affect the behaviours of graduate entrepreneurs and incubator staff.

In conclusion, the institutional theory is the most appropriate theoretical foundation for this study because it captures the structural and cultural dynamics that limit incubator effectiveness. It enables the researcher to explore what challenges exist, why they persist and how institutional pressures within and outside the university shape incubator strategies and graduate outcomes. This theory offers a vital framework to reveal concealed limitations underlying apparent operational problems.

Empirical insights from the literature

Structural and strategic limitations of university incubators

University-led business incubators are increasingly seen as essential for promoting graduate entrepreneurship and tackling unemployment. However, structural and strategic constraints frequently hinder their efficiency. In the context of South Africa, Urban and Seely (2023) emphasise that numerous universities find it challenging to move from conventional academic roles to entrepreneurial ones, leading to insufficient assistance for academic spin-offs. This is additionally worsened by bureaucratic regulations and insufficient institutional backing, which obstruct the commercialisation of research results. Similarly, Lose (2021) notes that a lack of a distinct strategic vision and the misalignment between university aims and incubator objectives lead to the poor performance of ULBIs. Additionally, the misalignment between academic programmes and entrepreneurial initiatives restricts students' practical engagement with actual business difficulties.

The structural inefficiencies present in ULBIs are not limited to just South Africa. In a wider African framework, Lose (2021) highlights the need for established business incubation structures integrated into national innovation systems. These frameworks ought to aid in aligning incubator aims with national economic objectives, thus boosting their strategic importance. Additionally, Schwab (2015) indicates that sub-Saharan Africa's competitiveness is hindered by fragile institutional frameworks, impacting the effectiveness of business incubators. This highlights the significance of strong institutional structures that facilitate the strategic goals of ULBIs.

Strategic constraints also appear as insufficient involvement of stakeholders. Hausberg and Korreck (2021) highlight the fact that the absence of cooperation among universities, industry and governmental bodies leads to disjointed support structures for incubatees. Such fragmentation results in redundant efforts and ineffective use of resources, reducing the effectiveness of incubation programmes. Moreover, the lack of performance tracking and assessment systems in ULBIs hinders ongoing enhancement and responsibility (Lose 2021). Tackling these strategic deficiencies requires a united effort to cultivate cooperative partnerships and establish strong monitoring systems.

Access to finance and capital constraints

Access to financing remains a significant hurdle for graduate entrepreneurs in ULBIs, particularly in developing nations. Onyekwelu et al. (2023) highlight the fact that entrepreneurial institutions in Nigeria are crucial for enabling access to microfinancing, which is necessary for business sustainability. Similarly, Ganamotse et al. (2017) highlight the fact that business incubators in Botswana, Namibia and Uganda play a crucial role in helping resource mobilisation for emerging enterprises. However, they frequently encounter difficulties in obtaining sufficient financial support. The lack of a unified policy framework for entrepreneurship among universities in South Africa obstructs the fair application of support systems, which further restricts financial access for incubates (Ebewo, Schultz & Mmako 2025).

Gender inequalities further intensify financial limitations in ULBIs. Färber and Klein (2021) examine European start-ups and discover that ventures founded by women obtain considerably less funding than those led by men, highlighting an enduring gender bias in initial financing. Chen et al. (2025) delve deeper into this matter, indicating that female entrepreneurs encounter significant funding obstacles, frequently stemming from challenges in relocation and restricted networking options. In the South African context, Simatele, M. & Kabange, M., (2022) investigate how intersectional factors, including age, gender, and race, impact financial access, revealing that women and minority entrepreneurs face greater challenges in securing funding.

The structural setup of ULBIs does not frequently include the essential tools to connect entrepreneurs with possible investors. Makai and Döry (2023) indicate that the perceived support and atmosphere of a university greatly affect students' entrepreneurial aspirations, suggesting that increased institutional assistance can improve access to funding. Nevertheless, the lack of cohesive support systems in universities frequently results in disjointed initiatives to help start-ups. Govender and Van der Lingen (2024) analyse innovation initiatives in both the food sector and higher education, observing that university incubators often lack the flexibility and market-focused strategies needed to draw in and keep investors.

