

UNIVERSITY STRATEGIC PLANNING AND THE IMPARTATION OF TECHNOPRENEURSHIP SKILLS TO STUDENTS: LITERATURE REVIEW

Mapeto Bomani^{*}, Gladys Gamariel^{**}, James Juana^{**}

^{*} Corresponding author, Department of Business, Management and Entrepreneurship, Centre for Business, Management, Entrepreneurship and General Education, Botswana International University of Science and Technology, Palapye, Botswana

Contact details: Botswana International University of Science and Technology, Private Bag 16, Plot 10071 Boseja, Palapye, Botswana

^{**} Department of Business, Management and Entrepreneurship, Centre for Business, Management, Entrepreneurship and General Education, Botswana International University of Science and Technology, Palapye, Botswana



Abstract

How to cite this paper: Bomani, M., Gamariel, G., & Juana, J. (2021). University strategic planning and the impartation of technopreneurship skills to students: Literature review [Special issue]. *Journal of Governance & Regulation*, 10(2), 196–203. <https://doi.org/10.22495/jjgrv10i2siart1>

Copyright © 2021 The Authors

This work is licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0). <https://creativecommons.org/licenses/by/4.0/>

ISSN Print: 2220-9352

ISSN Online: 2306-6784

Received: 28.01.2021

Accepted: 05.05.2021

JEL Classification: G11, G14, G15, G23, G24, G32, G41, G51, H26

DOI: 10.22495/jjgrv10i2siart1

The Fourth Industrial Revolution (FIR) has ushered in an era in which technopreneurship is central to economic development. Universities are viewed as critical conduits for imparting technopreneurship skills to university students (Cereiyo, as cited in Suradi, Yasin, & Rasul, 2017), and this should be reflected in the university's strategic plan. The purpose of this conceptual paper is to explore the nexus between university strategic planning and the impartation of technopreneurship skills to science, technology, engineering and mathematics (STEM) students in Sub-Saharan Africa. Methodologically, the paper adopted an integrative approach in reviewing, critiquing, and synthesising scholarly literature on the link between strategic planning and the impartation of technopreneurship skills in STEM universities. This paper argues that strategic planning has an impact on the transfer of technopreneurship skills to students. A university's strategic plan defines its future direction, provides a coherent basis for decision-making, and establishes priorities (Albon, Iqbal, & Pearson, 2016). Hence, it influences the procurement and allocation of resources, courses to be taught and pedagogical approaches to be adopted. This paper contributes to knowledge by suggesting that strategic planning in STEM universities should encompass technology and entrepreneurship in the vision, mission, and strategic goals.

Keywords: Strategic Planning, University, Technopreneurship, Skills, Fourth Industrial Revolution

Authors' individual contribution: Conceptualisation — M.B.; Methodology — M.B.; Formal Analysis — M.B., G.G., and J.J.; Writing — Original Draft — M.B., G.G., and J.J.; Writing — Review & Editing — M.B., G.G., and J.J.

Declaration of conflicting interests: The Authors declare that there is no conflict of interest.

Acknowledgements: We acknowledge the role of Botswana International University of Science and Technology in promoting research of this nature.

1. INTRODUCTION

A Sub-Saharan African 21st century science, technology, engineering and mathematics (STEM) university in the Fourth Industrial Revolution (FIR)

should not be viewed as an institution for imparting knowledge to high school graduates, advancing knowledge, and improving skills of a country's human resource, but should conduct research, develop and commercialise a technology, and

transfer technopreneurship skills to students for economic development (Lakitan, 2013). A university should not be an ivory tower pursuing knowledge of little relevance to the developmental needs of its country (Kamuzora, 2012). A university should impart entrepreneurship skills to STEM students to enable them to fit in the current dispensation (Ikhtiangung & Aji, 2019). Given that the global rate of unemployment is rising, students need to be equipped with technopreneurship skills that enable them to create employment rather than seek scarce jobs. In Sub-Saharan Africa, the “public sector is shrinking, and the private sector is unable to absorb the increasing number of job-seeking graduates” (Assan, 2019). There is documented evidence that the high rate of unemployment among university graduates across the world is attributed to a mismatch between the skills acquired and the skills required in industry and the wider economy (Assan, 2019; Maunganidze, Faimau, & Tapera, 2016; Ndung’u, 2014; Kamuzora, 2012). Consequently, universities have been under increasing pressure to meet the expectations of the labour market, which has been undergoing rapid transformation (Dowsett, 2020). Universities should also change to reflect the new realities through producing entrepreneurial graduates. Against this backdrop, a combination of technology and entrepreneurship skills i.e. technopreneurship skills (Suradi, Yasin, & Rasul, 2017), should be transferred to students so that they assist in addressing the socio-economic challenges facing Sub-Saharan countries. Universities have an important role to play in developing entrepreneurial thinking and building entrepreneurial mindsets among students and within their communities (Yiannakaris, 2017).

