



# Exploring The Role Of Innovation Spaces In Creating Stimulants And Opportunities For Innovative Universities Of Technology

Xolile Veronica Ngubane<sup>1</sup>(✉)  and Stephan van der Merwe<sup>2</sup> 

<sup>1</sup>Mangosuthu University of Technology, Durban, South Africa

<sup>2</sup>North West University, Potchefstroom, South Africa

[xolilengubane@mut.ac.za](mailto:xolilengubane@mut.ac.za)

## Abstract:

Universities are generally regarded as reservoirs of knowledge, and skills where academics generate novel and new ideas and initiatives. However, it has become apparent that the innovation outputs are not aligned with the potential that exists within the South African Universities of Technology (UoTs). Therefore, it is imperative to explore the role of innovation spaces in creating stimulants and opportunities for innovation at universities of technology and initiatives that can be adopted to increase the innovation outputs and harness the wealth of capabilities that exist within these spaces. Hence, this paper proposes the promotion of innovation spaces within the university as one initiative that can enhance and facilitate the spirit of innovation from the entire university community. It further asserts that properly designed and sufficiently resourced innovation spaces stimulate the creativity of users while providing an opportunity for the development of competencies and enhancing learning for the holistic development of students and staff. This innovation-enabling environment incorporates spaces or laboratories, academic communities of practice, funding and rewards policies and awareness programmes that encourage innovation. The presence or absence of such infrastructure as the virtual and physical spaces providing access to state-of-the-art information on pertinent issues of education, research, entrepreneurship and innovation, availability of facilities, and nurturing aid for start-up businesses and other

entrepreneurial activities communicates and affirms the innovation culture of a university. Developing, harnessing, and cultivating the innovative capabilities of employees, will further benefit the universities from the inherent enhancement of intrapreneurial abilities.

**Keywords:** innovation, innovation outputs, university(ies) of technology, increase/enhance innovation outputs in South Africa and innovation spaces.

## 1. Introduction

There exists a need for any country to be self-sufficient, through generating its own technologies, and venture into new markets through innovative products and services that address the needs of local and global citizens. There is also a long-standing argument that an ever-increasing amount of wealth amongst the large global economies emanates from knowledge-based industries that are heavily reliant on human capital and technological innovations [1]. Furthermore, the NDP 2030 emphasizes the importance of innovation as a tool for introducing diverse products, services and markets with enhanced efficiencies and further presents that it will require expansions in research and development coupled with collaborations at national and international levels [2]. Hence, the need to develop and sustain a knowledge-based economy, where research outputs are transformed into products and services and an environment conducive to innovation. The importance of an innovative environment to SA advancement is evident in the articulations of the 2019 White Paper on Science, Technology, and Innovation, where four (4) of the ten policy thresholds are directed towards creating an enabling society, government and systems [3]. These imperatives are enhancing the innovation culture in society and government, developing a more enabling environment for innovation, developing local innovation systems, and supporting social and grassroots innovation.

Universities are generally regarded as reservoirs of knowledge, skills and academics who are expected to facilitate the generation of new ideas and initiatives [4]. However, there is a growing interest in establishing if the recognition of universities as knowledge producers is still a fact in the current technological landscape [5], as other non-university role players in the form of