Weak industry linkages and ecosystem disconnection

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Graduate entrepreneurial mindset and commitment challenges

Developing an entrepreneurial mindset in university graduates is crucial for the effectiveness of ULBIs. Nonetheless, various obstacles hinder this progress, such as curriculum restrictions, resource shortages and socio-cultural influences. Bodolica and Spraggon (2021) highlight the fact that innovation centres at universities can promote entrepreneurial aspirations by incorporating hands-on experiences like contests and workshops into the educational curriculum. Meanwhile, Makai and Döry (2023) emphasise that the perceived support and atmosphere of a university significantly influence students' entrepreneurial intentions, indicating that institutional support is vital. Additionally, the teachers' credentials and the pertinence of course material serve as intermediaries in improving students' problem-solving abilities, crucial for entrepreneurship (Mittal & Raghuraman 2021).

Resource limitations present another major difficulty. Makgeledisa (2021) emphasises that in resource-constrained settings, fostering a growth mindset and building professional networks are vital for enhancing entrepreneurial skills. Moreover, Thetsane, Tilo and Mosoeunyane (2024) highlight the fact that delays in funding distribution and infrastructure shortages are major obstacles for incubatees, potentially impeding the advancement of entrepreneurial knowledge and dedication. Socio-cultural influences, such as gender prejudices and societal norms, significantly affect graduates' entrepreneurial dedication. Petrescu and Suci (2024) highlight the fact that cultural prejudices and gender bias continue, restricting opportunities and equality for women in business. This is supported by findings showing that businesses led by women obtain an unfairly low share of venture capital funding, underscoring systemic obstacles (Brush & Elam 2024). Tackling these socio-cultural obstacles through awareness, education and policy reforms is crucial to guarantee equitable treatment and opportunities for all budding entrepreneurs.

Challenges in the scalability and sustainability of graduate startups

The main challenge for university incubators is that the startups they assist seldom grow beyond initial development phases. Research shows that numerous incubated ventures depend on university subsidies and struggle to evolve into self-sustaining business models (Barbero et al. 2012). Graduates frequently have limited experience in handling growth, and incubators might not have the resources or connections to assist startups with scaling difficulties. Moreover, the challenge of 'graduation without advancement' affects numerous ULBIs. Startups exit the incubator without obtaining additional funding or collaborations, resulting in ultimate stagnation or shutdown (Siegel & Wright 2015). Restricted interactions with venture capitalists, angel investors and growth-stage guidance exacerbate this problem. ULBIs might also lack performance measures that monitor startups after the incubation phase, leading to inadequate accountability and diminished institutional learning (Bergek & Norrman 2008).

Research methods and design

This section describes the research methodology used to evaluate the influence of university-run business incubators on tackling graduate unemployment. It describes the research framework, sampling strategy, data collection methods and analysis techniques, justifying their efficacy in achieving the research objectives. The methodological choices are grounded in the study's theoretical framework and the practical difficulties of acquiring trustworthy data in the South African context.

Research design and rationale

This study uses a qualitative secondary-data approach, implemented via a systematic thematic synthesis of scholarly literature, governmental and institutional reports, along with publicly accessible incubator documentation released from 2019 to 2025. The choice to utilise secondary analysis is supported by three reasons: (1) the availability of a significant and current body of evaluative research on incubators and entrepreneurship policy in South Africa and similar settings; (2) the practical limitations of gathering primary data within the deadline for conference submission and (3) the appropriateness of secondary sources for theory-driven, policy-focused analysis (Johnston 2017; Long-Sutehall, Sque & Addington-Hall 2011). To address reviewer concerns and enhance empirical grounding, the study incorporates carefully chosen illustrative cases: one research-focused solution hub (University of Cape Town Solution Space), one technology and rapid incubator (University of Pretoria Business Incubator or TuksNovation), one sectoral accelerator with industry collaboration (Stellenbosch LaunchLab), and one regional university incubator (University of Mpumalanga CFERI) sourced from institutional websites, annual reports and press

releases. These cases serve as triangulation anchors for the thematic synthesis instead of being independent case studies with original data collection. The study relies entirely on secondary data sources, so no ethical clearance was required, in line with institutional research ethics guidelines.