Public universities are viewed as agents for driving the national agenda (Bomani, Fields, & Derera, 2019). As many countries, both in Sub-Saharan Africa and the rest of the world, are moving from resource-based to knowledge-based economies, technopreneurship is viewed as an important vehicle for that transition (Cereijo, as cited in Suradi et al., 2017). The development and growth of an economy are inherently linked with the intellectual property created, developed, and harnessed, and the exploitation of new opportunities through its intellectual wealth (Phani & Bhaskar, 2018), and the creation of human capital with relevant skills. Against this background, developing technopreneurs becomes imperative.

Various studies have been conducted on strategic planning in higher education institutions and its impact on institutional performance (Dowsett, 2020; Akyel, Korkusuz Polat, & Arslankaya, 2012;

Albon et al., 2016; Amoli & Aghashahi 2016; Hayward, 2008; Jalal & Murray, 2019; Sart, 2014; Goldman & Salem, 2015; Dooris, Kelley, & Trainer, 2004). Goldman and Salem (2015) posit that strategic planning can help universities maintain stability in a changing and uncertain environment and respond appropriately to external threats. Several studies on technopreneurship in universities have also been carried out (Abbas, 2018; Abdulgani & Mantikayan, 2017; Fowosire, Idris, & Opoola, 2017; Lakitan, 2013; Suradi et al., 2017). Extant literature focuses on strategic planning, its importance, impact on institutional performance and challenges. Existing literature on technopreneurship covers conceptual framework on technopreneurship, the future of technopreneurship, factors affecting technopreneurship, technopreneurship as a means of commercialising university-created technology, and the development of technopreneurship-based education for students. However, insufficient research has been conducted on conceptualising and understanding the nexus between STEM university strategic planning and the impartation of technopreneurship skills on students in Sub-Saharan Africa. This article seeks to contribute to the literature by suggesting a way forward in which technopreneurship should be central to strategic planning in a Sub-Saharan STEM university.

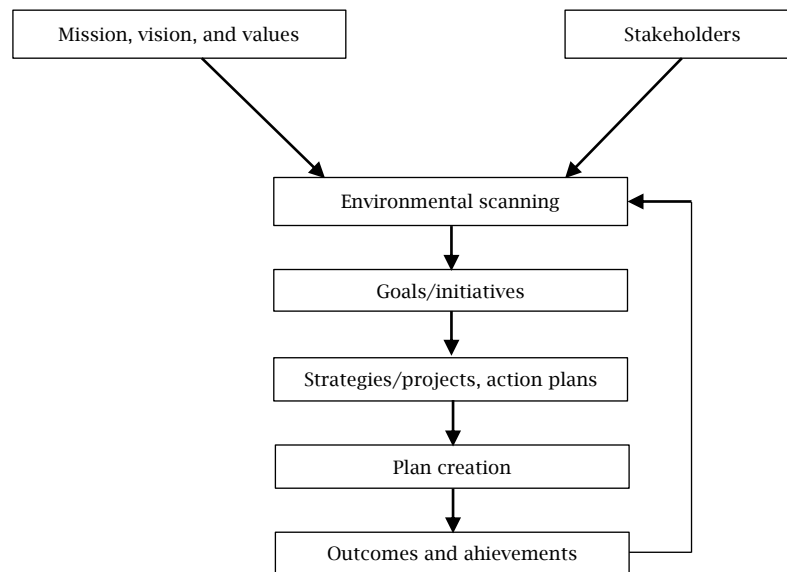
The structure of this paper is as follows. Section 2 focuses on the conceptual framework, which covers the strategic planning process and its role in a STEM university. The concept of technopreneurship is also explained in this section. Section 3 presents the nexus between strategic planning and the impartation of technopreneurship skills. Section 4 describes the way forward, while Section 5 covers the conclusion, limitations and areas for future research.

2. CONCEPTUAL FRAMEWORK

2.1. Strategic planning in a STEM university

2.1.1. *The strategic planning process in a STEM university*

Strategic planning in universities in Sub-Saharan Africa is guided by the global, regional, and institutional realities (Ngwana, 2002). Strategic planning is a process that is conducted by the top management of a STEM university. There are steps that are followed in conducting the process. The strategic planning process is illustrated in Figure 1 below.

