

# A Preliminary Qualitative Assessment of the University of the Philippines Visayas's Technology Business Incubation Project in Western Visayas, Philippines

Frediezel G. De Leon<sup>1✉</sup>, John Lorenz R. Belanio<sup>1</sup>,  
Fredelino A. Galleto Jr.<sup>2</sup>, and Thereze Pauline V. Capaque<sup>1</sup>

<sup>1</sup> University of the Philippines Visayas, PHILIPPINES

<sup>2</sup> University of Southern Mindanao, PHILIPPINES

## Abstract

The primary role of business incubators is to provide a variety of services, resources, and facilities in support of start-ups or enterprises in the early stages of their ventures. While business incubator success indicators have been studied elsewhere, knowledge is scarce regarding incubator processes and how their support programs are organized to achieve their goal of helping out start-ups thrive and survive. This study presents an assessment of the University of the Philippines Visayas's traditional business incubation facility based in Western Visayas, Philippines, highlighting the activities involved, outputs, and outcomes. Primary data were gathered to describe the project's activities, outputs, and outcomes, while secondary data were sought from secondary data sources. The key success factors of the incubation project were derived from key informant interviews participated by 16 incubated enterprises. Incubatees underwent six activities throughout the project that led to the formulation of a business plan and improved incubatees' enterprises. The project's outcomes gauged through hard (definable and quantifiable results) and soft measures (subjective and unquantifiable results) were highlighted. The most prominent outcome based on hard measures is the growth of their enterprise. The effectiveness of the partnership has the highest impact among the soft measures. Results of the study show that incubatees deemed connections and/or partnerships as crucial to the growth of their enterprises and affiliations with other institutions serve as a window of opportunity to secure financial assistance, marketing services, and technical support. Moreover, gaining trust and establishing good working teams with individuals who are passionate and highly committed were also identified as important factors for the project's success.

**Keywords:** business incubation · entrepreneurship · partnership

**Correspondence:** FG De Leon, College of Management, University of the Philippines Visayas, Iloilo City, Philippines. Contact number: +63917 620 0770. Email: fgdeleon@up.edu.ph.

**Author Contribution:** FGDL: conceptualization, project administration; FGDL, JLRB, FAG, TPVC: data validation, data acquisition, original draft preparation, review and editing, final revision; FGDL, FAG: methodology, investigation, supervision

**Editors:** Raymundo R. Pavo, PhD, University of the Philippines Mindanao, PHILIPPINES  
Rowena DT. Bacongus, PhD, University of the Philippines Los Baños, PHILIPPINES

**Received:** 1 April 2022

**Accepted:** 26 May 2023

**Published:** 23 June 2023

**Copyright:** © 2023 De Leon et al. This is a peer-reviewed, open-access journal article.

**Funding Source:** Personally-funded project

**Competing Interest:** The authors have declared no competing interest.

**Citation:** De Leon, Frediezel G., John Lorenz R. Belanio, Fredelino A. Galleto Jr., and Thereze Pauline V. Capaque. 2023. "A Preliminary Qualitative Assessment of the University of the Philippines Visayas's Technology Business Incubation Project in Western Visayas, Philippines." *Banwa A* 15: art072.

# A Preliminary Qualitative Assessment of the University of the Philippines Visayas's Technology Business Incubation Project in Western Visayas, Philippines

**Frediezel G. De Leon<sup>1✉</sup>, John Lorenz R. Belanio<sup>1</sup>, Fredelino A. Galleto Jr.<sup>2</sup>, and Thereze Pauline V. Capaque<sup>1</sup>**

<sup>1</sup> University of the Philippines Visayas, PHILIPPINES

<sup>2</sup> University of Southern Mindanao, PHILIPPINES

## Introduction

With the prime intention to lessen the likelihood of venture failures, incubation programs surfaced in the 1950s and went through substantial development in the early 1980s to hasten the growth and stability of fresh enterprises (World Bank 2010; Al-Mubarak et al. 2013; Lalkaka 2002). Initiated in North America and Western Europe, there are currently thousands of business incubators instituted throughout the world, primarily intended to ensure a successful undertaking of small- and medium-scale enterprises, thus stimulating entrepreneurship, innovation, and socio-economic development (Adegbite 2001). A business incubator is an entrepreneurial firm that aims to support starting enterprises in their development process through the provision of support, resources, and targeted services (Matthews and Rice 1995; Thompson and Downing 2007; Cameron 2007; Masutha and Rogerson 2015). These firms help start-ups survive and flourish in the business industry by establishing the latter's credibility and assisting them to build encouraging livelihood and business networks (Peters et al. 2004; Pettersen et al. 2015). Studies centered on business provided reference frameworks on how to assess incubators' work, performance, and impacts (Tritoasmoro et al. 2022; McIver-Harris and Tatum 2020; Hackett

and Dilts 2008; Voisey et al. 2006).

With the increasing acceptance of business incubation practices, various literature has been conducted to assess the evolving incubator industry (Bøllingtoft and Ulhoi 2005; Plosila and Allen 1985; Siegel et al. 2003). The study of Lukes et al. (2019) suggests that the initial negative effect of incubation on sales revenues will have a positive effect in the long term. Start-ups, also referred to as "incubatees" once they have undergone business incubation processes, make a significant presence in the business world. Others, unfortunately, disappear. The passage of a start-up can be described as a challenging path confronted with many barriers, as established by previous researchers (Shane 2009; Xavier et al. 2014; Rubin et al., 2015). Failure of fledgling ventures has been attributed to factors such as stern competition, inadequate funding and network or linkages, unrealistic expectations, flimsy entrepreneurial knowledge, employing eligible candidates, partnership decision-making, cyber security, and gaining clients' trust (Hackett and Dilts 2004a; Shane 2009; Xavier et al. 2014). Rubin et al. (2015) have also pointed out that insufficient experience in management and nurturing capital contributes most to the collapse of start-ups. Competition and unrealistic expectations are considered to be the most prominent setbacks that affect the survival of start-up businesses. To succeed, new ventures must play aggressively in marketing and operational efforts to introduce their products and services. Moreover, it is of tantamount importance for start-ups to have high yet controlled expectations by keeping a view of the accessible resources, the scope of growth prospective, and other market elements (Hackett and Dilts 2004b).