Justification for methodological choice

Secondary analysis is suitable for this study because of:

- **Accessibility to High-Quality: Data** The study utilises established peer-reviewed studies and credible institutional documents, guaranteeing data trustworthiness while avoiding the limitations linked to gathering primary data.
- **Scope of Perspective:** Including results from various studies allows for analysis of UBIs in diverse policy, cultural and economic environments.
- **Time Efficiency:** The approach facilitates prompt delivery of evidence-based insights by avoiding the lengthy duration typically needed for primary fieldwork.
- **Relevance to Policy and Practice:** Merging recent studies guarantees that conclusions are rooted in present socio-economic conditions (post 2019), while thoughtfully including previous significant studies when essential.

Research question

This research was guided by the central question: *What are the key limitations and challenges facing ULBIs in effectively supporting graduate entrepreneurship and employment?*

The question guides the systemic choice, assessment and analysis of the secondary sources.

Data sources and criteria for selection

Sources were located through organised searches of academic databases, institutional repositories, government websites and incubator platforms. Inclusion criteria mandated: (1) significance to university incubation or postgraduate entrepreneurship; (2) publication date ranging from 2019 to 2025 (older studies deemed relevant only if they are foundational) and (3) content that is evaluative or empirical. Documents from UCT Solution Space, UPBI, TuksNovation, LaunchLab, and the University of Mpumalanga Centre for Entrepreneurship Rapid Incubator (UMP CFERI) were examined for triangulation to gather information on KPIs, missions, activities and performance indicators.

Data evaluation

The evaluation of sources associated with Johnston's (2017) six-stage framework for analysing secondary data:

- **Clarification of aim:** Framing the study's aim in the context of graduate unemployment and university incubation.
- **Credibility assessment:** Ensuring the credibility of the original data sources, including peer-reviewed journals and reputable institutional reports.

- **Thematic limitation:** Analysing the kind of data collected to confirm their consistency with themes like entrepreneurial ecosystems, university support frameworks and sustainability of start-ups.
- **Timeframe limitations:** Selecting sources by their publication dates, limiting inclusion to newer works (after 2014) unless essential foundational legislation or significant reports are involved.
- **Methodological rigour assessment:** Evaluating the data-collection techniques of original research to determine rigour.
- **Triangulation:** Validating results through comparison among various studies to improve consistency and confirm the reliability of interpretations.

Analytical procedure

Text from various sources was analysed to highlight recurring themes, including incubator goals, governance structures, funding sources, industry collaborations, post-incubation assistance and assessment and evaluation. These topics were subsequently associated with institutional theory, emphasising regulatory, normative, and cultural-cognitive components (Scott 2001; Thornton et al. 2012). Results were compared among various sources to enhance validity. The study acknowledges its limitations, particularly the dependence on secondary data and the absence of primary interviews and explicitly outlines the extent of its assertions given these restrictions.

Methodological rigour and limitations

The methodical use of Johnston's framework improves internal validity, while depending on trustworthy secondary and institutional sources bolsters external validity. However, the study is constrained by its reliance on the quality of original studies and the lack of primary work. These risks are reduced by employing multi-source triangulation, clear inclusion criteria and consistency with a cohesive theoretical framework.

Contribution of methods

In contrast to earlier South African research on university-driven incubation, which depended on descriptive policy analyses or singular case studies, this study enhances the field methodologically in two respects. Firstly, it methodically utilises Johnston's (2017) secondary-analysis framework to guarantee transparency and rigour in data selection, evaluation and synthesis. Secondly, it incorporates triangulation through deliberately selected institutional anchors (UCT Solution Space, UPBI/TuksNovation, Stellenbosch LaunchLab, and UMP CFERI), which improves empirical validity without exaggerating the assertions of primary case-study research. The combined focus on methodological precision and a triangulated institutional context creates a model that can be replicated for future research on the intersection of higher education, entrepreneurship ecosystems and outcomes in the graduate job market.

Ethical considerations

This study used secondary data gathered from publicly available academic literature, institutional reports and official documents. As there was no primary data collection with human participants, ethical clearance was not necessary. The study presented no threat of harm to people or organisations and followed the ethical standards of academic honesty, proper referencing and accountable data handling.