Figure 1. Strategic planning process in a STEM university

Source: Tromp and Ruben, as cited in Immordino, Gigliotti, Ruben, and Tromp (2016, p. 39).

According to Figure 1, the strategic planning process starts with defining the vision, mission, and core values (Jalal & Murray, 2019). A vision defines where an institution intends or desires to be in the next five to ten years, while a mission explains the reason for the existence of an organisation (Immordino et al., 2016). Values are the principles and perspectives that guide the daily operations and the organisational culture (Tromp & Ruben, 2010). An institution then identifies key stakeholders, their needs, expectations, and satisfaction levels (Immordino et al., 2016). Environmental scanning is conducted through analysing a university's current situation, i.e., analysing the socio-economic, political, regulatory, technological, and cultural environment (Akyel et al., 2012; Jalal & Murray, 2019). This helps an institution to develop relevant goals. Furthermore, environmental analysis enables an institution to design strategies for exploiting its strengths and opportunities for its benefit and deal with weaknesses and threats. After that, goals or initiatives are defined leading to the designing of strategies and actions plans, which explain what needs to be done to achieve the goals. Through plan creation, documents are created clearly articulating the university's plan, which guides the organisation's operations (Bryson, 2011). Outcomes and achievements relate to the translation of goals, strategies and action plans into meaningful results that are used to assess the performance of an institution (Immordino et al., 2016).

2.1.2. The role of strategic planning in a STEM university

According to Bryson (2011), strategic planning is "a deliberate disciplined effort to produce fundamental decisions and actions that shape and guide what an organisation is, what it does, and why it does it" (p. 26), it helps an organisation to identify "who we are" and "who we want to be." The strategic planning process, therefore, articulates future strategic direction for the university, its schools or faculties, and departments (Chen, Nasongkhla, &

Donaldson, 2018; Khudair, Atta Abd, & Fahmi, 2019). As such, it involves the identification and implementation of strategies that define the behaviour of the university in a dynamic and uncertain environment (Akyel et al., 2012). Albon et al. (2016) concur that strategic planning in universities is important for clarifying future directions, providing a coherent basis for decision-making, establishing priorities, and improving organisational performance. In this context, strategic planning influences how the university should be structured in terms of governance, the learning programmes, their content, and how the programmes should be taught (Immordino et al., 2016). Albon et al. (2016) agree that the quality of teaching, learning programmes and students experiences are a product of strategic planning.

Strategic planning usually focuses on enhancing the quality of teaching, increasing research opportunities, and fostering community partnerships in higher education institutions (Amoli & Aghashahi, 2016; Khudair et al., 2019; Nataraja & Bright, 2018; Sart, 2014). Furthermore, strategic planning encompasses the accreditation of the institution and its learning programmes (Guerra, Zamora, Hernandez, & Menchaca, 2017; Immordino et al., 2016). Strategic planning has become a standard tool for managing universities today (Albon et al., 2016; Chen et al., 2018).

This current era of complexity, competition, and rapid change has necessitated strategic planning (Albon et al., 2016; Sart, 2014). Universities are engaged in strategic planning to make beneficial strategic changes to adapt to the rapidly shifting environment (Hassanien, 2017). Strategic planning, thus, enables institutions to respond to issues of concern to stakeholders and the organisation. In that way, university leadership can meet the constantly changing needs and expectations of the clients served by the institution (Guerra et al., 2017).

An institution's values, vision, mission, and strategic goals determine resource allocation to divisions, departments, and sections. In universities, the allocation of resources to directorates, faculties

or schools, departments or disciplines is influenced by values, visions, missions, and strategic goals (Guerra et al., 2017; Nataraja & Bright, 2018). In most cases, resources in universities are limited. Resources are focused on a limited number of strategic efforts, departments, or goals that are regarded as critical (Guerra et al., 2017). Strategic planning defines departments or goals that are regarded as priority areas (Immordino et al., 2016). The value attached to a department or centre is determined by the strategic direction that a university is taking.

The performance of universities is effectively measured with the aid of strategic planning. Moreover, it creates a platform for a continuous process of examining and evaluating a university's strengths, weaknesses, goals, resource requirements and allocation, and prospects for the future (Sart, 2014). Such an evaluation leads to the creation of a strong institution.