Business incubation gained popularity due to success stories including the impact of financial management, the provision of networking opportunities and social linkages to bring value, and the establishment of collaborative relationships with other organizations (Cooper et al. 2012; Sá and Lee 2012). Business incubation has been particularly useful in terms of financial management, which is a significant element to ensure start-ups' continued existence (Sonne 2012). Extant literature demonstrates that

incubators produce successful companies through knowledge transfer and rendering services and resources, thereby building links between entrepreneurs and stability, economic growth, and long-term company survival (Porter and Kramer 2011; Schwartz and Hornych 2008; Mas-Verdú et al. 2015; Hansen et al. 2000). Given the significant impact of start-ups on the economy, studies have been conducted to fill the gaps that impede their growth in the business spectrum. This is where business incubators set in. These are entities (i.e. policy-makers, universities, and business incubators) designed to speed up the progress and attainment of entrepreneurial endeavors through a collection of business provisions that could include physical support, capital support, mentoring, and networking connections (Soetanto and Jack 2016; Mian et al. 2016). However, determining the extent of success that business incubators offer must be considered, especially in terms of expediency in implementing its projects and programs. The efficacy of business incubators has been debated at length in literature, and many theories about assessing business incubation success or effectiveness have been proposed. To lay the groundwork for a successful incubation program, incubator designers must spend time and money on a viability study to determine the critical factors associated with the program's success (O'Neal 2005). Ács and Naudé (2013) disputed that the government guidelines must explicitly be integrated into the role of the entrepreneur and the country's development. In the study conducted by Al-Mubarak and Schrödl (2011), four critical dimensions can significantly measure the effectiveness of business incubation: graduation of incubatees, the success of the business, the number of jobs created, and salaries paid by incubator clients. This four-dimension model is useful in determining the efficacy of business incubators individually and as an industry. A similar study was conducted by Obaji et al. (2014) where the role of government policy in an incubator's success was determined. The study exemplified that incubators are greatly dependent on government proclamation, which shape the program as a whole. Government funds must be directed toward the structural support of the innovation system through financial

support or other privileges. The assistance of the government must also be geared towards value addition and enterprise development (Aerts et al. 2007). Universities and the academe play a vital role in innovative and technological development, and most literature agree that the presence of a major university is significant, though not sufficient, for the development of technology-oriented enterprises (Price 2004; Allen and Rahman 1985; Mian 1996; Smilor 1987; O'Shea et al. 2005). Universities serve as outlets for students' ideas that can be commercialized and can potentially have increasing shareholder value in the future. Academes are also seen as a natural breeding ground for the incubation industry (Zuo et al. 2014). Rice (2002) suggested that the length of time dedicated to counseling incubatees may be a good indicator of business incubation outcomes. The incubator adds value by giving quality monitoring and business consulting services inside the incubation process (Sherman and Chappell 1998). From a global perspective, a myriad of incubation centers has been operative for many years (Alinsunod et al. 2019) and they portray an essential function in bolstering both small and medium enterprises as well as start-up ventures (Esponilla et al. 2019). Its potential to support new and small companies in dealing with setbacks in the initial phases and to facilitate the business's growth has been described in other literature (Stal et al. 2016; Ozdemir and Sehitoglu 2013). Moreover, incubation centers are discerned to be valuable in boosting the entrepreneurial culture, promoting innovation, creating revenues, and generating new start-ups in many developing Asian countries (Esponilla et al. 2019).

In the Philippines, the underpinnings of technology business incubation (TBIs) have been recently established. Incubation centers serve as strategic venues where innovative concepts are fostered toward commercialization (Esponilla et al. 2019). Since the 1990s, several studies have underscored the importance of relating business incubators' performance to the implemented activities in order to identify best practices (Bergek and Norrman 2008; Colombo and Delmastro 2002; Hannon 2003). While much is known about the outcome indicators of business incubation programs, studies on TBI

in the Philippines centered on the activities of incubators, and how they organize and manage their processes to deliver their ultimate goal of assisting start-ups (Bergek and Norrman 2008). TBI received considerable assistance from different institutions but due to its relative infancy, much has to be done to elucidate their processes, outputs, and impacts. These knowledge gaps have led to the formulation of the present work. This study seeks to evaluate the results and outcomes of incubation practices with reference to the experiences of participants within a traditional business incubation project in the Philippines. It emphasizes the processes implemented and the outcomes in terms of developing and assisting the entrepreneurial activity of start-ups in Western Visayas, Philippines. It seeks to contribute to the extant literature on business incubation by establishing good practices and identifying measurements of performance and success within similar projects. It also aims to address the following objectives:

1. Identify the key activities involved in the project;
2. Describe the salient outputs of the project; and
3. Evaluate the incubatees' assessment of the project outcomes in terms of hard and soft measures.

### **Defining Business Incubation**

Various definitions exist for the term “business incubation” but several authors have pointed out a common element—the concept of assisting starting ventures through different provisions aimed at helping them to flourish, and have financial and operational stability (Adegbite 2001; Hackett and Dilts 2004b; Bergek and Norrman 2008). One of the most widely-accepted definitions is provided in 1997 by the National Business Incubation Association (NBIA), which describes business incubation as a “business support process that hastens the successful growth of start-up and fledgling companies by providing them with an array of targeted resources and services” (World Bank 2010). Ozdemir and Sehitoglu (2013) remarked that this concept is directed at resource-sharing initiatives and provisions such as training, consulting,

and networking for commercial ventures. To help start-ups contend with the setbacks of entrepreneurial pursuit, business incubation lays particular emphasis on gaining and amassing knowledge, partaking of resources, and developing innovativeness and competitiveness (Phan et al. 2005; Akcomak 2009). Business incubators can be categorized based on their industry focus, namely manufacturing, service, technology, and mixed-use (Lewis et al. 2011). A manufacturing incubation program provides aid to new businesses through sharing of space and technical assistance (Al-Mubarak and Busler 2010). Service incubators enhance the development of ventures belonging to the service sector that may range from landscapers, accountants, and graphic designers to internet-based and web development companies (Lewis et al. 2011). Mixed-use incubators, also known as general-purpose incubators, are programs designed to foster the development of all kinds of ventures, and incubatees under this category need not fit into any specified niche. Technology incubators are centered on community research and high-technology expansion. They render services to technology-oriented micro, small, and medium enterprises (MSMEs) eager to commercialize research and development (R&D) findings, with the outlook to promote technological advancement and entrepreneurship growth (Adegbite 2011). This incubator type creates a long-standing impact on economic development and job generation, as suggested by Al-Mubarak and Busler (2010). The Department of Science and Technology in the Philippines elucidated the motivations of Technology Business Incubators (TBI): “The Technology Business Incubators are established to assist in the transfer and commercialization of technologies and investment in technologies with high economic impact and employment generating potential. They help ensure the survival and successful growth of new technology firms by providing them with appropriate marketing, financial, technical, and management assistance” (Macdonald and Joseph 2001).

Business incubation is established on the premise that new and small ventures are assisted to grow and become prosperous mature

businesses through inclusive support programs. These programs are typically sponsored by private institutions or public entities such as universities and colleges cooperatively coined as business incubators (Etzkowitz 2002). They pave the way for the success of entrepreneurial trades by proffering resources and services such as facilities or physical space, equipment, funding sources, coaching, networking connections, knowledge of the market, legal and technical advice, administrative services, and financial endowments (Stal et al. 2016; Adegbite 2001; Ozdemir and Sehitoglu 2013).

### Processes and Fundamentals of Business Incubation

A run-through of the business incubation process was devised by Masutha and Rogerson (2015), which constitutes three important stages: pre-incubation, incubation, and after-care. Business incubation commences with the pre-incubation stage, which is essentially designed to help out potential incubatees nurture their business ideas into an implementable venture prior to their admission as new clientele of a business incubator (Bergek and Norrman 2008). The second phase of incubation is comprised of an intense process of rendering all necessary support services to guarantee the completion and graduation of as many small fledgling enterprises as possible into prosperous and lucrative ventures (World Bank 2010). The incubation process concludes with the post-incubation stage in which the recent graduates are aided in their transition and integration into the outside business domain to ensure their sustained development and success (Masutha and Rogerson 2015). The fundamentals of business incubation, which include target enterprises, key features, revenue sources, business model, and goals are depicted in Table 1. Business incubators are essentially focused on early-stage enterprises that have high growth potential in the market. They help nascent and starting companies to handle the difficulties prevailing during the start-up period until they grow into full-fledged businesses (Ozdemir and Sehitoglu 2013; World Bank 2010). The table also demonstrates that government/donor subsidies, fee-for-service, rent, royalties,

and equity are among the fund sources that incubatees can utilize to subsist throughout the incubation period. Business incubators, whether profit-oriented or not, share the common goals of creating jobs, enhancing the entrepreneurial environment, retaining business, establishing, and accelerating local industry development, and creating diversified local economies.

Business incubators render four major provisions to accomplish their goals: infrastructure, business services, financing, and people connectivity. Each of these elements plays a vital role in business incubation and has a well-defined value to entrepreneurs. In establishing a business, an imperative expenditure that needs to be thoroughly considered is the infrastructure (World Bank 2010). This component includes the physical space for office and meeting rooms, as well as basic services such as electrical services, phone, internet, lab facilities, and other overhead

**TABLE 1** Fundamentals of business incubators

Target enterprises	Early-stage enterprise with high growth potential
Key features	Emphasis on co-location and the "cluster" effect between enterprises
	Ongoing supply and demand-driven assistance until an agreed-upon performance milestone has been reached
	Integrated mix of intensive strategic and operational support focused on the enterprise in its entirety
Revenue sources	Government/donor subsidies
	Fee-for-service
	Rent
Business model	Royalties
	Equity
	Non-profit or profit-making
Goals	Create jobs in a community
	Enhance a community's entrepreneurial climate
	Retain business in a community
	Build and accelerate growth in the local industry
	Diversify local economies

Source: World Bank (2010)

costs that the enterprise will incur. To alleviate these outlays, business incubation programs provide an array of support to allow flexibility for prospective clients. Business incubation programs offer monthly rental terms for infrastructure requirements and bestow essential services such as internet connection, knowledge, and capital for technology-based start-ups (Örnek and Danyal 2015).

Apart from infrastructure provisions, business incubators also offer valuable know-how and business services to incubatees such as strategy advice, market research, exporting facilitation, accounting, and assistance in securing registration and license, among others. This permits incubatees to render their attention to their fundamental business rather than to support infrastructure, thereby enhancing their capabilities and opportunities for success (Ikebuaku and Dinbabo 2018; Lai and Lin 2015). Assistance on financial aspects is the third element provided by business incubators. Incubatees are given access to investment depending on the growth stage of the enterprise. Funding can be obtained from government grant schemes, banks, or venture capitalists, and some incubators render their own financial resources available for their clients. This element of the program is of particular importance in helping incubates overcome financial gaps. People connectivity stands as the final component of business incubation programs. This is of utmost significance as it emphasizes the relationship between incubatees and the incubator management team, along with an external expert from the industry. Incubators and experts help incubatees develop entrepreneurial skills in financing, marketing, management, and overall good business judgment. Moreover, incubators expedite connections between their incubatees and industry leaders relevant to the former's markets. These linkages ultimately help incubates recruit new customers, enter new markets, identify prospective partners, and reach potential investors (Tötterman and Sten 2005).

### **Incubator Performance Indicator**

With reference to incubation evaluation literature, the concept of "performance" generally

pertains to the attainment of the objectives of a scheme or an activity (Mosselman and Prince 2004). In their study about incubator best practices, Bergek and Norrman (2008) described the term "incubator performance" as the degree to which the outcomes of an incubator coincide with the incubator's objectives. There have been thousands of incubation centers functional for several years throughout the globe, but they are confronted with hurdles brought by the absence of standard criteria to measure incubator performance (Alinsunod et al. 2019). Consequently, this gap makes the evaluation and comparison between studies complicated (Dee et al. 2011). Some literature has demonstrated that incubator performance can be established through outcomes and main indicators such as economic advancement, entrepreneurship, job creation, and innovation (Al-Mubarak and Busler 2010; Dee et al. 2011). To shed light on how to appraise incubator performance, a summary of measures adopted by Dee et al. (2011) is shown in Table 2.

Irrespective of whether incubators are profit-oriented or not, previous research has indicated that they may have two primary objectives: (a) promote economic development and/or increase employment in a locality by facilitating the start-up of new firms, enhancing their survival and growth; and provision of training to entrepreneurs; and (b) stimulating companies engaged in emerging technologies or the commercialization and transfer of R&D results from universities and research institutions (Mian 1997; Nolan 2003; Philips 2002; Peters et al. 2004). Different countries have supported and implemented the activity of business incubation driven by varying motivations such as generation of jobs, technology transfer, acceleration of enterprise growth, improved survival of MSMEs, entrepreneur empowerment, and revival of local and national economies (Akcomak 2009; World Bank 2010; Al-Mubarak and Busler 2010; Colombo and Delmastro 2002).

### **Business Incubation in the Philippines**

Micro, small, and medium enterprises (MSMEs) make a substantial contribution to the economic development of the Philippines,

**TABLE 2** Outline of measures used to evaluate the performance of incubators

Measures	Literature and year	Addressed stakeholder				
		Entrepreneur	Investors	Employees	University	Government
Tenant firms' survivability	Allen and Levine 1986, Allen and McCluskey 1990, Mian 1997, Westhead 1997	x	x	x	x	x
Tenant firms' sales growth (%)	Mian 1997, Allen and Levine (1986), Lindelof and Lofsten 2002, Amezcua (2010), Chen (2009), Philips 2002	x	x	x	x	x
Tenant firms' employment growth (%)	Allen and McCluskey 1990, Mian 1997, Udell 1990, Lindelof and Lofsten 2002, Amezcua (2010),	x		x	x	x
Incubator occupancy rate	Allen & McCluskey 1990, Campbell 1988, Allen and Rehman 1985, Smilor 1987	x			x	x
Average length of tenancy	Centre for Strategy & Evaluation Services (CSES) and Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (European Commission) 2002	x			x	x
Management team and staff (quality of support)		x	x	x		x
Incubatee selection process	Kuratko and LaFollette 1987, Merrifield 1987, Bergek and Norrman 2008	x			x	x
Funding sources and support made available to tenants		x	x		x	x
Business assistance	Mian, 1996, Bergek and Norrman 2008, Centre for Strategy & Evaluation Services (CSES) and Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (European Commission) 2002, Rice 2002	x	x			
Incubator industry network and incubator support services network	Smilor 1987, Mian 1996, Hansen et al. 2000, Nowak and Grantham 2000, Dettwiler et al. 2006, European Commission 2002, Rice 2002	x	x			

manifested through the creation of job opportunities, source of foreign exchange income, and reduction of poverty. In 2015, roughly 100 start-up businesses were documented, and the figure is envisioned to magnify to 500 (Ito and Shahnaz 2019). The total funding for these start-ups ranges from \$40 million (2015) to \$200 million (2020), creating 8,500 high-skilled jobs and acquiring 15,166,684 users globally. Over 900,000 MSMEs subsist at present, representing 90% of all Philippine enterprises and constituting 70% of total employment in the country (PricewaterhouseCoopers 2017). Given their essential role in the country's economic advancement, three government agencies are dedicated to create and help start-up ventures through business incubators: the Department of Science and Technology (DOST), the Department of Information and Communications Technology (DICT), and Department of Trade and Industry (DTI). These agencies render assistance using four strategies: collaboration, policy promotion, education, and fostering technology entrepreneurship. Apart from these agencies, the Commission on Higher Education (CHED) extends financial provisions to various universities intended for instituting incubation centers. As of July 2018, the number of incubation centers amounted to 20, consisting of 30 investors, 20 venture capitalists, and more than 200 active start-ups (PricewaterhouseCoopers 2017; Alinsunod et al. 2019). The DOST funded 14 of the 20 incubation centers, and some were instituted and supported in collaboration with other agencies (Alinsunod et al. 2019).

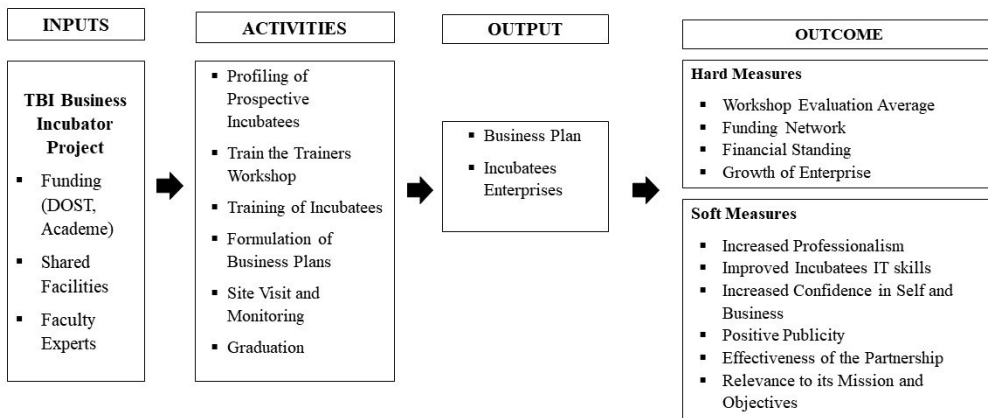
Voisey et al. (2006) developed a framework that identifies the performance measures of business practice in incubators through soft and hard measures. These are further identified as client/incubatee-specific and incubator specific. Hard measures are quantifiable information that contributes to the success of the business (Voisey et al. 2006). These include sales turnover, profitability, growth of the enterprise, graduation to independent trading, number of clients, number of business trading independently, meeting targets, and continued operation/success. These are widely known as part of the critical success factors in the business industry

and are considered to be eye candy to investors. Soft measures are subjective indicators that are more difficult to ascertain and rate but nonetheless exist. Under this are enhanced client professionalism and skills, improved confidence in self and business, productive networking with peers, expertise growth savings through the use of business incubator resources, and creation of favorable publicity. Although these are immeasurable factors, they contribute to the success of an enterprise in the long run. The framework also delineates the parameters to effectively quantify the attainments of incubators.

## Conceptual Framework

The framework developed by Voisey et al. (2006) was modified and adopted to provide an end-of-project assessment of UP Visayas's TBI Project (Figure 1). Through this framework, the key processes consist of four domains: inputs, activities, outputs, and outcomes. The input element describes the interventions done and provisions rendered by the project to its incubating enterprises. With reference to Australian Centre for International Agricultural Research (ACIAR) Impact Assessment Series Report (Mayne and Stern 2013), interventions are a generic term to describe a specific set of activities or deliberate actions undertaken to fulfill the goals of a project. The activities element of the study's framework depicts the six-step process done during the project, commencing with profiling, and concluding with the incubatees' graduation. The results, referred to as the sequence of effects deriving from the interventions, are depicted in terms of outputs and outcomes (Mayne and Stern 2013). The output element encompasses the first-level results from the interventions, including the services and information delivered by the project, congruent with its objectives. The outcomes or the effects and consequences of the actions taken by the incubatees as a response to the output are presented in terms of hard and soft measures based on Voisey et al.'s (2006) framework. The outcome element includes changes in the behavior of the incubatees, reflected as changes in skills, capacity, and practices.





**FIGURE 1** Conceptual framework for assessment of the Technology Business Incubation Project

## Methodology

The study seeks to evaluate the results and success of business incubation practices with reference to the experiences of participants within a traditional business incubation project in the Philippines. Since the success of an incubation facility is inseparably associated with the experiences and outcomes of the incubating businesses, this study provides an overview of the operation of the Technology Business Incubation Project and outlooks from the participating enterprises on their experience of its incubation procedures. To address the research objectives, a 5-point Likert Scale was applied to elucidate the general incubator performance (Voisey et al. 2006), while the qualitative approach was used to contextualize the incubatee-incubator interaction, the incubatees' needs, and progress, thus conveying a rounder, more factual image of the project's impacts (Dewson et al. 2000). A descriptive design was chosen as it provides a more realistic representation of the situation under consideration by stating and explaining the observed situation and the behavior concluded. Furthermore, a descriptive study is associated with statistical methodologies related to the explanation and documentation of information. Since the evaluation is largely qualitative in nature, the result depended on both primary and secondary data sources. Secondary data gathering encompassed a literature review of the

project services, which was performed to create a descriptive analysis of the project's processes (inputs rendered and activities undertaken). Primary data such as the project monitoring report and terminal report were elicited to describe the outputs and outcomes of the project

The three-step procedure commenced with the identification of target incubatees and the formulation of survey questionnaires based on the outlined performance measures of business practice for incubators (Voisey et al. 2006). The second phase involved the conduct of key informant interviews (KII) with the 16 micro-enterprises that have undergone the project. Incubatees rated their perception of the outcomes of the incubation project in terms of hard and soft measures using a 5-point Likert Scale. Table 3 shows the 5-point Likert scale measures responses or attitudes, with 5 as the highest score, denoting "Best", and 1 as the lowest, which signifies "Poor".

The interviews explored the incubatees' experience and perception regarding the training modules and their outlook on establishing networks with other incubatees. In the context of business incubation, qualitative data was used for the following purposes: highlight progress at an individual level, show stakeholders what progress is being made, and assess support for the project. While the researchers recognize the importance of hard measures in evaluating success, considering soft outcomes postulates a valuable context for clients' needs and progress, thereby

rendering a truer, more comprehensive picture of accomplishments (Dewson et al. 2000). The third step involved the transcription of the information gathered from the interview and the analysis of the survey results to generate descriptive statistics. Calculated mean scores were used to evaluate the incubatees' assessment of the project's outcomes.

**TABLE 3** Verbal interpretation of the weighted mean

Score points	Mean range	Verbal interpretation
1	1.00–1.89	Poor
2	1.90–2.59	Fair
3	2.60–3.39	Good
4	3.40–4.19	Better
5	4.20–5.00	Best

## Results and Discussion

This study presents the processes of the University of the Philippines Visayas's Technology Business Incubation Project, which conducted a series of training workshops on the comprehensive entrepreneurial process and implementation with micro-enterprises from 1 June 2018 to 31 May 2019. The project assisted 16 micro-enterprises in Western Visayas, Philippines, belonging to three industries: retail, service, and food industry. Twelve of the participating incubatees were females and four were males, all registered as sole proprietors under the Department of Trade and Industry (DTI). The majority of the incubatees (10) were registered for two years or less, while six of them were registered for two to five years. The TBI Project was initiated to provide business and technical support services and facilities to MSMEs. Through provisions like this, start-ups and fledgling companies are assisted to become competent, viable, and responsible players in the regional, national, and global economy.

### Inputs of the Project

#### *The Technology Business Incubation Project*

With the goal to provide a total package of assistance to budding entrepreneurs and start-ups in Region VI, the project is a multi-

disciplinary project of UP Visayas, government institutions, the private sector, and the local government units of Western Visayas. This project envisions the following goals: institutionalize the first technology business incubator; catalyze entrepreneurial development; and promote growth in consonance with technological advancement. The TBI Project was the first technology business incubator in the region established in 2011 with funding from the Department of Science and Technology. Since its inception, the project has conducted various entrepreneurship fora, boot camps, and training; and provided business, technical, and administrative support services to students, graduates, start-ups, and fledgling companies.

The business incubator has the following objectives:

1. Stimulate development and value-adding of micro-enterprises and enable products and services to make them more competitive; and
2. Provide technical and business support to SMEs to prepare them for their eventual convergence with the mainstream business environment.

It offers an array of services such as:

1. Shared meeting, training, and conference facilities;
2. Mentoring, advisory services, and training;
3. Networking opportunities and linkages to strategic partners;
4. Regulatory compliance assistance; and
5. Access to microfinancing, grants, aids, and other loan funds

These services mainly constitute the inputs provided by the project to the incubating enterprises intended to support the growth and scaling up of nascent companies. These inputs are purposed to: (1) reduce the cost of starting a venture; (2) save time and money in securing regulatory compliances; (3) gain knowledge and psychological support, and establish partnership and business relationships; and (4) overcome financing gaps (World Bank 2014). The project's resources adhere to the four basic components proffered by business incubators (World Bank 2010): infrastructure such as office space, meeting rooms, lab facilities, and utilities; business services in the form of assistance in

registration, licenses, accounting, strategy advice; people connectivity through mentoring, coaching, and marketing linkages; and funding such as brokering, provision of financial services such as equity, credit, and guarantees. These inputs allow the incubatees to concentrate on their core business whilst obtaining operational support and thorough coaching. Mentoring, advisory services, and training were provided by experts consisting of the faculty members of the implementing state university.

### Activities of the Project

The project consisted of six key activities undertaken by its 16 incubatees, with profiling as the initial step and graduation as the concluding step. All prospective incubatees should meet the entry requirements and observe all defined guidelines to be able to avail of the services of the facility. The periodic assessment was conducted to monitor incubatees' performance as the basis for exit/graduation from the TBI. With affordable lease rates and service fees, and an integrated business support services package, the Project aims to yield sustainable and competitive enterprises ready for the local and global market. Figure 2 shows the flow of activities of the project for all incubatees of the organization.

The initial step involves profiling potential incubatees of the project. An interested entity pass an application form to the organization, which will be subject to deliberation with the committee. They will subsequently undergo a series of panel interviews to know more about

the technicalities of the company's operations. The training needs assessment were conducted to the accepted incubatees. The result shows that they needed inputs in crafting the business plan. The project team then formulated the training design and modules. The commitment and perseverance of the start-up companies to finish the one-year project were thoroughly considered. After finalizing the official list of incubatees, they will enter the next steps of the project—participation in training in preparation for their business plan formulation. In particular, the project provides four modules for incubatees throughout its entire duration.

The incubating businesses went through a series of training and workshops, covering four modules to equip them with relevant information and skills to administer their respective enterprises. The training series discussed the following modules: (1) Introduction of entrepreneurship business model canvas, (2) Product marketing and organizational structure, (3) Production process and simple financial statements, and (4) Digital and social media marketing.

#### *Training Series 1: Introduction to Entrepreneurship Business Model Canvas*

The training commenced with an overview of the definition and fundamentals of Business Model Canvas (BMC). Developed by Alexander Osterwalder, BMC serves as a visual representation of the business, showing all the building blocks when starting a business including the target customers, value proposition,

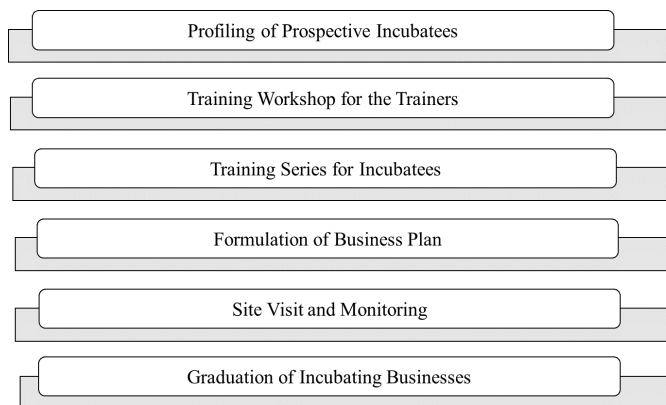


FIGURE 2 Project activity flow

channels, route to market, and financial considerations. It is a business tool useful in describing, designing, challenging, inventing, and turning a business model. As deduced from the training, BMC also provides a common language through which business practitioners can assess traditional procedures and create innovation in their business models. The concept of BMC can be useful to incubating businesses as a strategic guide for establishing their business plan roadmap.

#### *Training Series 2: Product Marketing and Organizational Structure*

The second module emphasizes theories and processes in developing a marketing plan. It provides practical knowledge on market analysis, marketing mix, and competitive position. Organizational structure, which refers to how individual and team functions within an organization are coordinated, was also discussed in depth. To achieve the goals and objectives of an organization, the responsibilities of each individual must be coordinated and managed. Organizational structure allows for the demarcation of tasks of the management body and members. A working and efficient structure with clearly-defined roles allows for improved accountability and flow of information; delineation of formal communication channels and authority; and allocation of responsibilities within the organization. Various organizational models exist, having distinctive advantages and shortcomings, and some structures are better suited for specific environments and tasks.

#### *Training Series 3: Production Process and Simple Financial Statements*

Since operations are one of the most crucial facets of a business, the third training session was devoted to the paradigm of business operations such as the location, store hours, supply chain, and production procedures. The incubatees were taught about the key factors in determining the strategic location for the business, aspects to consider with the store and business hours, and its operations. The elements in the supply chain and the production process were also discussed. A comprehensive lecture and run-through on

the fundamentals of financial assumptions and projections including the income and expense assumptions, assets, and product costing were also given. These are basic sections of all business plans and are useful in projecting future sales and constructing the cash flow statement.

#### *Training Series 4: Digital and Social Media Marketing*

The last part of the training series centered on how marketing can be done using digital social media platforms. The concept pertains to all sorts of marketing strategies that a business can implement digitally. Specifically, the incubatees were trained on how to create a website and use free social media platforms such as Facebook and Instagram in promoting and selling their products and services. They were also coached on how to boost their online page as well as the approaches to promote and extend their reach on social media.

The project also convened a trainer workshop for the staff of a partner institution. The workshop enabled the staff to learn the fundamentals of incubation, which is regarded as indispensable when handling different incubatees. The trainings attended by the trainers followed the same modules. Unlike the incubatees, the training for the trainers were conducted for four days only. The partner organization designated its business development services (BDS) staff as one of the trainers. They take part in training and monitoring activities and take full responsibility for their incubatees until the end of the project. The personnel of the incubation facility then conducted site visits to monitor whether the topics discussed during the training and mentoring sessions were being applied by the start-ups in running their businesses. Finally, the project is capped off with a graduation ceremony to certify that the start-up business finished the program. It also shows that the enterprise is fully equipped and ready to hit the ground in the business world.

Most of the DOST-funded incubator projects operate only as “in-wall” or incubatees residing at the university TBI facility. This incubation project, however, operates both as “in-wall” as well as “out-wall” where incubatees still avail of the services while staying in their respective business

addresses. Moreover, this is a collaborative project that involves the partner organization to designate a business development services (BDS) staff to take part in training and monitoring activities. The personnel of the incubation facility then conduct site visits to monitor whether the topics discussed during the training and mentoring sessions are applied by the start-ups. The project likewise opened opportunities for the incubatees to partner and affiliate with other stakeholders such as the endowment of financial aid and market expansion through Tinukib, a souvenir shop that also served as the program's marketing arm.

### **Outputs of the Project**

The series of activities undertaken by the incubatees led to the generation of the project's outputs. As defined by Voisey et al. (2006), output encompasses the tangible services that an incubation project renders. The outputs include the first-level results such as the information, services, or goods provided by the project's intervention (Mayne and Stern 2013). Based on the incubatees' responses during the key informant interviews, TBI Project's outputs were the business plan and the incubatees' enterprises.

#### *Business Plan*

The business plan can serve as a bridge between academic, theoretical, and general knowledge; and practical contextualized activities of the potential entrepreneur (Dal Mas et al. 2021). The series of training courses that includes business plan writing resulted in new product development and some of the incubatees improved the product. Out of the 16 incubatees, six of them were able to develop new products, which became the central content of the business plan for this incubation project. Other incubatees used their existing products or enterprise for their business plan, with improved content either in product costing, marketing, or operations. The business plan spells out the incubatee's role as a caretaker of the natural environment alongside the business endeavors. The output business plan is also a tool used to communicate their business ideas to convince investors that the proposed venture will be worth investing in. This output specifies the

ways to convert the business idea into a saleable product; know more about the target market; identify the distribution channels, the pricing strategies, and ways on how to promote the product. It also presents the needed competencies of the management team in running such a business as well as the production/operations management aspect. Lastly, the business plan shows the likelihood of business prosperity as it presents the anticipated costs, probable sales, the expected net income, and the general strategies to achieve the success of the planned business.

The knowledge and skills from the training were used by the incubatees in the formulation of their business plan, which can be applied to their respective enterprises. The information also allows new entrepreneurs to develop good management techniques, a positive outlook, and exemplary behavior. These outputs translate to a better demeanor in running a business (Chang and Rieple 2013) and are a key factor in achieving enterprise sustainability and expansion (Adegbite 2001).

#### *Incubatees' Enterprises*

Micro-enterprises play an essential role in the advancement of a country. They contribute to economic progress in several ways such as increase employment, social income distribution, economical utilization of resources, and desirable sustainability. (Ruhui et al. 2014). This incubation project consisted of six key activities undertaken by its 16 incubatees, with graduation as the concluding phase. As a major output of this project, each incubatees must be able to successfully implement an enterprise using the business plan as a key guide in the monitoring. The incubatees' performance served as the criteria for their graduation from the TBI, which were based on the results of the periodic monitoring.

True to its mission and goal, UP Visayas and the government aims to yield sustainable and competitive enterprises ready for the local and global market.

### **Outcomes of Project**

The ultimate gauge of the success of an incubator is the outcome defined by Voisey et al. (2006) as "a wider behavioral change that

results from the output". As argued by Bergek and Norrman (2008), business incubation performance must adhere to the objectives of the project. Hence, the outcomes attained need to be relevant to the pre-defined or expected results. The incubatees' assessment of the project outcomes was determined through hard and soft measures, with reference to Voisey et al. (2006) framework on business incubator performance.

#### *Results Based on Hard Measures*

One of the main goals of the study is to determine the outcomes of the incubation project through hard measures. Voisey et al. (2006) described hard measures as "clearly definable and quantifiable results which show progress made through incubation". The project assessed the outcomes in terms of hard measures through the workshop evaluation scores, funding network, financial standing, and growth of enterprise. To gauge the immediate outcome, incubatees went through an examination to evaluate their learnings and insights regarding the workshop. A 5-point Likert Scale was used to assess the incubatees' perception of the usefulness and relevance of the module used during the training. The data collected were evaluated through mean and standard deviation, and the responses were summarized in the form of a weighted mean, wherein the scale or score point is used as a weight multiplied by the frequency divided by the total frequency to compute the weighted mean. The calculated weighted mean was then interpreted using an interval or numerical range, corresponding to its verbal description (Table 3).

A tabular representation of the workshop evaluation results is shown in Table 4. The scores were deduced from the incubatees' interview responses conducted after each training activity. Several appreciation responses were drawn from incubatees such as "Through the training, I've learned that I am also entitled to have a salary so that it can be included in the computation of the cost"; "I am glad that I am able to study about my business and to have this business plan to guide me in my daily operations and future decisions"; and "Learning the break-even point and break-even in sales helped me to decide my target sales in a month."

The highest mean score recorded for Training Series 4 signifies that incubatees consider this as one of the vital components in underscoring the competitiveness of their product in the market. With the high-strung competition in the corporate world, MSMEs must adapt to existing strategies, especially in marketing their products and/or services through the web. This allow them to have a reasonable advantage over their competitors by breaking geographical barriers and reaching a larger number of potential customers. This also boost the awareness and interest of customers regarding the product. The workshop attained an overall mean score of 3.94, which indicates positive feedback from incubatees. It suggests that the information imparted is an essential add-on for their business. This finding also typifies the importance of having an on-site trainer that guide the business owners throughout the project. The training modules are of great help to the incubatees.

The outcomes of the TBI project in terms of hard measures were also assessed using other important indicators, forming the intermediate outcomes. These include the following: (1) access to funding network, (2) improvement in financial standing, and (3) growth of the enterprise. Voisey et al. (2006) described access to funding as a key element in establishing an economic environment beneficial for the growth and sustenance of business. The funding network is hampered by shortcomings in the financial and the credit market, inadequate capital, and credit constraints. This is amplified in the context of developing nations where small and medium businesses are beset with the challenge of accessing financial sources due to high collateral requirements, towering capital costs, and weak experience with financial mediators. The incubatees' perception of their financial standing after the incubation process was also rated. Financial standing is considered as one of the chief indicators of a business's success, manifested by its ability to gain revenues to sustain the operation (Eveleens et al. 2017). It can be assessed based on the positive flows made, which can then be used to finance the business' succeeding productions (Buys and Mbewana 2007). Enterprise growth has also been assessed as an indicator of the project's

**TABLE 4** Workshop evaluation table

Training title	Mean	Standard deviation	Remarks	Rank
Series 1: Introduction to entrepreneurship business model canvas	3.94	0.68	Better	2
Series 2: Product marketing and organizational structure	3.69	0.79	Better	3
Series 3: Production process and simple financial statements	3.19	0.40	Good	4
Series 4: Digital and social media marketing	4.56	0.51	Best	1
Overall mean evaluation				3.84

outcomes. Gupta et al. (2013) characterized enterprise growth as the generation of revenue, value addition, and business expansion in terms of volume. Market position, product quality, and customer goodwill are qualitative attributes that can also be used to measure enterprise growth. According to Sarlija et al. (2016), the growth of an enterprise is a highly enviable outcome for scholars and decision-makers, and an essential driver of employment, economic development, social inclusion, and competitiveness. Table 5 depicts the mean scores along with the verbal interpretation for the three hard measure indicators.

Key informant interviews were conducted to determine the impact of the incubation process on their fledgling businesses in terms of three hard measures. The 16 incubatees were asked a series of questions based on the modified conceptual framework of Voisey et al. (2006) for performance measures of business incubation. Respondents characterized the prime benefit of the incubation project as the growth of enterprise (4.31) and improvement in financial standing (4.06). The incubation project has served as a venue where start-ups can display and promote their products, and interact with prospective customers and partners. This has substantially expanded the reach of their merchandise and boosted their sales. As for the resources and funding network, new donors and sources of financial were observed among the incubatees' funding networks. This was brought about by the affiliations and partners of the program with other stakeholders, which endows financial aid to incubatees; and Tinukib, a souvenir shop, which serves as the program's marketing arm. