CHAPTER 9

THE ROLE OF BUSINESS INCUBATORS AND SCIENCE PARKS IN FACILITATING THE DEVELOPMENT OF ACADEMIC ENTREPRENEURS

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Abstract

The primary aim of this chapter is to highlight the roles of business incubation and science parks in facilitating academic entrepreneurship. This chapter explores how best to utilize business incubation and science parks in managing the connection between business incubation centres and higher educational institutions. It examines the activities of business incubation and science parks as they relate to entrepreneurial universities and provides an overview of the key challenges associated with developing entrepreneurial universities. Findings are presented in the form of a conceptual framework that facilitates an improved understanding of the benefits of connecting the capabilities, activities, and outcomes associated with higher education and business incubation. The goal of this chapter is to contribute to a general understanding of the economic growth and development impact of business incubators, thereby assisting governments and policymakers in creating environments that promote entrepreneurship and national development. The definitions, types, strategies, and programmes of business incubation are all covered in detail in this chapter. This chapter also covers the stages of incubation programs, including the start-up, early-stage, and expansion stages. The statistical evaluations of business incubators all over the world are also discussed. The chapter offers a lens by which to consider the design of BICs as they relate to Academic entrepreneurship and offers pathways to consider future research.

Introduction

The origins of academic entrepreneurship (AE) can be traced back to the university's atmosphere and mission. Universities have always been seen of as knowledge repositories and generators, with a commitment to preparing graduates for gainful work. The university's third purpose, which is based on fundamental research, has resulted in incubation and scientific parks (Siegel and Wright, 2015). The genetics of birds that lay eggs and sit on them for several days before hatching into a mature chick gave rise to the concept of incubation. In today's world, new firms are like the proverbial eggs that must be fostered in order to live. University business incubators and scientific parks are special incubators on campus that help entrepreneurs and spinoffs grow by transferring knowledge and technology, applying innovation, and providing additional support services. According to Collins (2021), a scientific park is an area, usually associated with

a university, where a large number of private enterprises, particularly those involved in high technology, are concentrated. University business incubators are special incubators located on campus to build entrepreneurs and spinoffs through knowledge and technology transfer, innovation application, and other supportive services rendered to the spinoff. Business incubators are tools designed to house incubates in a conducive environment in order to build an entrepreneurial society, whereas university business incubators are special incubators located on campus to build entrepreneurs and spinoffs through knowledge and technology transfer, innovation application, and other supportive services rendered to the spinoff. Therefore, to drive entrepreneurship, we need the creative application of knowledge that comes from innovation as innovation is said to be knowledge-based. It is a common knowledge that creativity has two major ingredients, namely; artistic, which is usually talent-based and scientific, which is skill-based

Encouragement of entrepreneurship through small and medium firms is vital in a developing economy like Nigeria. Business incubators are initiatives that use a combination of resources and services to help new businesses get off the ground faster. Business incubators are valuable resources for encouraging new graduates to launch their own companies. Participating in the incubation program allowed universities to make a substantial contribution to the economy's growth. Science parks and university business incubators, according to Rakesh Basant (2016), develop academic entrepreneurs and maintain spin-offs. Universities are increasingly offering entrepreneurial education and focusing on it rather than the traditional manner of teaching.

Academic Entrepreneurship

Academic entrepreneurship takes the form of formal commercialization activities like patenting, licensing intellectual property, and forming technology-transfer spin-off companies, as well as informal commercialization activities like contract research and consulting with industry and other external stakeholders (Blair & Shaver, 2020; Abreu & Grinevich, 2013). Universities provide a variety of mechanisms to aid the development of formal commercialization activities, including science, technology, or research parks, incubators and accelerators, entrepreneurship courses and programs, entrepreneurship centers, alumni commercialization funds, and student business plan competitions (Siegel & Wright, 2015). Beyond the institution's first and second purposes of teaching and research, academic entrepreneurship is considered the third mission of a university (Marzocchi, Kitagawa & Sanchez-Barrioluengo, 2019). Universities pursue this third goal to generate new revenue streams, create new businesses, and contribute to local and national socioeconomic development as well as the development of knowledge-based communities in the face of tightening institutional budgets.