Results

This part outlines the results from the desktop research on the effectiveness of ULBIs in tackling graduate unemployment. Based on an extensive array of academic articles, policy documents and case analyses from both national and global contexts, the results emphasise the main challenges and opportunities affecting the efficiency of ULBIs.

Strategic and structural limitations

Findings summary: University-led business incubators face challenges because of structural rigidity, bureaucratic obstacles and a misalignment between academic objectives and entrepreneurial ambitions (Hausberg & Korreck 2021; Urban & Seely 2023).

Institutional theory and literature: Institutional theory describes these challenges as results of institutional isomorphism, where universities duplicate conventional academic standards, thus opposing entrepreneurial change (eds. Greenwood et al. 2011). In line with the work of Lose (2021), this structural inflexibility arises from deeply embedded academic cultures that favour research over commercial applications. Worldwide, comparable inefficiencies exist, indicating a deficiency in stakeholder alignment and strategic foresight (Sharma & Soederberg 2020).

Interpretation: These difficulties are not merely operational but also involve normative and cultural-cognitive aspects: established academic values and professional identities clash with entrepreneurial reasoning (Thornton et al. 2012). In terms of the institutional theory, structural persistence represents a normative lock-in issue, where academic standards diminish entrepreneurial motivation.

Recommendations: The following recommendations are presented:

- Incorporate business incubation into university-wide strategic objectives.
- Create internal motivations that correspond with entrepreneurial results.
- Encourage entrepreneurial leadership across faculties to transform institutional culture.

Capital constraints and access to finance

Findings summary: Research shows that graduate entrepreneurs encounter challenges in obtaining capital and

opportunities because of fragmented financial systems, bribery issues and gender inequalities (Färber & Klein 2021; Ganamotse et al. 2017).

Institutional theory and literature: Scott (2001) indicates that restricted financial access shows the presence of regulatory institutional obstacles and an absence of legitimacy assigned to entrepreneurship as a fundamental university role. Chen et al. (2025) and Onyekwelu et al. (2023) emphasised in their work how socio-political constraints, such as gender biases and weak policy coordination, worsen financing gaps. The lack of national entrepreneurship frameworks mirrors this institutional weakness.

Interpretation: These obstacles are institutional rather than simply market-driven. They indicate a lack of regulation and legitimacy: in the absence of university-operated seed funds and established investor collaborations, incubatees encounter persistent liquidity and credibility challenges (Bruton et al. 2010; Scott 2001).

Recommendations: The following recommendations are presented:

- Create university-level seed funds for early-stage start-ups.
- Develop gender-sensitive funding schemes.
- Strengthen the links between incubators and public or private investment bodies.

Ecosystem disconnection and industry linkages

Findings summary: Research indicates that ULBIs frequently function independently of industry and government environments, hindering the commercialisation and expansion of student-led enterprises (Govender & Van der Lingen 2024).

Institutional theory and literature: These results indicate a divergence in institutional logics; universities adhere to academic principles, whereas the industry is driven by market principles, leading to a misalignment in expectations and collaboration among institutions (Thornton et al. 2012). According to Leal, Leal and Silva (2023), the scholars argue for ecosystem-wide stakeholder integration; meanwhile, Yuan et al. (2021) also emphasise the importance of infrastructure and human capital as key to bridging academia and industry.

Interpretation: The gap arises from normative and cognitive discord: varying institutional logics create distrust and restrict collaboration. From the viewpoint of the institutional theory, without regulatory incentives for cooperation, universities do not function as bridging institutions within the innovation framework.

Recommendations: The following recommendations are presented:

- Form strategic partnerships with industry and government.
- Develop joint research-commercialisation pipelines.
- Institutionalise university roles within national innovation systems.

Entrepreneurial mindset and graduate commitment

Findings summary: Scholars have discussed and indicated that curriculum deficiencies, lack of experiential learning and socio-cultural barriers impede the development of entrepreneurial mindsets (Bodolica & Spraggon 2021; Makgeledisa 2021).

Institutional theory and literature: The institutional theory reveals that cultural-cognitive constraints deeply held beliefs about the role of universities, impede reforms needed for mindset transformation. Makai and Döry (2023) and Petrescu and Suciu (2024) stress the importance of institutional support and gender inclusivity in shaping entrepreneurial intent.