innovations and technology hubs, industry and government-owned laboratories are also active in this space. Others even contend that innovative entrepreneurship built on new or inventive ideas does not always emanate from research [6]. Hence, suggestions that the leading role of conventional universities as knowledge creators has ceased as this space has been transformed by the emergence on non-university role-players and organizations such as science councils, non-governmental organizations, state-owned entities (SOEs) and other privately funded institutions, thus introducing diversity and heterogeneity in the landscape [3;5]. However, some researchers have argued that technology adoption is easier for enterprises operating within science parks, universities, and other higher education institutions as they can deliver the necessary knowledge thus facilitating innovation for their tenants and clients [7]. Furthermore,[8] identified the need for research on university units that function as technology and innovation support agencies and their impact on the technology transfer, as these also benefit small business incubation research. Further arguments claim that it is accepted that universities promote entrepreneurship as they struggle to cope with the dynamic requirements demanded by the labour market and the accelerating rate of graduate unemployment [5]. Therefore, universities are expected to reinvent themselves in the present landscape not only as knowledge producers but as active role players within the innovation system that connects researchers to industry, and local communities through stimulating both innovation and economic development in an active and vibrant manner. Central to this ideal environment is the ability to coordinate the co-creation of knowledge. However, the awareness and correspondingly, the innovation outputs do not seem to match the potential that exists in the South African Universities of Technology (UoTs) [9]. It, therefore, poses a question of what strategies and initiatives are required to be adopted to increase the innovation outputs and harness the wealth of capabilities that exist within the HE landscape of UoTs. Therefore, the main purpose of this study is to explore the role of innovation spaces in creating stimulants and opportunities for innovation in a university of technology.

## 2. Statement of the Problem

SA's White Paper on Science, Technology and Innovation emphasizes the importance of innovation as a developmental tool. Innovation is depicted as having the potential to improve the quality of life of citizens given its ability to enhance public policy service delivery and decision making, create new technology-based firms and advance the competitiveness of the existing ones, revive and revolutionize industries by supporting new and emergent sectors, explore novel sources of economic growth and eventually benefit poor communities and encourage environmental custodianship [3]. Furthermore, the NDP 2030 purported that through education, training and innovation poverty and inequality will be reduced and the economy will rise by an average of 5.4 percent and unemployment will be reduced to 6 percent [2]. However, South Africa is still confronted with the crippling challenge of increasing levels of unemployment, which can be traced at 27.2% in the second quarter of 2018 to 29.1% in the first quarter of 2020 [10] and currently stands at 32,9% in the first quarter of 2023 [11]. Furthermore, the South African National Treasury established that these high levels of unemployment, accompanied by extreme levels of inequality and stagnant economic growth are indicative of an unsustainable economic trajectory [12]. SMMEs are highly demanding in terms of labour and require minimal capital investment for operations and can be resourced locally [13]. Given the persistently high levels of poverty and unemployment in the country, the South African government has concentrated their energies on SMME development as a principal policy intervention [14]. Measuring the success of SMMEs in terms of the growth in the number of employees, turnover and assets is a long-standing tool in South Africa [15]. Researchers and scholars in North America reported that general business incubators have a positive impact on employment creation and similar results were revealed by the Business Incubation Industry study of incubators which demonstrated that 19,000 businesses and over 245,000 jobs have contributed to the economy [15]. However, there is a long-standing challenge that the actual contribution of South African SMMEs to employment creation has been poor given the general failure by these businesses to grow [13,14,17].

SMMEs are amongst the major contributors to employment, firstly through self-employment, even though evidence from empirical studies suggests that SMMEs have a minimal contribution to employment creation for others [18]. Therefore it is critical for developing countries like South Africa to explore further assistance to SMMEs to grow and be sustainable and thereby contribute meaningfully to employment creation. However, researchers in developed countries, like those belonging to the European Union, maintain that ensuring economic growth and job creation from entrepreneurs is about encouraging high quality and funding high-growth companies [18,19]. South Africa, like most countries, has witnessed a proliferation of business-focused collective communities, described as technology and/or innovation hubs, technology development and transfer centres, and science or technology parks. All of these have a singular objective of promoting innovation and building strong technology-focused businesses [20,21]. Given the traditional role of UoTs in South Africa, which is their ability to establish and forge close links with industry, these institutions should be playing a pivotal role in promoting innovation and developing technology-focused entrepreneurs [9]. Notwithstanding the availability of creative knowledge, competencies, expertise and willingness to generate novel ideas and initiatives, academics are bound by work overloads, lack of appropriate modelling of innovative behaviour and limited funding [22]. South Africans therefore expect Universities of Technology to develop the knowledge and skills of their academics and students towards innovation, which this paper argues, can be enhanced through opportunities and stimulation from innovation spaces.

