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Issues and Challenges of Technology Business Incubators in the Philippines

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ABSTRACT

The creation of various technology centers such as innovation center, incubation center, fabrication laboratory and science technology park is perceived to have a crucial role in the creation of jobs and social and economic empowerment. Nowadays, technology business incubation (TBI) is the current trend in capacitating the small and medium enterprises (SMEs) or even the start-up companies. This study explored the issues and challenges faced by TBIs in the three (3) major island of the Philippines. A qualitative approach was used in collecting the data through personal interviews to the TBI managers in order to gain in-depth knowledge and understanding to the issues and challenges they are facing. Content analysis was done to identify the relevant information. A total of eight (8) TBIs was selected randomly. The results showed that lack of funding, very slow procurement process, plantilla designation for faculty involve and no clear IP policy were among the issues and challenges that are hindering the development of an effective TBI in the Philippines.

Key words: entrepreneurship, start-ups, state university, technology business incubator, technopreneurship

1. INTRODUCTION

The widespread poverty in the Philippines has challenged many Filipinos to create innovative ideas that will address this major problem of the nation. For the past years, the Philippine government has been demonstrating huge support on the growing ideas of the Filipinos. This support can be clearly seen on the Philippine Development Plan that reinforces the thrust on entrepreneurship through trade and investment for the economic development [1] and the financial support granted to various academic agencies and institutions.

The creation of various technology centers or also known as the innovation center, incubation center, fabrication laboratory or science and Technology Park was perceived playing a crucial role in the creation of job and social and economic empowerment [2][3]. According to [4], governments around the world have been adopting policies focusing on technology advancement in their economic policy.

In the Philippines, there are a growing number of incubators where innovative ideas are promoted and supported towards commercialization.

Despite support from various institutions and success stories of some incubators, there are issues and challenges encountered by the TBIs around the world. In the study of [5] on the TBI in South Africa, it was found out that lack of sponsorship, production space, advanced technological facilities (prototype) and expansions to different areas were found to be among the challenges hindering incubators.

In some developing Asian countries like China, India, Malaysia, and Pakistan, their TBIs were perceived to be an important factor in achieving the "commercialization targets, creating new startups, promoting the entrepreneurial culture, innovation and generating revenue" (p1). However, the slow progress was due to the lack of human and technical expertise, and financial constraints [6]. On the other hand, in the study of [7], TBIs in developing countries have been facing difficulties such as inadequate financial resources, hiring qualified employees, lack of partnering opportunities, no mindset for entrepreneurship [8], less developed property rights, varied cultures, and lack of capital or investors.

In Russia, lack of technical specialists, funding, and lack of education and experience of young entrepreneurs are considerable issues encountered during the process of collaboration with foreign partners and investors [9]. These issues limit the ability to involve in business locally and globally. It was, therefore, suggested that the

systematization of resources for financial support of innovative entrepreneurship, forming conveniently integrated information systems for the whole range of programs operating at the federal and regional levels, and helping to promote are important factors to address the mentioned issue [10][11][12].

References [13] and [14] listed some issues faced by the TBIs in India. These issues are financial resources, revenue generation, hiring right members, infrastructure support, awareness in markets, customer expectations, the tenacity of founders, rules, and regulations, growth decelerators, lack of mentorship, and lack of a good branding strategy. Kumar, however, has found out that the incubators may take advantage of the large population in India, and the change of mindset of the working class.

In Serbia, the most common challenging issues faced by the TBIs are the poor growth rates, lack of venture capital, low productivity, ageing population, massive downsizing inadequate knowledge on entrepreneurship, gaps in education, no existing patent, less R&D support, and lack of funds [7].

To examine the possibility of addressing issues and challenges of TBIs, this study will determine the issues and challenges of the selected TBIs in the three major islands of the Philippines nemely Luzon, Visayas, and Mindanao which will shape the Philippine TBIs in the Philippines.

Furthermore, this study will be helpful to potential incubators and startup making them aware of the potential problems they may encounter in the future.

The paper will firstly discuss the TBI profiles including the TBI focus, products and services, partners or source of funding, and its clients. Another section of this paper will highlight the identified issues and challenges provided by the TBI managers.

2. METHODOLOGY

The Department of Science and Technology (DOST) defines Technology Business Incubator (TBI) as a "facility where start-ups are hosted, and business development services are provided" (p. 1) leaving them financially viable and able to sustain the operation. On the other hand, some of its main tasks are to offer office facilities and help start-up or spin-off companies or new entrepreneurs to realize their business objectives faster and better [15]. Like other TBIs, the TBIs in the Philippines have three major objectives which are to create jobs, develop entrepreneurs, and promote public-private partnerships in regional economic development [16].

This study adopted a qualitative method in collecting data by formal interviews to gain profound details, information and understanding of the issues and challenges of TBIs in the Philippines. This approach requires unforeseen findings without depending on numerical measurements and produces illustrative data from interviews and participant observation in describing specific occurrences [17].

2.1 Profile of TBIs

A total of eight (8) Technology Business Incubators in the Philippines were benchmarked. These TBIs were randomly selected. It has created startups and provided assistance to many clients. Table 1 shows the profile of the selected TBIs in the island of Luzon.

As can be seen, TBI 1 focuses on communication, energy, food, health, and water. This TBI is managed by one of the premier universities in Metro Manila that aims to not only commercialize research outputs of the university but also to create strong ties with the government and even new businesses. This is to help address national problems such as potable water, secured source of food production, accessible energy, affordable low-cost health care, and even world class education for the community and startups. Its partners and funding agencies are Nippon Telegraph and Telephone Corporation (NTT), Naro, Philippine Long-Distance Telephone Company (PLDT), Thailand's National Electronics and Computer Technology Center (NECTEC), Japan Radio Co. ltd. (JRC), Smart Telecommunication Technology Commission (TTC), and Department of Science and Technology (DOST).

TBI 2, on the contrary, focuses on Information and Communication Technology, Electronics System and Food Processing and Engineering that aims to assist and guide the interested and potential entrepreneurs to take first step in establishing their own business. TBI 2 was funded by the Department of Science and Technology - Innovation Council (PCIEERD) through RITTD and was identified as one of the TechHubs in the country under the CHED-IDIG Program in partnership with the Philippine Development Foundation. The center helps its incubators succeed by providing a supporting ecosystem that includes financing, mentoring, leadership, development, intellectual property protection and technology commercialization. Education becomes the first line of introducing the technopreneurship and innovative mindset among the students and faculty members. Backed by trainings sponsored by different agencies, the center has prepared an entrepreneurial curriculum suitable for students in the engineering and computing science programs. Basically, the clients of TBI 2 are students, alumni of the university, and the potential entrepreneurs.

Table 2 shows the profile of the selected TBIs in the island of Visayas. As appeared, TBI 3 is the second largest state university in the Philippines acknowledged by the Philippine Tourism for its diverse flora and fauna linking the mainland and the seaside. TBI 3 is the first of its kind in the Eastern Visayas for a wide range of services catered by the Technology Business Center (TBI) in the areas of agriculture and food. These include agribusiness and food technopreneurship that fosters livelihood, employment, the creation of local business enterprising, training and coaching, and assistance to both administrative and regulatory applications. The center is a joint venture of the University's Department of Business Management (DBM) and the Department of Science and Technology (DOST). Takers of the goods, services, and products of the TBI 3 are Industries, Local Government, Small-scale business entrepreneurs. The university in order to boost the TBI by

being included in the curriculum offering in the trainings and diploma course that will serves as an engagement framework towards operating and running a business venture.

On the other hand, TBI 4 is the first Fabrication Laboratory (FabLab) in the Philippines and is launched in 2014. As can be seen in the table, this TBI focuses on Manufacturing, Recycling, and Creative Industry in which it serves as a training provider for its clients, technology access center, and training tour provider for all benchmarkers. This fablab was initiated and continuously supported by the Japan International Cooperation Agency (JICA) in partnership with the Department of Trade and Industry (DTI), Department of Science and Technology (DOST) and the Commission on Higher Education (CHED) to support some hundreds of micro-, small-, and medium-scale enterprises (MSMEs) and allow local manufacturers to design and create almost anything through an open source software. TBI 2 help interested clients to create design prototypes, scale models, illustrate graphic designs, combine local materials and even mass-produce products faster.

TBI 5, moreover, was established through the collaboration of a private non-sectarian academic institution and the Department of Science and Technology which aims to promote technopreneurship in a conducive environment where innovative ideas and solutions can flourish and promote innovation in research and business through industry-academe partnership. Its thrusts include artificial intelligence, data analytics, machine learning, internet of things, mechatronics, and food innovation, among others that will serve the academic community.

Finally, TBI 6 was founded in partnership with and support of the Department of Science and Technology (DOST and the academe-partner. TBI 6 is an incubation facility that nurture innovative or creative ideas and create an environment where members of different sectors and disciplines can work together to develop technological innovations which can be used to solve real problems for technology-based enterprises.

Table 3 shows the profile of the selected TBIs in the island of Mindanao. As seen, TBI 7 and TBI 8 were DOST- funded innovation centers. TBI 7 is operated by the university that offers courses related to marine, sea studies, and food technology. TBI 7 is a food innovation center while TBI 8 is an innovation center for metals and engineering. At present, the TBI 8 is still in the process of procuring of equipment and establishment of the Center.

Table 1: Profile of Selected Technology Business Incubators in the Island of Luzon

TBIs	TBI Focus	Products and Services	Partners/Funding	Clients
TBI 1	Communication Energy Food Health Water	Package research for commercialization Looking for investors Provides Training and Seminars Community Support and Linkage Assistance to Intellectual Property Rights Applications Use of space and facilities Broker	NTT Naro PLDT NECTEC JRC Smart Telecommunication Technology Commission (TTC) DOST	Community & Interested startups
TB1 2	ICT, Electronics System Food Processing Engineering	Design and fabrication space System development and deployment support Expert guidance and mentorship Office and huddle space Incubation Acceleration fund.	DOST - Innovation Council (PCIEERD) through RITTD CHED-IDIG Program PhilDev Foundation DTI	Students and alumni of Batangas State University and the potential entrepreneurs.

Table 2: Profile of Selected Technology Business Incubators in the Island of Visayas

TBIs	TBI Focus	Products and Services	Partners/Funding	Clients
TBI 3	Agriculture and Food	Provision of office space at concessionary rates Access to shared use of facility Promotion and marketing assistance Provision of shovel-ready farms Branding and packaging/label design Quality and shelf-life analysis Training/coaching Technology Development and 2nd-generation tech problem research Links to strategic partners Administrative Assistance Help with regulatory compliance	DOST Local Government CHED	Industries, Local Government, Small-scale business entrepreneurs
TBI 4	Manufacturing/ Recycling Creative Industry (Creating innovative products that are not sold outside the Province)	Training Provider Technology Access Center Service Bureau Tours	JICA CHED through the University DOST-GIA	hundreds of micro-, small-, and medium-scale enterprises (MSMEs), and the community
TBI 5	Artificial Intelligence, Engineering, Robotics, Data Analytics, Green Technology, and Food	Co-working space, and use of facilities, including specialized engineering laboratories, and library and information centers Assistance to regulatory compliance, i.e. technology licensing, tech commercialization Mentoring support on legal, finance and business and technology Community support network, linkages to technology upscaling, marketing support Business permit assistance, plan formulation Provides training and services Incubation support services	The University DOST	Academic community
TBI 6	Technological innovations	Use of Incubation and IT facilities offers basic services such as: Mentoring Training Consultation Business Linkages Product Marketing Business Financer Intellectual Property Rights	Self-regulating incubation center	Tech based enterprises

Table 3: Profile of Selected Innovations Center in the Island of Mindanao

TBIs	TBI Focus	Products and Services	Partners/Funding	Clients
TBI 7	Agriculture and Food	Food Product Development Technical Training Food Processing Use of facilities and equipment	DOST Region IX	
TBI 8	Technology and Engineering	Technology and Engineering Development Shared facilities	DOST Region IX	

2.2 Data Collection and Analysis

In this study, the method used in collecting the data is a qualitative approach. After the data was collected, content analysis is applied. Structured and unstructured interviews are done to randomly selected TBIs in each island of the Philippines. This has been carried out in person by going to their place and had an interview with the managers. The analysis is done through the use of coded keywords and forming it to major themes and categories [18]. Eight (8) technology business incubators are personally interviewed. This study is done in a span of thirty (30) days as this includes the travel from Manila to other island of the Philippines.

3. RESULTS AND DISCUSSION

Table 4 shows the summary of the issues and challenges of the TBIs in the Philippines. TBI 1 has been facing various issues and challenges such as lack of financial support from the University, no allocation of item for the Operations Manager, and an absence of a clear policy regarding the shares of revenue of annual income of start-ups since 2018.

TBI 2 sees the following factors as the major issues that delay the operation of the center: slow procurement process, absence of plantilla positions for the employees, and traditional mindset of the faculty members as regards incubation center. In addition, having no success story to present to benchmarkers and others since the establishment of the center, according to TBI 2 managers, indicates that there were no success indicators and evidences.

In TBI 3, awareness and cooperation among faculty members in the university with the emergence of the need for a research center in the university is not a big issue since they adhere of the development thrust of their university on the State Universities and Colleges (SUC) performance. As the usual government offices concerns, TBI 3 encounter only issues and challenges in the procurement of the deliverables the research center. Given that the Republic Act of 9184 or also known as the procurement law that governs all government owned and controlled agencies, TBI 3 strengthen its linkage with DOST, the local government, and CHED not only for funding but also for the provision of equipment and other expert services.

In TBI 4, the sustainability of the facility was considered a major issue like the other incubation centers or fablabs. Funding and procurement of equipment are also other issues ensuring the sustainability of the laboratory. From 2015 to present, there are over 3,000 clients were assisted by the fablab, 100 workshops, classes, and training conducted, and 5,026 national and international benchmarkers.

Skilled professionals in managing business functions are one of the concerns of every business incubator. In the case of TB 5, specifically in the Food Incubation Center, the manager of the said center is an employee of the DOST and for the Innovation Labs, a faculty of the University has been responsible for the operation the contrary, since TB 6 is a stand-alone entity, the employees were not part of the University organizational structure. One of the measures of good management is the incubator's ability to attract sponsors, raise funds and mobilize resources that could be used to improve the incubator business model for incubators. In cases of TB 5 and 6, although incubators face a number of challenges not limited to lack of finance, availability of materials, limited stakeholder support, the need for financial support tends to dominate. Lack of funding means that incubators have to generate their own funding which can be quite challenging [19]. These results concur with [20] that maintains that most business incubators do not have enough in-house seed funds. Moreover, the procurement process under Republic Act 9184 is additional to the list of issues and challenges faced by business incubators.

The major problem of TBI 7 are the supply of raw materials and the research lack of linkage of the research of the researcher and the innovation center. There was one project of TBI 7 that has industry takers already but was deferred due to lack of materials.

In TBI 8, the center was funded in 2014 but it is still ongoing bidding of equipment and delivery. One of the major issues of the center is the procurement process which taking too long and there are times the delivery of equipment requested is unfit to the terms and reference of the end user.

Table 4 : Issues and Challenges of Technology Business Incubations in the Philippines

TBI	Issues and Challenges
TBI 1	Lack of financial support from the university No Item for Operations Manager No Clear internal IP Policy No income from Successful pioneering start-ups
TBI 2	Procurement process under RA 9184 No Success Stories Traditional Mindset of faculty members No Designation of Administration and Staff under Plantilla Positions
TBI 3	Location for the construction of the new Centers for TBI, other TBI is located away from the main campus Request for the funding of the deliverables affected by RA 9184 Permanent plantilla to work on the TBI Centers No available person specialized in the products design and labeling for marketability of the products
TBI 4	Sustainability of the facility was considered a major issue like the other incubation centers or fablabs. Procurement Process Source of Funding
TBI 5	Lack of funding Limited stakeholder support Legal aspect (preparation of MOAs) Lack of available packaging
TBI 6	Procurement process under RA 9184 Source of Funding The TBI employees not part of the University organizational Chart
TBI 7	Operator of equipment are faculty (on-call) There is a slot for hiring operator of equipment but there are no applicants Supply of raw materials There is no link of products to the research office
TBI 8	Procurement process Requested equipment delivery unfit to the terms and reference of the end user Commitment of Senior Faculty

4. CONCLUSION

The Philippines has already started establishing technology business incubators. This move of the Philippine government will help the SMEs to improve, enhance and capacitate their small businesses. Also, funding for such TBIs is encourage and introduced to state universities and other private higher education institutions (HEIs). HEIs has a pool of experts and great minds that will innovate and provide creative ideas in the enhancement of SMEs through TBIs.

This study explored the issues and challenges faced by the TBIs in the different island of the Philippines as they attempt to upkeep and support their clients. Based on the data collected and analyzed, the major problems of the TBIs are lack of funding, very slow procurement process, plantilla designation for faculty involve, and no clear IP policy.

These issues and challenges are hindering the development of an effective TBI. It is recommended that effective business framework and models should be developed. Also, the intensive support from the government and commitment from the people involve should be practiced. Moreover, from this, policy maker can develop policies that will advances the strategies of the TBIs.

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