Interpretation: The concern is cultural-cognitive: entrenched convictions regarding the functions of universities hinder entrepreneurship. Institutional theory indicates that curricular reforms will be merely symbolic rather than transformative unless there is normative change and cultural reframing.

Recommendations: Based on the above, we recommend:

- Introduce experiential entrepreneurship education across disciplines.
- Provide tailored mentorship and coaching.
- Implement gender awareness and cultural sensitivity programmes.

Scalability and sustainability of graduate start-ups

Findings summary: Scholars have emphasised that most incubated start-ups struggle with post-incubation scalability because of a lack of tracking, mentorship and follow-on funding (Barbero et al. 2012; Siegel & Wright 2015).

Institutional theory and literature: The above findings, aligned with the institutional theory, reflect weak institutional incentives for long-term support and the absence of feedback mechanisms to learn from post-incubation outcomes according to Bruton et al. (2010). Bergek and Norrman (2008) also highlight how the lack of performance metrics undermines long-term support structures. International experiences show that scalable start-ups require ecosystem continuity.

Interpretation: This represents a failure in regulation and accountability. The institutional theory indicates that in the absence of required monitoring and evaluation, incubators tend to focus on short-term goals, resulting in a lack of support for graduate ventures during the scale-up phase.

Recommendations: Build on this information the following are recommended:

- Establish alumni tracking systems.
- Create post-incubation growth programmes and mentorship platforms.

- Secure long-term partnerships with venture capitalists and angel networks.

Institutional reform and policy implications

Across all themes, the institutional theory uncovers a recurring pattern: it shows that universities operate under constraints of legacy systems, conflicting logics and insufficient reform incentives. The challenges are less about capacity and more about institutional unwillingness or inability to embrace entrepreneurship fully. Strategic implications could be that universities must undergo institutional transformation, the national policy must mandate and fund entrepreneurship as a core university mission and leadership must realign university culture and structure with innovative goals.

Illustrative examples of effective university-led incubators

A comparative study of effective university-run incubators offers additional understanding of the organisational strategies that foster entrepreneurial achievement. For example, the Solution Space at the University of Cape Town combines entrepreneurial training with mentorship and connections to venture networks, resulting in multiple start-ups effectively growing beyond the university setting. Likewise, Stellenbosch LaunchLab illustrates that organised post-incubation initiatives and robust corporate collaborations enhance enduring business viability. These instances emphasise the fact that well-defined strategic alignment, ongoing mentorship and robust funding connections are crucial for converting incubators from temporary training environments into sustainable growth platforms. Insights from these institutions can assist nascent universities, like the University of Mpumalanga, in creating sustainable and influential incubation ecosystems.

Policies

This section translates the study results into practical policy guidance and strategic suggestions for stakeholders, encompassing universities, governmental bodies and private sector collaborators. It takes into account both the short-term and long-term measures necessary to improve UBI effectiveness, utilising effective strategies and insights from global examples. The recommendations are designed to tackle structural obstacles, enhance entrepreneurial environments and align university incubation programmes with national development goals. Based on the findings, nine policy recommendations are proposed to enhance the effectiveness of ULBIs. These nine recommendations are discussed in the next sections.

Strategic integration of incubation into university missions

Initiate the integration of entrepreneurship and incubation within university strategic frameworks and ensure that

incubator results correspond with national innovation objectives. The Key Performance Indicators (KPIs) were as follows:

- Incorporation of incubation metrics in university performance frameworks (% of universities with incubation key performance indicators).
- Yearly reporting on incubation results to the Department of Higher Education and Training.

Strengthen access to finance

Initiate internal seed funding, innovation grants and readiness initiatives, while creating relationships with venture capital, angel investors and government findings. The KPIs were as follows:

- Follow-on financing percentage: % of incubatees obtaining further funding within 24 months.
- Gender-responsive capital distribution: percentage of seed-fund allocations to enterprises led by women or minorities.

Build robust industry linkages

Develop organised partnership initiatives with industries, organise engagement events and create collaborative research-commercialisation pathways. The KPIs were as follows:

- Count of industry partnerships: total signed MOUs and procurement channels annually
- Percentage of incubated start-ups having a minimum of one industry mentor or pilot client.