### **3. Aims and objectives**

This paper seeks to highlight the significant role of innovation spaces in the South African Universities of Technology as stimulants for innovation amongst staff and students breeding novel ideas that will benefit innovators, entrepreneurs and industry. The key objectives of this paper incorporate presenting the case for the promotion of innovation spaces within the Universities of Technology as one initiative that will enhance and facilitate the

spirit of innovation from the entire university community and presenting these facilities as nurturing aid for start-up businesses and other entrepreneurial activities within a university.

#### 4. Methodological Note

This study adopted the systematic literature review as a research method, which involved the systematic collection and synthesis of available research, which establishes a foundation for expanding knowledge and facilitating theory development [23]. This was achieved through integrating findings and perspectives from empirical and literature review studies that focused on innovation spaces. Online databases accessed include EBSCOhost, Taylor and Francis Group, Science Direct, Google Scholar and Emerald Insight. Articles were then selected guided by the keywords of this review. The operative Boolean phrase used included innovation, innovation outputs, university(ies) of technology, increase/enhance innovation outputs in South Africa and innovation spaces. The systematic literature review process followed is outlined in Figure 1 below.



**Fig1:** Schematic representation of the systematic literature review process

Given the limited results, all articles were considered. Relevant government publications including Acts of Parliament were sourced from the South African government websites. The results and discussions are discussed in Section 5 below.

## **5. Conceptual Issues**

### **5.1. Why Innovation?**

As early as 2008, the South African government had identified the need to pursue knowledge economy that will be fueled by human capital development, knowledge production and exploitation (research and development), knowledge infrastructure and enablers that address the innovation chasm spanning from research findings and innovation outcomes [24]. However, the 2019 White Paper on Science, Technology, and Innovation accords that the nation is yet to benefit meaningfully from the potential presented by science, technology and innovation towards the achievement of the objectives of the National Development Plan (NDP) [3]. To date, innovation remains a critical tool in generating solutions that respond to both industry and societal needs [4,5]. Hence the necessity to ensure a sustainable industry and SMME sector. Innovation itself can be described as a process that involves bringing forth a novel or significantly amended creation which demands a long-term commitment, adequate allocation of resources and an innovation-conducive organizational climate and can only be achieved through networks of interdisciplinary stakeholders, efficient systems, and access to funding [22].

Furthermore, the NDP 2030 requires that graduates should possess skills and knowledge to address the current societal and economic needs as well as for the future that is currently unknown [2]. However, the changing nature of industry needs, accompanied by increasing unemployment amongst graduates are some of the compelling reasons for universities to review their position within the greater ecosystem. On the other hand, the government considers Small, Medium and Micro Enterprises (SMMEs) as creators of employment in South Africa. However, most SMMEs fail to survive past a few years given the challenges of lack of technical skills and education, poor infrastructure and facilities and a modest support system [16]. The survival rates for start-up SMMEs have not improved over the years ranging from being rated amongst the lowest in 2014 [14], to a crippling failure rate of 85% within the first year of establishment [13,25]. The steep failure ratio of SMMEs, emanates from a innumerable

internal and/or external challenges that impacts negatively on the endurance and sustainability, emerges amongst the key factors that impede economic growth and creation of employment in SA [26,27, 28]. The challenges associated with establishing, nurturing and developing new enterprises in SA, range from regulations on human resources and markets, identifying ideal markets for the products, limited access to finances, inadequate research and development infrastructure, limited education and training of entrepreneurs [16]. The rarity of the archetypal SMME attaining substantial growth has sustained the interests of scholars, practitioners and government policymakers in exploring ways of ensuring and promoting successes within this sector [13]. They undoubtedly require meaningful support to survive.

Generally, innovation relates to local challenges while invention, which flows from a creative event or unexpected ideas with potential to result in discoveries but can also result from interrogation of the necessary sources, stimuli, actions and actors, considers worldwide issues with similarities emerging from their (innovation and invention) need for planning, a long-term view, and a strong focus on development and technology [22]. It is apparent that technological innovations enhance the country's productivity levels, improve the standard of living of its citizen, contribute towards sustainable economic development, hence, the necessity for governmental support on science and knowledge-based innovations [29]. Innovation can be further classified as sustaining if it is compatible with the current business frameworks of the organization or disruptive if it requires significant changes [22]. This view also supports the motion that SMMEs will require support if they are to survive the technologically advanced economies. As such the establishment of new technology-based firms is regarded as an integral component of economic growth. The substantial technological gap between African countries and the other nations of the world is a persistent challenge, and the observed slow rate of technological progress accounts for differences in total factor productivity among African countries [5]. Hence, bridging this gap is crucial to the success of poverty alleviation, economic growth, and job creation. The SA government views SMMEs and entrepreneurship as enablers in economic development



policies and therefore targets incubators and innovation spaces, to address the multiple challenges faced by this sector [2]. This view is supported by research which has identified business incubation as an instrument that leads to innovation and economic development [8]. The evolution of outcomes of small business incubation from mere supporting companies and creating jobs to increasing expectation of technology support, technology commercialization and innovation is evident from Table 1 below:

**Table 1 – Review of Outcomes and impact of small business incubation**

Article	Year	Outcomes	Impact
Al-mubarak	2013: 97	Entrepreneurs, companies created, jobs created, and incubator companies.	Economic development
Subhan, Mehmood & Sattar, 2013	2013: 4	Technology development comes with new or improved processes.	Expansion of the country's productivity into new areas and in the process providing avenues for foreign direct investment
Díez-vial and montoro-sánchez	2016: 41	Individual and institutional networks Enhanced knowledge and understanding	Increased capacity to innovate
Ayatse, Kwahar & Iyortsuun	2017: 3,5	Create new jobs and businesses, Foster a climate of entrepreneurship, Commercialize technology, Reduce company mortality rate, Reduce unemployment, Increase university-incubation interaction and foster technology development	Economic development Diversify, revitalize and accelerate the growth of industry and local economies Technology diversification Profits; Successful products Viable companies; Job creation
Sanyal and Hisamic,	2018: 10	Transfer of technology and the promotion of innovation	Technology-based enterprises; Competitiveness*
Rungani and Potgieter	2018: 2	Entrepreneurship and innovation	Technology-based enterprises. Competitiveness*

The sampled results, as presented in Table 1 above bear testimony to the increasing importance of technology and innovation in economic development and diversification. drive for the innovative transformation of companies such that their competitiveness capabilities can meet local and international standards

[16]. Ensuring that technology is accessible to SMMEs will strengthen their competitiveness, according to the 2020/21 Annual Performance Revised Plan [30]. Some researchers contend that inspiration is necessary to identify challenges facing society, develop competences to interrogate real-life issues and subsequently draw solutions, preferably in an inclusive and multidisciplinary manner, and this is the key role of innovation spaces within universities [22]. Hence, innovation spaces are regarded as stimulants for innovation, reduction of R&D costs and mitigation of inherent risks.