Academic entrepreneurship has risen to the top of policymakers' priority lists in order to spur national economic growth. Universities are eager to demonstrate their contribution in response to this increasing push to demonstrate a commercial outcome. The advantage of a university to society, on the other hand, is difficult to demonstrate because research and teaching are used in a

variety of ways. The majority of emphasis is usually placed on so-called university spin-off companies (USOs), which are new businesses that arise directly from the university's research side (Duruflé, Hellman, & Wilson, 2018). Literature that is relevant The existing literature reveals at least three commonly acknowledged taxonomies when it comes to the many conceptions and definitions of academic entrepreneurship namely;

Commerce Definition
Transfer Knowledge Definitions
Value-add Definitions

Commerce Definition

The core notion of academic entrepreneurship, according to Gubbins et al. (2020), stems from commercial profitability and the emergence of university spin-offs (USOs). (Audretsch, 2014; Van Toan, 2021). Other authors had considered any enterprise founded on intellectual property developed within universities, regardless of whether the entrepreneur was a member of academia or not (De Almeida Borges et al., 2020). It's worth noting that the definitions only apply to entrepreneurial aims that don't have a monetary value, such as knowledge transmission. The definitions that followed broadened the scope and challenged the notion. According to Ziyae and Tajpour (2016), organizational, individual, institutional, and environmental factors have a positive and significant impact on entrepreneurial university in science and technology parks.

Transfer Knowledge Definitions

The juxtaposition of universities' technological talents and competences is frequently overlooked (Dost et al., 2019; Rao, 2019). Tajpour et al., (2017) defended the idea that the suggestion scheme has a positive effect on the creativity of bank employees. Although authors such as Melkas et al. (2019), Pisoni et al. (2018), and Steinfield & Holt (2019) see AE as a means of advancing businesses by changing academic knowledge, which is the foundation of monetary value production. According to Pilegaard et al. (2010), collaboration and partnerships between academia and business are common. Mohar et al. (2010) took it a step further, promoting AE as the primary principle for company turnaround and long-term economic viability.

Value-add Definitions

The final defining category considers entrepreneurship to be a cradle of societal value, but does not prioritize monetary value or proving the value and credibility of researchers and professors. Industry and academia have an inextricably linked relationship that is both profound and multi-faceted, with their destinies interlinked. Looking ahead, both must build a long-term, mutually beneficial collaboration in which academic research is suitable and industry is robust and innovative. It is not only about examining standard hard indicators like investment value and trade volume when evaluating partnership between companies and universities, but also additional qualitative criteria. There are at least two areas to consider: one is how to develop human capital (talent), and the other is how to use technology to make local businesses more competitive. According to Hogan et al. (2021), business schools and faculties play a positive part in the mission of universities through AE. AE, on the other hand, is a fundamentally abstract idea. According to recent data, AE is an important aspect of the university's technology-market matching and the USO's inception (Wadhwani et al., 2017). According to Phan and Siegel (2006), the AE is responsible for schools' efforts to stimulate entrepreneurship. This notion is supported by Hayter et al. (2018), who found that USOs are an important tool for economic and

social growth. To meet expectations for entrepreneurial growth, universities must tackle new challenges. Third-generation universities are often entrepreneurial and based on entrepreneurship and scientific approaches to tackling societal problems (Tajpour et al., 2020).

Technology Business Incubators and Science Parks

Technology Business Incubators

Several factors contribute to the failure of new and small enterprises, including a lack of managerial skills and access to high-risk finance (Dlamini, Ogunlela, Iwu & Baporika, 2022). These causes of business failure are addressed through business incubation. A business incubator, according to Hackett and Dilts (2004, p. 57), is a shared office-space facility that aims to provide its incubatees (i.e. portfolio", client-", or tenant-companies") with a strategic, value-adding intervention system (i.e. business incubation) of monitoring and business assistance. Its goal is to give the resources needed to help a young or developing business reach a certain level of maturity (Mohan & Chinchwadkar, 2022). To effectively explain what happens within an incubator, Lalkaka (2006) offers a biological analogy. According to the researcher, a venture progresses in an incubator from a) conception through b) early-stage (embryo), c) physical product (child), d) learning and testing (adolescent), and e) market entry (adult) (Lalkaka, p. 5). Incubators are classified by Temali and Campbell (1984) based on the principal source of funding. This classification yields four types of incubators, each with its own set of goals: nonprofit incubators that focus on economic development; university-related incubators that focus on commercializing science and technology developed through university research; privately sponsored incubators that seek to make money; and publicly sponsored incubators that focus on job creation (Cadorin, Klofsten & Lofsten, 2022). A university incubator is sometimes known as a technology business incubator (TBI), which focuses on the formation of technology-based businesses (Lalkaka, 2006). Universities, research laboratories, and scientific or technology parks are frequently related with TBIs (Corsi & Di Berardino, 2014; Lalkaka, 2006; Phan et al., 2005). Incubators for technology businesses bring together technology, know-how, entrepreneurial talent, and funding (Mohan & Chinchwadkar, 2022).

They provide tangible resources and intangible chances in a shared physical setting to their tenant enterprises (Mohan & Chinchwadkar, 2022). Office, communication, and administrative services (e.g., reception and printing services, and IT support); business services (e.g., strategic business planning, financial planning, finance clinics, entrepreneurship training, management counseling and training, mentoring by experts and business experts, human resource development, hot desks, and access to external networks of bankers, venture capitalists, technologists, and government offshoring); and human resource development (e.g., human resource development, hot desks, and access to external networks of bank; conference, meeting, and training rooms; computers and internet connections; shared laboratories and manufacturing space for designing and testing goods; and finance (either by investing in the ventures themselves or by arranging contact to investors). In addition, start-up companies benefit from intangible benefits such as being placed in a peer environment, access to important networks and psychological support from other tenants, and the possibility of gaining legitimacy because the incubator can improve both the tenant company's visibility and credibility.

A business incubator is a framework that specializes in fostering the formation and successful operation of small innovation (venture capital) enterprises that utilize novel scientific and practical concepts (Jenyo, Salau & Jenyo 2019). 2022 business incubation (BI) is a strategic instrument that helps a country increase its entrepreneurial base and lower the high mortality rate of SMEs, according to Dlamini, Ogunlela, Iwu, and Baporikar. A business incubator, according to Mohan and Chinchwadkar, 2022, is a business-support organization that assists in the development of new ventures and increases their chances of survival by providing various resources (tangible and intangible) and services, and then facilitates their successful exit from the incubator. The incubator's different service offerings have an impact on the overall entrepreneurial ecosystem, which includes material, social, and cultural factors. This is accomplished by supplying these businesses with the necessary materials, knowledge, consultation, and other services.

Many university spin-offs face a slew of problems, including a lack of knowledge, experience, resources, funds, and other services (Hanoku, Manisha, and Malcolm, 2011), as well as a high risk of failure. Business incubation is the process of assisting fresh start-ups in their early stages of development in order to lower the failure rate. Olafsen and Khalil (2015). According to the National Business Incubation Association (NBIA 2014), business incubation is a business support process that aims to accelerate the rate at which early-stage ventures grow by providing clients (entrepreneurs) with the human resources, networks, and other resources they need to succeed.

A business incubation program's objective is to assist entrepreneurs in the construction and growth of a new company, product, or service so that it can survive and thrive. To accomplish so, an incubation program provides a structure that aids in the development of a business concept and its transformation into a viable commercial enterprise by an entrepreneur. A successful incubation programme focuses on the implementation phase of a signature, and provides support to transform a business, not just to maintain the existing situation of a company. For example, an engineer and a seller, both lovers of cycling, raise a common idea for a new shift system. They enter programme incubation with a concept, a business plan and a minimum capital.

O'Shea and Stevens (1998) state that "the notion of innovative or entrepreneurial behaviour always corresponds to some context or set of circumstances." Innovating in one setting may not be innovative in another. Typically, an incubator's management team is required to record and publish periodic data that shows their performance in successfully graduating customers, recruiting new clients, and managing the incubator's daily operations. While each incubator may already gather and disclose such data to meet the needs of their supporters, there is currently no one source of data that allows state governments and national agencies to properly target business incubators based on their mission, need, and development. . Many stakeholders will be interested in the performance and efficacy of the business incubator they sponsor or are affiliated with (UKBI, 2011). Entrepreneurs learn to create their company plan during the pre-incubation

stage, using all of the required tools to define and realize their idea in this environment, which emphasizes quality, professionalism, and entrepreneurship.

Entrepreneurial learning requires business training, counseling, business connections, and links. This stage lasts 3 to 6 months, depending on how long the entrepreneur takes to finish his or her company strategy. Through a series of integrated services ranging from physical installation to business support, incubating companies receive all the support and have the powers and abilities necessary for the development, operation, and consolidation of the company once the entrepreneur has developed his idea into a defined and approved plan (training, business, personal tutoring, and specialised counselling, among others). When a firm develops and grows outside of the Business Incubator Physics, help is provided in the form of specialized business training, personal coaching, and a business assessment by a public or private entity, among other things.

The incubation process is critical for identifying and structuring business ideas with commercial potential, including elements of differentiation, innovation, and value added at various stages of the business process, as well as assisting the entrepreneur in developing a business plan and learning the fundamentals of modern business management. Incubators provide specialized tutoring, strategic assistance, management training, information, direction, and business connections. The business incubation process ensures that each project is in a controlled environment to develop the process of conceptualisation, structuring, simulation, and planning activities for the creation, development, and completion of the business plan.

Science Parks

The terms "science park," "technology park," "technopole," and "research park" are all used interchangeably to describe science parks. According to the International Association of Science Parks and Areas of Innovation, a science park is a professionally managed organization whose primary goal is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions. A Science Park stimulates and manages the flow of knowledge and technology among universities, R&D institutions, companies, and markets to achieve these goals; it facilitates the creation and growth of innovation-based companies through incubation and spin-off processes; and it provides other value-added services in addition to high-quality space and facilities.

A science park (also known as a technology park, technopole, research park, or science and technology park) is an organization managed by specialized professionals whose main goal is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions, according to the International Association of Scientific Parks (n.d.).

A science and technology park usually has three features:

1) A concentration of high-tech enterprises and specialized service centers;
2) the presence of at least one university/technology institute with whom tenant companies can maintain a formal link; and
3) the promotion of knowledge transfer (tacit knowledge and technology to tenant organizations) (Henriques, Sobreiro, & Kimura, 2018).

A technology park's enterprises can range from start-up companies founded by researchers and spin-off companies founded by academics looking to market their research findings to big industrial firms (United Nations Industrial Development Organization [UNIDO], 1999). An incubator, accelerator, companies at various stages of maturity, dry and wet labs, research institutes, hotel accommodation, conference/exhibition venues, onsite childcare facilities, health and wellness centers, and retail centers may all be found in a technology park (Lalkaka, 2006; O'Neal, 2005).

Tenant companies may benefit from synergies with other park members and the park's credibility, space within the park after graduation from the incubator, and the seamless integration of university learning and venture formation by locating a technology business incubator within a technology park (Lalkaka, 2006, p. 10). Park tenants may be able to pay for access to university communications, IT, and network support services, library services, laboratory equipment and services, graduates as potential employees, and qualified university personnel, as well as accumulated knowledge, consultation opportunities, and intellectual exchange (Lalkaka, 2006; UNIDO, 1999). Technology parks contribute to local, regional, and national economic growth and development through diversification of the local economy's industrial base, job creation, general and academic entrepreneurship development, skills development, income for the sponsoring university, business and personal incomes and taxes, and social development, in addition to innovation and technological development (European Commission, 2014; Lofsten & Lindelof, 2003; Phan et al., 2005).

Role of science parks in academic entrepreneurship

As noted by Amboala, and Richardson (2016) technological incubation and science parks play a number of roles in academic entrepreneurship. These include;

1. Facilitating the Commercialization Process
2. Internal Networking
3. External Networking
4. Strengthening University Culture
5. Adjusting the University Climate
6. Strengthening University Culture
7. Strengthening the Support offered by the University Technology Transfer Office

Facilitating the Commercialization Process

The commercialization process necessitates technological know-how that university innovators rarely possess, such as generating product concepts, designing items and procedures, and manufacturing or production. Technology business incubation speeds up the commercialization process by reducing faculty members' commercialization learning curve. It connects them to vital internal and external networks that help them advance their technology abilities and give them access to vital resources and services. Incubation also cuts down on the costs, time, and other delays that come with bringing a product to market. Collaboration with other essential participants in a network, as a result, leads to a more effective prototype development, testing, evaluation, and marketing process, and provides entrepreneurs with distinct benefits. These networks were deemed by the incubation center and scientific parks to enhance the processes of learning by doing, learning by utilizing, and learning by interacting.

Internal Networking

In terms of internal networks, faculty members have access to a number of learning resources that help tenant companies collaborate. Tenant companies gain access to vital information about new markets, business locations, technologies, and funding sources that they would not have otherwise. Internal networks may facilitate collaborative relationships that lead to formal or informal joint ventures and partnerships.

Faculty members are also introduced to the services of the university technology transfer office (UTTO), which serves as a technology intermediary in the incubation process by facilitating commercial knowledge transfers by licensing inventions or other forms of intellectual property resulting from university research to industry. The technical advice provided helps with commercialization by advising on knowledge transfer protocols, research and technology supply pipelines, and intellectual property protection.

External Networking

Networking on the outside External networks are similarly vital to tenant enterprises during incubation since they connect tenants with potential partners, customers, local businesses, and so on. The meticulous pre-incubation selection criteria used for tenant admittance into the university incubator may alleviate the lack of credibility that a new start-up company could otherwise encounter when dealing with investors, suppliers, customers, and workers. Incubation allows eventual access to more technology, finance, and seed capital from private financial institutions (e.g. investors and banks), government programs, and international investment by increasing the reputation of faculty members' enterprises. Business contacts in academia, industry, and government who may serve as mentors and sources of information, advanced research institutes or academic staff at other universities, other entrepreneurial support organizations, and community and local government economic development agencies are all available through incubation. When academic spin-off firms have breakthrough technology that

are appealing to foreign niche markets, export sales may result. Civera, Meoli, and Vismara (2019) discovered that academic enterprises are more likely to internationalize than non-academic companies, especially when the parent university is more internationalized. When incubation encourages academic entrepreneurship by giving faculty members access to these vital networks, it also helps them build their own social capital. According to Rasmussen and Wright (2015), academic members may lack the social capital required to transition from scientific to commercial social networks. They may have tight or strong links with colleagues in their department and fellow researchers outside of their universities, but they have only shaky or no contacts with industry.

Faculty members must interact with industry in order to identify and modify a feasible company plan, get valuable knowledge and resources, particularly financial resources, and establish a positive reputation and credibility. Faculty members should have the social skills to interact with potential clients as well as investors who offer investment and initial cash. Due to variations in expertise, interests, aims, and assumptions, certain faculty members may have difficulty engaging with actors beyond their scientific research network. To investigate the challenges faced by Western European start-ups, Van Weele, van Rijnsoever, Eveleens, Steinz, van Stijn., and Groen (2018) conducted 90 semi-structured interviews with entrepreneurs, incubator managers, investors, university technology transfer officers, mentors, and policymakers in four Western European countries. The researchers discovered that university entrepreneurs lacked an entrepreneurial culture and market orientation, as well as a lack of familiarity with activities such as pitching investors, reaching out to customers, and managing workers. The lack of market orientation, according to the experts, is due in part to European education systems that have not produced entrepreneurial talents and commercial attitudes.

Strengthening University Culture

Successful academic entrepreneurship and technology business incubation may be hampered by the different cultures of the university and the technology business incubator. Every organization (for example, the university) has its own culture, which is the set of shared values and norms that governs how members of the organization (for example, university administrators, faculty members, support staff, students, council/board members) interact with one another and with people (for example, government, accrediting agencies, grant agencies, unions, and suppliers) outside the organization. The way individuals of an organization set personal and professional goals, accomplish tasks, and manage resources to attain them is influenced by the culture of the organization (Huyghe & Knockaert, 2015). Challenges to successful academic entrepreneurship and technology business incubation can arise when universities are forced to behave like businesses by accommodating downstream commercial activities such as product development alongside upstream basic research projects (Sideri & Panagopoulos, 2018), and when universities' non-commercial environments must create a supportive environment that can potentially reduce the conflict of interests (Sideri & Panagopoulos, 2018).

At its core, the issue entails taking an institution that is equipped and accustomed to doing one thing (university research) and expecting it to establish capability for doing something very different (commercialization of technologies and ideas). The exceptional difficulty here is that universities and their professors must acquire simultaneous capacity for two tasks, rather than just switching from one (single-handed) activity to another (academic rigor and commercialization).

The pursuit of science is culturally defined as primarily a disinterested search for truth and only secondarily, a means of earning a living.... the institution of science, like other social institutions, has its own set of values, norms, and organization.... the pursuit of science is culturally defined as primarily a disinterested search for truth and only secondarily, a means of earning a livelihood. The recognition of the information gained from financed research and distributed through publishing in peer-reviewed journals and conference presentations is therefore the fundamental motivator of university scientists.

While there is evidence that entrepreneurial activities in universities and spin-off activity are linked to higher research productivity and quality (e.g., Francois & Philippart, 2019; Colombo et al., 2010; Di Gregorio & Shane, 2003; van Looy et al., 2011), there are also studies that suggest that the pursuit of academic entrepreneurship may create a cultural tension between values and interest, forcing faculty members to choose whether or not to engage in commercial activities in the first place. By combining commercial and scholarly interests, Sideri, & Panagopoulos, (2018); Causino, and Louis (1996) argue that university technology transfer efforts risk undermining the university's research and teaching goals. The reluctance to sully one's academic reputation by engaging in economic activity is noted by Lalkaka (2006). Some academics believe that the adoption of an entrepreneurial culture threatens the university's integrity and its role as an independent critic of society and producer of knowledge, because capitalization of knowledge appears to be taking precedence over disinterestedness as the standard of science (Rasmussen & Wright, 2015).

Staff employees use standards or guiding principles to establish which types of actions, events, situations, and outcomes are desirable or acceptable in the university culture. Academic entrepreneurship is fueled by university culture. A university's mission, one of the primary institutional mechanisms via which faculty members internalize the university's culture, can convey the importance and support for academic entrepreneurship. An organizational mission articulates the organization's distinctive purpose, sets the tone for its strategy, and stimulates organizational members to work toward common objectives (Bart et al., 2011). According to Huyghe and Knockaert (2015), incorporating academic entrepreneurship within the university's goal and then disseminating this information to research scientists through various modes of communication can affect research scientists' intents to engage in entrepreneurial activities (e.g. newsletters, speeches by university management, etc.). These researchers discovered that the

more universities emphasize academic entrepreneurship in their mission vs research and teaching, the greater are research scientists' intentions to engage in spin-off creation and commercialization activities involving intellectual property (i.e. patenting and licensing).

Faculty members' opinions of academic entrepreneurship may be positively shaped by a university's proclaimed principles and norms reflected in clear regulations and procedures that clarify concerns connected to their engagement in both academic entrepreneurship and incubation. Faculty members based their decisions to reveal novel innovations to the university on the university's technology commercialization policy, according to Owen-Smith and Powell (2001). The university's commercialization strategy, as well as its position on the distribution of commercialization-related revenues (e.g. net royalties, equity and equity proceeds, and licensing fees), the university's and faculty members' respective obligations, and the use of university resources (e.g. facilities, equipment, personnel, and so on) for commercialization purposes, should all be outlined in university policy. Faculty members considering academic entrepreneurship should be able to understand how the university defines and resolves conflicts of interest, commitment, and internal equity from university policy. Financial concerns can lead to conflicts of interest. Conflicts of interest can arise when faculty members use university resources for commercialization activities, manipulate research design or fail to present accurate research results if the findings do not yield a profit or the desired result for the sponsoring entity, delay the dissemination of research findings on the grounds that proprietary information must be protected in order to maintain the client's competitive edge, or delay student publication.

Adjusting the University Climate

Schneider, Ehrhart, and Macey (2013) define organizational climate as employees' shared impressions of and meaning connected to the policies, practices, and procedures they encounter, as well as the behaviors they see rewarded and anticipated. According to the literature, a university can stimulate academic entrepreneurship by addressing an essential part of its organizational climate: faculty members' rewarded behaviors. When a university's promotion and tenure system expressly rewards faculty members who engage in official and informal commercialization efforts, academic entrepreneurship may be fostered. The faculty member who establishes a spin-off firm or holds a company directorship, as well as the number of patents, licenses, and research and consultancy projects received, may receive a larger prize. Huyghe and Knockaert (2015) discovered that research scientists at six Swedish and German institutions who were expressly rewarded for entrepreneurship had greater levels of spin-off and patenting or licensing intents. Urban and Gamata (2020) discovered that university reward systems focused on academic entrepreneurial activity had positive influences on academic entrepreneurship outputs of academics and scientists working at South African universities, while also investigating organizational factors and academic entrepreneurship. Faculty members may be encouraged to consider technology transfer if the reward system is changed to reflect commercialization activities.

Strengthening the Support offered by the University Technology Transfer Office

The university technology transfer office (UTTO) is a university office that oversees the commercialization of the institution's intellectual property (IP). In the commercialization process, it acts as a link between the university and industry. Several studies have recognized the value of a UTTO in conjunction with an incubator and a science park (Holgersson & Aaboen, 2019). Caldera and Debande (2010) report that universities with both a UTTO and a science park perform better because the two organizations complement each other, while Siegel and Phan (2005) report that the incubator's role is to support university scientists' research while the UTTO handles the patenting. By providing faculty members with information, guidelines, and resources on the IP protection-commercialization process, as well as exposing them to the concept of academic entrepreneurship, the UTTO may play an essential role in preparing them for entrepreneurship and incubation. According to Sideri and Panagopoulos (2018), the UTTO was able to overcome faculty members' aversion to academic entrepreneurship by teaching them the fundamentals of commercialization and addressing significant moral and cultural concerns about technology transfer. According to the researchers, this procedure was able to address "frictions arising from the tense connection between business and science," win faculty trust, and facilitate a "meeting of minds" between faculty members and the technology transfer office. Faculty members can be inducted on the disclosure process and why and how the UTTO carries out its remit in terms of evaluating and valuating disclosures of new discoveries, seeking legal protection for the technology, selling licensing agreements to industry, collecting royalty, and enforcing contractual agreements with licensees. They understand that, once a technology is patent protected, the UTTO's decision on whether to commercialize the discovery through licensing in exchange for sponsored research, equity, or cash is based on the technology itself, that is, whether the technology is classified as an early-stage invention (i.e. a discovery based on basic research with a highly uncertain market potential), proof of concept (i.e. a technology developed to the point of commercialization), or proof of concept (i.e. a technology developed (i.e. the new technology can be constructed as a reliable method of producing a given or desired result).

University Incubators, Science Parks and Entrepreneurial Society

Globally, University Business Incubators and science parks played a major role than any other institution within the university system due to their uniqueness, they have special traits which include proper monitoring of their performance, involvement of private sectors and most of their clients/spinoffs were the graduates of the university involved. For instance, Salem (2014) allude that University business incubators are the most influential among other type of incubators, student incubatees (entrepreneurs) takes advantages from University business incubator to establish links with industries. Similarly, science parks also take initiatives to collaborates with industries and other type of incubators (Farhan, Kamariah and Nasir 2015) identify that university has become a growing trend in the development of incubators (Culkin, 2015) observe that University business incubators are more supportive to incubatees (entrepreneurs) than any

other type of incubator University incubator also provide adequate training for their incubates (students) and serve as commercial outlet for faculty research. Somsuk, Wonglimpiyerat and Laosirihongthong, (2012) further affirm that University incubator are tool to develop entrepreneurial culture for creating spinoff and to reduce the failure rate at the early stage of the spinoffs .The roles of University Business Incubators are not only to provide supportive services to new spinoffs venture rather provide avenue for leadership training and institutional development to achieve entrepreneurial reasoning and culture

University business incubators (UBIs) and sciencien parks also encourage innovation, commercialization and entrepreneurship in the society to foster economic development through the incubators contributions. (Al- mubaraki and Busler, 2010) . Also, University business incubators are described as an instrument to foster commercialization by starting spinoff (Palumbo and Domici 2013).Sammer,Farheen and Fareeha (2017) affirm that University business incubation promote spinoff ventures to establish their businesses and also, nurture and instill entrepreneurial culture and encourage them not to be a job seeker rather to be a job provide. (Lewis, 2011) allude that university business incubator accelerates spinoffs by providing quick knowledge support services and resources.

Audretsch (2014) opined that in any entrepreneurial society, University should not only depend on educating students but should build the tool that will assist innovation, entrepreneurial culture, entrepreneurial leaders and also ensure that the standard of living of the people are improved .Adelowo and Egbetokun (2012), affirm that incubation programme can be seen as economic development tool to promote entrepreneurship development and technological innovation enterprises through supportive resources and services in a conducive environment. University business incubators also, provide space for the incubates (students) on campus to nurture, mentor and give other supportive services to the spin-offs in order to grow and diversify.

University business incubators also provide special resources such as knowledge and technology, licenses to new spin offs which reduces the failure rate of such spin offs. University business incubators are to provide support to new knowledge enterprises, through transfer of scientific and technology from university to the enterprises (Hanoku, Manisha and Malcolm 2011). However, in any entrepreneurial society, universities would not depend only on educating students alone rather build the mechanisms that will advance innovation, entrepreneurial culture and entrepreneurial leaders.

The major role of Business Incubators is to help entrepreneurs start or expand their business by providing various functions in a supportive environment for business. They are composed of services that provide work spaces, utilities, facilities, equipment, cafeterias, post office, banks; and soft services that provide coaching, mentoring, making an effective business plan, counselling, legal advice, upgrading skills and techniques, networking, links to industries, access to market channels, assistance with intellectual property protection, financial resources for R&D,

access to capitals, access to potential private investors and strategic partners, administrative services, finance and accounting, and other shared services

Conclusion

In this chapter, the authors have examined the concept of academic entrepreneurship, science parks and technological incubation. In the process it is noted that these science parks and technological incubation play seven major roles in academic entrepreneurship. Although, the distinction between the concepts were not highlighted, the study affirm that both play similar roles in academic entrepreneurship. The chapter further highlighted the different types of science parks and technological incubation.

References

De Esteban Escobar, D., De-Pablos-Heredero, C., Montes-Botella, J.L., Blanco Jiménez, F.J. and García, A., 2022. Business Incubators and Survival of Startups in Times of COVID-19. *Sustainability*, *14*(4), pp, 21-39.

Dlamini, T.M., Ogunlela, O.O., Iwu, C.G. and Baporikar, N., 2022. Business Incubation Initiatives' Impacts on Entrepreneurs and SMEs. *International Journal of E-Entrepreneurship and Innovation (IJEEI)*, *12*(1), pp.1-21.

Mohan, V. and Chinchwadkar, R., 2022. Technology Business Incubation: A Literature Review and Gaps. *International Journal of Global Business and Competitiveness*, pp.1-11.

Farid, M., Ahmad, M.I.S., Baharuddin, A. and Hasan, M., 2022, January. Business Incubator Model in Support Makassar State University Edupreneur. In *International Conference on Social, Economics, Business, and Education (ICSEBE 2021)* (pp. 189-194). Atlantis Press.

Cadorin, E., Klofsten, M. and Löfsten, H., 2021. Science Parks, talent attraction and stakeholder involvement: an international study. *The Journal of Technology Transfer*, *46*(1), pp.1-28.

Cadorin, E., Klofsten, M. and Löfsten, H., 2021. Science Parks, talent attraction and stakeholder involvement: an international study. *The Journal of Technology Transfer*, *46*(1), pp.1-28.

Laspia, A., Sansone, G., Landoni, P., Racanelli, D. and Bartezzaghi, E., 2021. The organization of innovation services in science and technology parks: Evidence from a multi-case study analysis in Europe. *Technological Forecasting and Social Change*, *173*, pp.121095.

de Almeida Ribeiro, J., Ladeira, M.B., de Faria, A.F. and Barbosa, M.W., 2021. A reference model for science and technology parks strategic performance management: An emerging economy perspective. *Journal of Engineering and Technology Management*, *59*, pp.101612.

Abreu, M., & Grinevich, V. 2013. The nature of academic entrepreneurship in the UK: Widening the focus on entrepreneurial activities. Research Policy, 42(2), 408–422. https://doi.org/10.1016/j.respol.2012.10.005

Sideri, K., & Panagopoulos, A. 2018. Setting up a technology commercialization office at a non-entrepreneurial university: An insider's look at practices and culture. Journal of Technology Transfer, 43, 953 965.https://doi.org/10.1007/s10961-016-9526-z

Siegel, D. S., & Wright, M. 2015. Academic entrepreneurship: Time for a rethink? British Journal of Management, 00, 1-14. https://doi.org/10.1111/1467-8551.12116

Abreu, M., & Grinevich, V. 2013. The nature of academic entrepreneurship in the UK: Widening the focus on entrepreneurial activities. Research Policy, 42(2), 408–422. https://doi.org/10.1016/j.respol.2012.10.005

Marzocchi, C., Kitagawa, F., & Sanchez-Barrioluengo, M. 2019. Evolving missions and university entrepreneurship: Academic spin-offs and graduate start-ups in the entrepreneurial society. Journal of Technology Transfer, 44, 167–188. https://doi.org/10.1007/s10961-017-9619-3

Rasmussen, E., & Wright, M. 2015. How can universities facilitate academic spin-offs? An entrepreneurial competency perspective. Journal of Technology Transfer, 40, 782-799. https://doi.org/10.1007/s10961-014-9386-3

Hughes, A., Krabel, S., Kitson, M., Llerena, P., Lissoni, F., Salter, A., & Sobrero, M. 2013. Academic engagement and commercialisation: A review of the literature on university-industry relations. Research Policy, 42(2), 423- 442. https://doi.org/10.1016/j.respol.2012.09.007

Van Weele, M. A., van Rijnsoever, F. J., Eveleens, C., Steinz, H., van Stijn, N., & Groen, M. 2018. Start-EU-up! International incubation practices to address the main challenges faced by Western European start-ups. Journal of Technology Transfer, 43(5), 1161-1189. https://doi.org/10.1007/s10961-016-9538-8

World Intellectual Property Organization 2019. Global Innovation Index 2019: Key Findings. World Intellectual Property Organization.

Amboala, T., & Richardson, J. 2016. Technological entrepreneurship framework for university commercialization of information technology. Issues in Informing Science and Information Technology, 13, 279-290. https://doi.org/10.28945/3516

Blair, C. A., & Shaver, K. G. 2020. Of horses and jockeys: Perceptions by academic entrepreneurs. Entrepreneurship Research Journal, 10(2), 1-21. https://doi.org/10.1515/erj-2019-0011

Buckley, A. P. & Davis, S. 2016, June 9-10. Evaluating the contribution of technology start-up incubators – Exploring methodological and data-related conundrums [Paper presentation]. 13th European Conference for Research Methods in business and management (ECRM). London, U.K. https://doi:10.21427/D7403K

Caldera, A., & Debande, O. 2010. Performance of Spanish universities in technology transfer: an empirical analysis, Research Policy, 39, 1160–1173. https://doi.org/10.1016/j.respol.2010.05.016

Cooper, C. E., Hamel, S. A., & Connaughton, S. L. 2012. Motivations and obstacles to networking in a university business incubator. Journal of Technology Transfer, 37, 433-453. https://doi.org/10.1007/s10961-010-9189-0

Corsi, C., & Di Berardino, D. 2014. Assessing the business incubators performance referring the local development in Italy. European Scientific Journal, 1, 323-334.

Davis, L., Larsen, M. T., & Lotz, P. 2011. Scientists‘ perspectives concerning the effects of university patenting on the conduct of academic research in the life sciences. The Journal of Technology Transfer, 36(1), 14–37. https://doi.org/10.1007/s10961-009-9142-2

Ferrari, R. 2015. Writing narrative style literature reviews. Medical Writing, 24(4), 230-235. https://doi.org/10.1179/2047480615Z.000000000329

Francois, V., & Philippart, P. 2019. A university spin-off launch failure: explanation by the legitimation process. Journal of Technology Transfer, 44, 1188–1215. https://doi.org/10.1007/s10961-017-9648-y

Henriques, I. C., Sobreiro, V. A., & Kimura, H. 2018. Science and technology park: future challenges. Technology in Society, 53, 144–160. https://doi.org/10.1016/j.techsoc.2018.01.009

Holgersson, M., & Aaboen, L. 2019. A literature review of intellectual property management in technology transfer offices: From appropriation to utilization. Technology in Society, 59, 1-10. https://doi.org/10.1016/j.techsoc.2019.04.008