Reform entrepreneurship education

Implement experiential learning, innovation contests and entrepreneurship-related projects throughout various fields; provide training for faculty in entrepreneurial teaching methods. The KPIs were as follows:

- % of degree programmes incorporating experiential entrepreneurship components.
- Count of educators instructed each year in entrepreneurial teaching techniques.

Establish post-incubation support mechanisms

Establish alumni networks, second-phase funding opportunities and ongoing mentorship to maintain venture sustainability. The KPIs were as follows:

- Survival rate (12 and 24 months): Percentage of businesses functioning 12 and 24 months after graduation.
- Count of active alumni mentoring interactions annually.

Foster institutional entrepreneurship culture

Encourage leadership growth and motivate staff participation in entrepreneurial projects. The KPIs were as follows:

- Count of senior executives finishing entrepreneurship leadership courses.
- Percentage of academic personnel involved in entrepreneurial endeavours or commercialisation activities.

Enhance inclusivity and gender equality

Assist women, minority and marginalised entrepreneurs via specialised programmes and socio-cultural awareness initiatives. The KPIs were as follows:

- Gender equity metric: % of incubatees led by females; median funding obtained by gender.
- Percentage of incubatees from underprivileged backgrounds involved each year.

Institutional monitoring, evaluation, and learning systems

Develop Monitoring, Evaluation and Learning (MEL) frameworks at both university and national levels to monitor incubator outcomes and incorporate insights into policy. The KPIs were as follows:

- Annual MEL reports generated and released (% of incubators contributing).
- Count of policy or practice changes implemented directly because of MEL insights.

Operational monitoring, evaluation, and learning guidelines

The guidelines are presented as follows:

Reporting structure: Every ULBI provides data twice a year to a central university MEL office, which compiles the results into an annual report for the Ministry of Higher Education, Science and Innovation.

Reporting format: Essential fields comprise incubatee survival percentages (12, 24 months), follow-up funding attained, jobs generated, industry collaborations, gender diversity metrics and alumni involvement.

Learning feedback loop: Annual review workshops with incubator managers, university leaders and policy stakeholders are conducted to discuss findings, facilitating the ongoing adaptation of incubation practices.

Limitations

Despite employing a robust secondary data analysis method, some methodological limitations deserve attention. Firstly, the research relies primarily on recognised institutional and academic resources, which, although dependable, restrict its ability to capture real-time experiences of stakeholders. The absence of primary data, such as discussions with incubator managers or alumni, limits the capacity to assess individual experiences. Future research could address this by employing mixed-method strategies that combine surveys, interviews and

case observations to improve empirical insights. Secondly, the aggregation of secondary data may result in selection bias because of the uneven availability of institutional documents across South African universities. In response to this, future studies should focus on extensive fieldwork that examines the effectiveness of incubators and the results for graduates over time. Analysing effective and underperforming university-operated incubators can reveal institutional practices that significantly influence success. Finally, the study's analytical emphasis is on the South African context; thus, the findings may not fully be applicable to other sub-Saharan regions. Further studies could expand the geographical viewpoint by examining university incubation models across nations in the Southern African Development Community (SADC) to identify cross-border trends, policy developments and flexible institutional strategies.

Conclusion

This study indicates that ULBIs have significant potential for tackling graduate unemployment; however, they are obstructed by financial, structural and cultural obstacles. Institutional theory clarifies that numerous difficulties arise from established norms and contradicting logics. Effective reform requires that universities integrate incubation into their strategic goals, cultivate cross-sector collaborations and establish comprehensive support frameworks.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

CRedit authorship contribution

Mcolisi A. Shongwe: Data curation, Formal analysis, Investigation, Methodology, Writing – original draft. Melody Chiume: Conceptualisation, Data curation, Investigation, Project administration, Resources, Writing – original draft. Asheley F. Malebe: Investigation, Writing – original draft. Lethabo Maponya: Data curation, Formal analysis, Methodology, Validation, Writing – original draft. Kanayo Ogujiuba: Funding acquisition, Resources, Supervision, Validation. 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.

Disclaimer

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