## **5.2. Role of innovation spaces within UoTs**

The outputs of the SA Higher Education sector include research and competent graduates possessing sufficient knowledge, skills, and attitudes to enable a developing society to meet national challenges and to actively participate in a dynamic and competitive global environment [4]. The government's view of the role of innovations extends to the development of new ways of improving public service delivery [2]. Therefore, innovation, by definition and application also seek to improve the lives of the society. Hence, supporting innovation will enhance the outputs of the institutions and further provide an avenue for UoTs to assist the process addressing economic and social challenges currently facing South Africa. Presently innovation and technology transfer has an established relationship with universities, hence the definition of university based entity as *"a multi-tenant building, in and around university campuses which provide affordable, flexible space and a variety of typical incubator and university-related services for technology-based tenant firms"* [31]. SA Universities and in particular, Universities of Technology (UoTs) have a critical role to play in technology and innovation incubation, which is differentiated from general small business incubation by added aspects of enhancing technology transfer and creation of new enterprises [16], promoting high-technology industrial development [32] and those that are institutionalizing the support of enterprises with potential for high growth [33]. To remain competitive, enterprises do not only require access to the latest technologies and high-tech facilities but also skilled staff, and this entails investments [12]. Technology and innovation support the creation of new innovative enterprises and have become a critical

link encouraging science-industry-government collaborations and reduction of business expenses [34]. Innovation and technology development requires technical mastery, skills and investment in plant and enabling infrastructure thus linking the technology, finance, skills, and knowledge in promoting the emergence of new technology-based firms, thus accelerating the commercialization of technology [34,35]. UoTs, as public institutions, can further enhance the achievement of national objectives as there is evidence that the outcomes expected from the supporting innovation tend to vary based on the goals and ownership arrangements. Hence, government-funded innovation support spaces will carry the mandate that is aligned with global trends where, public policy is used to achieve practical political and strategic goals relating to increasing national competitiveness, innovativeness, and exports.

The further benefit of involving universities in supporting technology and innovation is based on these institutions' abilities to collate international and local know-how, which is then included within their curriculum and programmes, thus producing a reservoir of critical knowledge that will enhance the innovativeness of the incubatees [7,36]. Hence, university technology transfer stakeholders ensure the transfer of technology into the local economy [32] Unfortunately, current African innovation research that seeks to pioneer technological and economic development generally occurs at controlled and designated laboratories, and as a result limits the participation of communities and utilization of the ordinary local entrepreneur whose interest is in improving product designs and technical efficiencies in business [5]. The current reality hampers the focus on innovative technology, classified as inaccessible, native or community innovations with a proviso of sustainability and addressing local conditions. Hence, TBI's impact the people's cultural values, the degree of diversification of technology, development in economic, employment creation, the institution of viable enterprises and incomes from successful products [21].

### **5.3. Persistent Definitional Challenges**

The innovation-enabling environment incorporates spaces or laboratories, academic communities of practice, funding and rewards policies and awareness

programmes that encourage innovation. Researchers affirm that the use of interchangeable terms such as science parks, technology centres or hubs and similar entities add to the definitional challenges [8]. These institutions deliver unique business development support through innovations that lead to the generation of new markets, which further accelerates developments in technology [16,29]. Furthermore, the innovation and technology development and transfer space is still marred with definitional challenges arising from the current variations in physical, which is the traditional form, and increasingly virtual platforms compounded with the failure to specify the incubation process and how it occurs and with whom [8,37]. For the purpose of this discussion, the adopted definition is that an innovation space is an appropriately designed physical environment providing the resources that are essential in stimulating the creativity of users in innovation projects while providing an opportunity for the development of competencies and enhancing learning [37].

#### **5.4. Government and Policy issues**

The SA government has also developed an exceptional institutional arrangement of business incubation modelled to assist and develop in the present-day competitive landscape [8]. In 2008, the SA government promulgated the Technology Innovation Agency (TIA) Act (Act 26 of 2008) which established the public agency, TIA, tasked with promoting the competitiveness of the country through innovation [38]. The TIA Act established the TIA as a vehicle to support and sustain innovations created through public funding. In support of the TIA Act, the government promulgated the Intellectual Property Rights from Publicly Financed Research and Development Act (Act 51 of 2008), [39]. The object of this Act is to make provision that intellectual property (IP) emanating from publicly financed research and development are identified, protected, utilized, and commercialized for the benefit of the people of the Republic, whether it be for a social, economic, military or any other benefit [39]. The Act 51 of 2008 further assigns the function of ensuring compliance with this Act to the National Intellectual Property Office (NIPMO). This legislation has also witnessed the proliferation of a university-based incubation ecosystem comprising of offices of technology transfer entrepreneurial academics,