2.2. Technopreneurship

Technopreneurship combines technical know-how and entrepreneurial skills to create a new and versatile business model (Suradi et al., 2017). Therefore, there is an innovative application of science and technical knowledge by individuals who create and lead a business (Abbas, 2018; Fowosire et al., 2017; Selladurai, 2016). The achievement of economic development is hinged on making entrepreneurship "the sole base of innovation in science and technology" (Fowosire et al., 2017, p. 2). Therefore, both technology and entrepreneurship are required to effect economic prosperity as they empower individuals to use commercial opportunities to the advantage of their businesses (Nurdiyanto, 2018). Fowosire et al. (2017) assert that engineers possess high technical skills, but they lack business skills and entrepreneurial mindset that are important for business success. Technopreneurship, which imparts both technical and entrepreneurship skills, should constitute the science and engineering curricular in universities. Graduates with technopreneurship skills create a competitive advantage in organisations leading to sustainable business growth (Fowosire et al. 2017). Consequently, economic growth takes place. Thus, there is a strong and positive correlation between technopreneurship and business growth.

A technopreneur is a skilled businessperson who is "innovative, creative, enthusiastic, curious, able to enter unexplored paths, has no fear of failure, and is able to use technology as a key integrated component of goods and services" (Toral, as cited in Abbas, 2018, p. 563). Fowosire et al. (2017) concur that technopreneurs utilise technology to create innovative products and services through commercialisation. Businesses owned by technopreneurs are characterised by "high growth potential and high leverage of knowledge and intellectual property" (Fowosire et al., 2017, p. 4).

In today's constantly changing environment, strategic directions or decision-making processes are becoming complex. Therefore, universities, through their various academic and training programmes, should produce strategic thinkers with technopreneurship skills who can succeed in the rapidly changing and complex global environment (Fowosire et al., 2017). This is

substantiated by Paramasiva and Selladurai (2017) who observe that technopreneurship education should "highlight the development of skills and talents required to generate a technical mindset and trains future leaders to solve complicated problems" (p. 1174). Therefore, technopreneurship education should address technical and business problems.

3. THE NEXUS BETWEEN STRATEGIC PLANNING AND THE IMPARTATION OF TECHNOPRENEURSHIP SKILLS

The triple helix model (THM) states that the three spheres of academia, industry and government interact freely to utilise knowledge and technology for the benefit of the economy (Bomani et al., 2019; Walker, 2012). In this model, the academia (universities) transfer technological and entrepreneurial skills to students and the community (Bomani et al., 2019) according to their strategic plans. Pei-Lee and Chen-Chen (2008) argue that the success of technopreneurship programmes is a result of the institution's organisational structure, management policies and priorities. Given that strategic planning concerns the determination of long-term goals and how the goals will be met (Taylor & Miroiu, 2002), a STEM university that has entrepreneurship as part of its strategic initiatives will have teaching and learning operational strategies that embrace the impartation of entrepreneurship skills to its students.

In some STEM universities, technopreneurship is enshrined in the strategic plan of the institutions. The vision, mission, strategic goals, and strategy capture technopreneurship. In fact, it is central to the strategic planning of a STEM university. Suradi et al. (2017) concur that the success of technopreneurship is hinged on a well-designed and implemented strategic plan. If technopreneurship is not explicitly stated in a university strategy, implementation becomes a challenge as it viewed as a non-core component of the strategy. University leadership should be dedicated to technopreneurship to ensure its successful implementation. Dedicated and visionary leadership is a key to the successful formulation and implementation of strategic plans (Immordino et al., 2016).

A STEM university strategic plan determines the type of human resource required to attain the strategic goal. The strategic plan clearly defines individuals with specific knowledge, skills, experience and exposure to offer courses in technology and entrepreneurship and foster an entrepreneurial spirit among STEM students (Genç, Sesen, Castanho, Kirikkaleli, & Soran, 2020). In this way, strategic planning plays a pivotal role in imparting technopreneurship skills to students and communities. Such skills are important for societal development, and better equip the society for the FIR.

In the strategic planning process, a STEM university identifies key stakeholders (Immordino et al., 2016). One of the key stakeholders for a STEM university is industry. Industry, through industrial attachments or internships, creates an opportunity for students to have exposure to reality (Abbas, 2018; Ikhtiangung & Aji, 2019). Students are exposed to industrial technology, as well as the commercial part of the industry. In that way, students acquire technopreneurial skills. The industry is also invited

by universities on campus as guest lecturers to share their practical experience with business and technology. Some universities have established strategic partnerships with international universities (Abbas, 2018). Such partnerships create platforms for universities to explore new ideas, share information on technopreneurship for the benefit of students.