incubation managers, industry funders, policymakers from government and innovation consumers [32]. The trend among policymakers is to consider the science/technology parks/hubs and university-owned (research-based) incubators, as a knowledge-based economic development strategy which promotes and encourages the development and growth of the innovation-led industry is well established [40]. As a result, one critical factor that has emerged in policy in the past years is the development of an entrepreneurship support system to nurture particularly designated start-up SMMEs [14]. In a South African (SA) context small enterprise refers to “a separate and distinct business entity, together with its branches or subsidiaries, if any, including cooperative enterprises, managed by one owner, or more predominantly carried on in any sector or subsector of the economy....” [41]. Hence, the terms small business and SMMEs is used interchangeably. Therefore, innovation spaces are an essential components and enablers in addressing the “innovation chasm” between research results and socio-economic outcome. Hence, one of the reasons for establishing innovation supporting institutions is to ensure the commercialization of technology and outputs of research through setting up new small businesses, which are supported until they are fully sustainable [35]. The commercialization of technology and research then requires a close working relationship between those who generate knowledge (universities) and those who will use technology (industry). Hence, the role of incubators evolved to value-added support and organized incubation practice, with emphasis on the establishment of a strong national system of innovation that embraces the "triple helix' conceptual approach involving close collaborations between universities, government, and industry [34]. Many countries are therefore adopting developmental policies to stimulate regional innovation capabilities, in particular the incubation of new technology-based enterprises in science/technoparks [ 40].

## **6. Recommendations and Conclusions**

Innovation should not be viewed as a threat to academic programmes of teaching and learning, and research but as a compelling companion that

maximise success in all sphere of the university. Furthermore, the creation of innovation spaces within the university of technology is one of the initiative that can enhance innovation from both its staff and students while nurturing emerging technology-focused SMMEs. Innovations spaces can further augment the academic experience and resultant engagements can be integrated into the holistic development of UoT students and staff. Developing the innovative capabilities of employees, an aspect that is considered essential in every organisation, will further benefit the universities from the inherent enhancement of intrapreneurial abilities. To ensure the effectiveness of these centres, UoTs need to develop the appropriate policies, infrastructure and teaching-load model that encourages innovation and participation in collaborative innovation projects. Through innovation spaces that are either virtual or physical can provide access to state-of-the-art information on matters of education, research, innovation and entrepreneurship, thus providing a nurturing aid for start-up businesses and other innovative entrepreneurial engagements. The presence or absence of innovation-supporting infrastructure is also a non-verbal communication of the innovation culture of an institution. Hence, there is a need to develop a sustainable entrepreneurial ecosystem consisting of public and private innovation spaces for enhanced regional and national economic development.

## 7. References

1. Zhang, J. & Li, S.: The Impact of Human Capital on Green Technology Innovation—Moderating Role of Environmental Regulations. *International Journal of Environmental Research & Public Health*. 1-19. (2023).
2. SA Government. Full National Development Plan Our future - make it work. <https://www.doi.org/10.1210/me.2010-0352>. (2012). Last accessed 2023/09/06
3. Department of Science and Technology. *White Paper on Science, Technology and Innovation, South Africa* (Issue 41909).<http://www.dst.gov.za>. (2019). Last accessed 2023/09/06
4. Louw, A. H., & Moloi, K. C.: Teaching-research-innovation nexus: Towards an entrepreneurial university of technology. *Mediterranean Journal of Social Sciences*, 4(13), 63–72. (2013)

5. Atiase, V. Y., Kolade, O., & Liedong, T. A.: The emergence and strategy of tech hubs in Africa: Implications for knowledge production and value creation. *Technological Forecasting and Social Change*, 161(September), 1-13. (2020).
6. Ayandibu, A. O., & Houghton, J.: The role of Small and Medium Scale Enterprise in local economic development (LED). *Banach Journal of Mathematical Analysis*, 11(2), 133–139. (2017).
7. Díez-Vial, I., & Montoro-Sánchez, Á.: How knowledge links with universities may foster innovation: The case of a science park. *Technovation*, 50–51, 41–52. (2016).
8. Ayatse, F. A., Kwahar, N., & Iyortsuun, A. S.: Business incubation process and firm performance: an empirical review. *Journal of Global Entrepreneurship Research*, 7(1). (2017).
9. Malele, V., Mpofo, K., & Muchie, M.: Bridging the innovation chasm: Measuring awareness of entrepreneurship and innovation policies and platforms at the universities of technology in South Africa. *African Journal of Science, Technology, Innovation and Development*, 11(7), 783–793. (2019).
10. Statistics South Africa. *Media release QLFS Q2 2021. 000*(August), 1–2. [http://www.statssa.gov.za/page\\_id=1854&PPN=P0211](http://www.statssa.gov.za/page_id=1854&PPN=P0211). (2021). Last accessed 2023/09/06
11. Statistics South Africa. Media release QLFS Q1 2023. Statistics South Africa, 1. (2023). <https://www.statssa.gov.za/publications/P0211/MediareleaseQLFS20Q1202023.pdf>. Last accessed 2023/09/06
12. Economic Policy National Treasury: Economic transformation, inclusive growth, and competitiveness: Towards an Economic Strategy for South Africa Prepared by Economic Policy, National Treasury. 1–62. <http://www.treasury.gov.za/>. (2018). Last accessed 2023/09/06
13. Rungani, E. C., & Potgieter, M.: The impact of financial support on the success of small, medium and micro enterprises in the Eastern Cape province. *Acta Commercii*, 18(1), 1–12. (2018).
14. Masutha, M., & Rogerson, C. M. : Small business incubators: An emerging phenomenon in South Africa’s SMME economy. *Urbani Izziv*, 25(Special Issue), S47–S62. (2014).
15. Ladzani, W., & Netswera, G.: Support for rural small businesses in Limpopo Province, South Africa. *Development Southern Africa*, 26(2), 225–239. (2009).
16. Sanyal, S., & Hisamic, M. W.: The Role of Business Incubators in Creating an Entrepreneurial Ecosystem: A Study of the Sultanate of Oman. *Indian Journal of Commerce & Management Studies*, IX(3), 09–17. (2018).
17. SEDA SMME Quarterly Update 1st Quarter 2021 The Small Enterprise Development Agency. (2021). <http://www.seda.org.za/Publications/Publications/SMME%20Quarterly%202021%20Q1%20September.pdf>. Last accessed 2023/09/06

18. Dvouletý, O., Srhoj, S., & Pantea, S.: Public SME grants and firm performance in European Union: A systematic review of empirical evidence. *Small Business Economics*, 57(1), 243–263. (2021).
19. Shane, S.: Why encouraging more people to become entrepreneurs is bad public policy. *Small Business Economics*, 33(2), 141–149. (2009)
20. Zouain, D. M., & Plonski, G. A.: Science and Technology Parks: laboratories of innovation for urban development - an approach from Brazil. *Triple Helix*, 2(1), 1–22. (2015).
21. Al-mubarak, H. M., & Busler, M.: The road map of international business incubation performance. *Journal of International Business and Cultural Studies*, 10(1), 1–12 (2013).
22. Jakovljevic, M.: A model for innovation in higher education. *South African Journal of Higher Education*, 32(4), 109–131. (2018).
23. Snyder, H.: Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104(August), 333–339. (2019).
24. South African Government.: Department of Science and Technology Ten-Year Innovation Plan. Government Gazette, 1–14.  
<https://www.sansa.org.za/wpcontent/uploads/2018/05/DST-Ten-Year-Innovation-Plan.pdf>. (2008). Last accessed 2023/09/06.
25. Bushe, B.: The causes and impact of business failure among small to micro and medium enterprises in South Africa. *Africa's Public Service Delivery and Performance Review*, 7(1), 1–26. (2019).
26. Botha, A., Smulders, S. A., Combrink, H. A., & Meiring, J.: Challenges, barriers and policy development for South African SMMEs—does size matter? *Development Southern Africa*, 38(2), 153–174. (2021).
27. Bruwer, J.: Fortifying South African Small Medium and Micro Enterprise Sustainability through a Proposed Internal Control Framework: The Sustenance Framework. *Expert Journal of Business and Management*, 8(2), 147–158. (2020).
28. Moise, L.; Khoase, R.; & Ndayizigaminye, P. The Influence of Supporting Institutions Interventions On SMMEs Managerial Competencies. *Academia.Edu*. 273-282 (2019).
29. Obaji, N. O.: The Role of Government Policy in Entrepreneurship Development. *Science Journal of Business and Management*, 2(4), 109–115. (2014).
30. The Department of Small Business Development.: *The Department of Small Business Development Annual Performance Plan 2020/21*. (2020).
31. Mian, S. A.: Policy business incubators to tenant firms. *Research Policy*, 25, 325–335. (1996).
32. Mcadam, M., Miller, K., & Mcadam, R.: Situated regional university incubation: A multi-level stakeholder perspective. *Technovation* 51, 69–78. (2016).
33. Dee, N. J., Gill, D., Lacher, R., Livesey, F., & Minshall, T.: A review of research on the role and effectiveness of business incubation for high-growth start-ups. *Centre for Technology Management Working Paper Series: University of Cambridge Institute for Manufacturing.*, 1–43. (2012).



34. Tang, M., Baskaran, A., Pancholi, J., & Lu, Y.: Technology business incubators in China and India: A comparative analysis. *Journal of Global Information Technology Management*, 16(2), 33–58. (2013).
35. Nkosinathi, S., & Robert, O. R. Commercialisation of research and technology: A multiple case study of university technology business incubators. *African Journal of Business Management*, 8(16), 641–659. (2014).
36. Subhan, Q. A., Mehmood, M. R., & Sattar, A.: Innovation in Small and Medium Enterprises (SME 's) and its impact on Economic Development in Pakistan. *Proceedings of the 6th International Business and Social Sciences Research Conference, 0092*, Pakistan1–18. (2013).
37. Delgado, L., Galvez, D., Hassan, A., Palominos, P., & Morel, L.: Innovation Spaces in Universities: Support for Collaborative Learning. *Journal of Innovation Economics & Management*, n° 31(1), 123–153. (2020).
38. South African Government.: Department of Science and Technology Ten-Year Innovation Plan. *Government Gazette*, 1–14.  
<https://www.sansa.org.za/wpcontent/uploads/2018/05/DST-Ten-Year-Innovation-Plan.pdf.1-20>. (2018). Last accessed 2023/09/06.
39. South African Government, Department of Science and Technology.: Intellectual Property Rights from Publicly Financed Research and Development Act <https://www.dst.gov.za/images/pdfs/IPRActof2008.pdf>. (2008). Last accessed 2023/09/06
40. Kim, H. Y., & Jung, C. M.: Does a technology incubator work in the regional economy? Evidence from South Korea. *Journal of Urban Planning and Development*, 136(3), 273–284. (2010).
41. Department of Small Business Development, National Small Enterprise Act: Schedule 1: Amendment.  
[https://www.gov.za/sites/default/files/gcis\\_document/201903/423041gon399.pdf](https://www.gov.za/sites/default/files/gcis_document/201903/423041gon399.pdf). 110-111. (2019). Last accessed 2023/09/06.

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