Through strategic planning, STEM universities provide facilities such as laboratories, research assistants, business incubators, science parks and many other important resources (Abbas, 2018). These facilities enhance the transfer of technopreneurship skills to students and the community. A university's strategic plan should clearly spell out the resources and facilities to achieve the mission and the goals (Guerra et al., 2017). Some universities have, through research and development, produced products to the market. Students gain technopreneurship skills, as they are involved in these researches and production of products.

The degree programmes offered, and courses taught in those degrees are a product of strategic planning (Immordino et al., 2016; Sumarno & Suarman, 2017). In some STEM universities technopreneurship courses are taught in both science and engineering degree programmes. The aim is to produce a graduate who has both technical and entrepreneurial skills that are critical for business growth and economic development. Massachusetts University of Technology (MIT) teaches entrepreneurship to engineering students (Walker, 2012). Consequently, entrepreneurship courses have increased entrepreneurial intentions among science and engineering students (Souitaris et al., as cited in Walker, 2012). In Botswana, Botswana International University of Science and Technology (BIUST) provides both science and engineering students with theoretical and practical entrepreneurship courses (BIUST, 2017). This is a new concept in Sub-Saharan Africa.

University strategic planning also influences the pedagogical approaches to be adopted in imparting technopreneurship skills to students (Immordino et al., 2016). Such pedagogical methods include lectures, study visits to research centres, the use of university incubation centres, market and company visits, industrial attachment, project presentations, the use of industry experts or guest lecturers, and group discussions. University operational teaching and learning strategic plans determine the allocation of resources for teaching approaches adopted in the institution. In addition, they determine new course developments in line with market demands as well as the associated infrastructure requirements for such new courses (Taylor & Miroiu, 2002).

Depending on the strategic direction of a university, some institutions have established centres of entrepreneurship that serve to impart entrepreneurship skills to science and engineering students (Walker, 2012). In addition, such centres combine with partners from industry, academia, and government to stimulate the technopreneurial spirit among students and the community. In this way, technopreneurship becomes an interface between universities and their stakeholders.

4. RECOMMENDATIONS

To continue to be relevant, it is critical that universities transform themselves into institutions that respond to the new realities of the FIR. This should be reflected in the strategic planning of universities. Thus, the vision, mission, values, and goals should capture technopreneurship. The successful implementation of programmes is dependent on the strategic goals and priorities of a university (Suradi et al., 2017). This creates a positive attitude among staff and STEM students towards entrepreneurship courses. Furthermore, STEM programmes and entrepreneurship require adequate budgets or funding to ensure the successful transfer of technopreneurship skills to students and the community. Resources are always scarce in universities. Departments and centres that are invisible in the strategic plan tend to be underfunded, as they are not regarded as important. Usually, they receive minimum attention from university management.

Offering entrepreneurship courses to science and engineering students is a relatively new concept in Africa that can meet resistance from both students and academic staff from science and engineering. It is, therefore, important that academic staff get oriented about the importance of teaching entrepreneurship to STEM students. Furthermore, top management support is needed for the successful implementation of technopreneurship programmes (Suradi et al., 2017).

While some STEM universities have established science parks and incubation centres and research centres (Abbas, 2018), more universities should do so to ensure technology transfer to students and the community. Furthermore, science parks and business incubation centres promote entrepreneurial growth, which is needed for economic development. Students, through the incubation centres, can link theory to practice.

When a centre of entrepreneurship is created, it should be given the freedom to interact with the industry, academia, and government institutions so that it carries out its mandate. Strategic partnership enables students to interact with industry and business experts who share with students' practical experiences (Walker, 2012). Strategic partnerships with international universities facilitate the sharing of knowledge about technopreneurship for the benefit of students. Various pedagogical approaches are adopted in teaching entrepreneurship (Immordino et al., 2016). Some teaching methodologies require resources for travelling and meeting experts from the industry. Universities need to avail resources for such efforts.

All students in a STEM university, like in the MIT, should do courses in entrepreneurship so that they are equipped with both technical and entrepreneurial skills that are important in the industry and the wider economy. Fowosire et al. (2017) note that engineers have technical skills, but they lack an entrepreneurial mindset required for business success. Given that the rate of unemployment among university graduates in Africa is increasing, STEM students should be equipped with entrepreneurship skills so that they can start and run their businesses and create employment for their communities. Degree programmes should be

restructured to address the needs of the FIR. If universities are to remain relevant in this era, they need to embrace the change brought by the FIR.

Developing technopreneurs among students requires transformational university leadership (Mujani et al., as cited in Suradi et al., 2017). Such leadership should be able to draw talents and establish and maintain working relationships among scientists, academics, engineers, and entrepreneurs (Suradi et al., 2017). University academic staff and students will be able to draw from a wealth of knowledge and experience.

5. CONCLUSION

The FIR places technopreneurship at the centre of economic development in both developing and developed nations. Economies across the globe are actively making efforts to transform from resource-based to knowledge-based economies for sustained economic growth. Universities have become critical conduits for imparting technopreneurship skills to university graduates who are critical agents in this transformation. The purpose of this conceptual paper was to explore the nexus between university strategic planning and the impartation of technopreneurship skills among STEM university students in the context of Sub-Saharan Africa. Methodologically, the paper adopted an integrative approach in reviewing, critiquing, and synthesising scholarly literature on the link between strategic planning and the impartation of technopreneurship skills in Sub-Saharan African STEM universities of Africa.

This paper argues that for a university to remain relevant in the FIR, it should be capable of imparting both technical and entrepreneurship skills to STEM students to enable them to fit in the current dispensation. From the analysis of literature, it is evident that the unemployment rate in Sub-Saharan Africa is rising. As such, it has become imperative that universities should be capable of not only producing employment-ready graduates but instead equally impart technopreneurship skills and competencies, which enable graduates to create employment.

Furthermore, the paper argues that strategic planning has an impact on the transfer of technopreneurship skills to students and the community. The critical analysis of the literature

revealed that a university's strategic plan defines the direction of the institution. Hence, it influences the allocation of resources, courses to be taught, pedagogical approaches to be adopted, and equipment to be procured. Furthermore, the literature indicated that strategic plans also influence the attitudes of students and instructors towards certain courses or modules, thereby affecting how students acquire skills in certain courses.

This study also established that the offering of entrepreneurship courses to STEM students is a relatively new concept in Sub-Saharan Africa. As such, it is critical for both academic staff and students to appreciate how entrepreneurship skills and competencies are a critical enabler for STEM graduates to either start their own businesses or contribute towards an FIR established firm's entrepreneurial orientation strategies. There are however some STEM universities in Sub-Saharan Africa that have embraced the need to incorporate entrepreneurship courses in their curricula and have even established science parks and incubation centres and research centres that have been instrumental in technology transfer to their students and the community.

Based on the literature review, this paper contributed to knowledge by suggesting that strategic planning should encompass technology and entrepreneurship in the vision, mission, and strategic goals, as these influence the impartation of technopreneurship skills. If universities are to be relevant in the FIR, technopreneurship should be central to teaching and learning.

This study has its own limitations. Firstly, the study is based on the critical analysis of the literature. Therefore, empirical research needs to be conducted to ascertain the findings of this study. Secondly, the study focuses on Africa, hence it may not be generalised to the whole world as Africa has a unique socio-economic context. Thirdly, the researchers targeted STEM universities. Therefore, some of the results of the study cannot apply to comprehensive universities.

Future studies could focus on an empirical study of the impact of strategic planning on the impartation of technopreneurship skills in STEM universities in Africa, and other parts of the world. Another area of study could be the challenges faced by African universities in imparting technopreneurship skills.

REFERENCES

1. Abbas, A. A. (2018). The bright future of technopreneurship. *International Journal of Scientific & Engineering Research*, 9(12), 563-566. Retrieved from https://www.researchgate.net/publication/329715398_The_bright_future_of_Technopreneurship
2. Abdulgani, M. A., & Mantikayan, J. M. (2017). Exploring factors that affect technopreneurship: A literature review. *CCSPC R&D Journal*, 1(2), 98-114. Retrieved from https://www.researchgate.net/publication/327542134_Exploring_Factors_that_Affect_Technopreneurship_A_Literature_Review
3. Akyel, N., Korkusuz Polat, T., & Arslankay, S. (2012). Strategic planning in institutions of higher education: A case study of Sakarya University. *Procedia — Social and Behavioral Sciences*, 58, 66-72. <https://doi.org/10.1016/j.sbspro.2012.09.979>
4. Albon, S. P., Iqbal, I., & Pearson, M. L. (2016). Strategic planning in an educational development centre: Motivation, management, and messiness. *Collected Essays on Learning and Teaching*, 9, 207-226. <https://doi.org/10.22329/celt.v9i0.4427>
5. Amoli, S. J., & Aghashahi, F. (2016). An investigation on strategic management success in an educational complex. *Procedia — Social and Behavioral Sciences*, 230, 447-454. <https://doi.org/10.1016/j.sbspro.2016.09.056>

6. Assan, J. K. (2019, April 23). *Why social science? Because it helps to address graduate unemployment in Sub-Saharan Africa*. Retrieved from <https://www.whysocialscience.com/blog/2019/4/23/because-it-helps-to-address-graduate-unemployment-in-sub-saharan-africa>
7. Bomani, M., Fields, Z., & Derera, E. (2019). The role of higher education institutions in the development of SMEs in Zimbabwe. *International Journal of Business and Management Studies*, 11(2), 1-15. <https://tjbm.org/index.php/ojs/article/view/21>
8. Botswana International University of Science and Technology (BIUST). (2017). *2017/2018 academic calendar*. Palapye: BIUST.
9. Bryson, J. M. (2011). *Strategic planning for public and nonprofit organizations* (4th ed.). San Francisco, CA: Jossey-Bass.
10. Chen, S.-H., Nasongkhla, J., & Donaldson, J. A. (2018). A strategic planning process model for developing open educational resources. *International Journal of Information and Education Technology*, 8(5), 362-368. <https://doi.org/10.18178/ijiet.2018.8.5.1064>
11. Dooris, M. J., Kelley, J. M., & Trainer, J. F. (2004). Strategic planning in higher education. *New Directions for Institutional Research*, 2004(123), 5-11. <https://doi.org/10.1002/ir.115>
12. Dowsett, L. (2020). Global university rankings and strategic planning: A case study of Australian institutional performance. *Journal of Higher Education Policy and Management*, 42(4), 478-494. <https://doi.org/10.1080/1360080X.2019.1701853>
13. Fowosire, R. A., Idris, O. Y., & Opoola, E. (2017). Technopreneurship: A view of technology, innovation, and entrepreneurship. *Global Journal of Research in Engineering: Electrical and Electronics Engineering*, 17(7), 1-7. Retrieved from https://globaljournals.org/GJRE_Volume17/5-Technopreneurship-A-View-of-Technology.pdf
14. Genç, S. Y., Sesen, H., Castanho, R. A., Kirikkaleli, D., & Soran, S. (2020). Transforming Turkish universities to entrepreneurial universities for sustainability: From strategy to practice. *Sustainability*, 12(4), 1496. <https://doi.org/10.3390/su12041496>
15. Goldman, C. A., & Salem, H. (2015). Getting the most out of university strategic planning: Essential guidance for success and obstacles to avoid. *Rand Corporation*. <https://doi.org/10.7249/PE157>
16. Guerra, F. R., Zamora, R., Hernandez, R., & Menchaca, V. (2017). University strategic planning: A process for change in a principal preparation programme. *International Journal of Educational Leadership Preparation*, 12(1), 1-14. Retrieved from <https://eric.ed.gov/?id=EJ1145462>
17. Hassanien, M. A. (2017). Strategic planning in higher education, a need for an innovative model. *Journal of Education, Society and Behavioural Science*, 23(2), 1-11. <https://doi.org/10.9734/JESBS/2017/37428>
18. Hayward, F. M. (2008). Strategic planning for higher education in developing countries: Challenges and lessons. *Planning for Higher Education*, 5-12. Retrieved from https://www.researchgate.net/publication/234563522_Strategic_Planning_for_Higher_Education_in_Developing_Countries_Challenges_and_Lessons
19. Ikhtiyang, G. N., & Aji, G. M. (2019). Strategies to grow the technopreneurship in polytechnic student. *Advances in Social Science, Education and Humanities Research*, 354, 199-204. <https://doi.org/10.2991/icastss-19.2019.42>
20. Immordino, K. M., Gigliotti, R. A., Ruben, B. D., & Tromp, S. (n.d.). Evaluating the impact of strategic planning in higher education. *Educational Planning*, 23(1), 35-47. Retrieved from http://isep.info/wp-content/uploads/2016/04/23-1_4evaluatingimpact.pdf
21. Jalal, A., & Murray, A. (2019). Strategic planning for higher education: A novel model for strategic planning process for higher education. *Journal of Higher Education Service Science and Management*, 2(2), 1-10. Retrieved from <https://joherd.com/journals/index.php/JoHESSM/article/view/31>
22. Kamuzora, F. (2012). *Taking university-industry linkages to higher heights in Africa: A practical guide*. Retrieved from <https://cutt.ly/Rbfbz9h>
23. Khudair, A. H., Atta Abd, K. M., & Fahmi, A. M. (2019). Impact of strategic planning practices on academic marketing in Iraq higher education. *Academy of Strategic Management Journal*, 18(2), 1-7. Retrieved from <https://www.abacademies.org/articles/impact-of-strategic-planning-practices-on-academic-marketing-in-iraqi-higher-education-7935.html>
24. Lakitan, B. (2013). Technopreneurship as a strategic mechanism for commercializing university-created technology. Paper presented at *Technopreneurship Seminar at Lampung University* (pp. 1-8). Retrieved from https://www.researchgate.net/publication/273634674_Technopreneurship_as_a_Strategic_Mechanism_for_Commercializing_University-created_Technology
25. Maunganidze, L., Faimau, G., & Tapera, R. (2016). Graduate employability in Botswana: Challenges and Prospects. *Mosenodi Journal of the Botswana Educational Research Association*, 19(1), 13-29. Retrieved from https://www.researchgate.net/publication/307631423_Graduate_Employability_in_Botswana_Challenges_and_Prospects
26. Nataraja, S., & Bright, L. K. (2018). Strategic planning implications in higher education. *Arabian Journal of Business and Management Review*, 8(2), 1-12. Retrieved from <https://www.hilarispublisher.com/open-access/strategic-planning-implications-in-higher-education-2223-5833-1000339.pdf>
27. Ndung'u, V. (2014). An investigation into the influence of culture on employability and work ethic, and the role of tertiary educators on graduate preparedness in Botswana. *European Scientific Journal*, 10(10), 9-99. <https://doi.org/10.19044/esj.2014.v10n10p%25p>
28. Ngwana, T. A. (2002). *Higher education strategic planning in Sub-Saharan Africa: A case study of Cameroon*. Retrieved from <https://eric.ed.gov/?id=ED477151>
29. Nurdianto, H. (2018). A work-based learning model with technopreneurship. *Global Journal of Engineering Education*, 20(1), 75-78. Retrieved from <http://www.wiete.com.au/journals/GJEE/Publish/vol20no1/11-Nurdianto-H.pdf>
30. Paramasivan, C., & Selladurai, M. (2017). Technopreneurship education: Teach and train the youths. *Asian Journal of Management*, 8(4), 1173-1176. <https://doi.org/10.5958/2321-5763.2017.00178.0>
31. Pei-Lee, T., & Chen-Chen, Y. (2008). Multimedia University experience in fostering and supporting undergraduate student technopreneurship programs in a triple helix model. *Journal of Technology Management in China*, 3(1), 94-108. <https://doi.org/10.1108/17468770810851520>

32. Phania, B. V., & Bhaskar, R. A. (2018). University-industry linkage in furthering innovation landscape towards a sustainable knowledge economy: Issues and challenges. *Tech Monitor, Apr-Jun 2018*, 21-32. Retrieved from https://www.researchgate.net/publication/327039981_University-Industry_Linkage_in_furthering_Innovation_Landscape_towards_a_sustainable_Knowledge_Economy_Issues_Challenges
33. Sart, G. (2014). Strategic model and strategic planning in higher education. *International Journal of Social and Economic Sciences*, 4(1), 34-37. <http://ijses.org/index.php/ijses/article/view/122>
34. Selladurai, M. (2016). Conceptual framework on technopreneurship. *SELP Journal of Social Science*, 7(27), 92-97. Retrieved from https://www.academia.edu/28721254/CONCEPTUAL_FRAMEWORK_ON_TECHNOPRENEURSHIP
35. Sumarno, & Suarman. (2017). Development of technopreneurship-based entrepreneurship education for students at Universitas Riau, Indonesia. *International Journal of Economic Research*, 14(12), 65-74. Retrieved from <https://www.researchgate.net/publication/320689723>
36. Suradi, S., Yasin, R., & Rasul, M. S. (2017). Increasing technopreneurs for a developing nation: The Majlis Amanah Rakyat (MARA) experience. *Journal of Technical Education and Training*, 9(1), 73-86. Retrieved from <https://publisher.uthm.edu.my/ojs/index.php/JTET/article/view/1258>
37. Taylor, J., & Miroiu, A. (2002). Policy-making, strategic planning, and management of higher education. *Papers on Higher Education*. Retrieved from <https://eric.ed.gov/?id=ED475531>
38. Tromp, S. A., & Ruben, B. D. (2010). *Strategic planning in higher education: A guide for leaders* (2nd ed.). Washington D.C.: NACUBO.
39. Walker, K. (2012). The technopreneurship process: Academic entrepreneur university spin-offs. *RIThink*, 2, 11-22. Retrieved from http://www.rithink.hr/brochure/pdf/vol2_2012/11-22.pdf
40. Yiannakaris, E. (2017, August 18). Universities must move from teaching to transforming. *University World News: The Global Window on Higher Education*. Retrieved from <https://www.universityworldnews.com/post.php?story=20170818132115709>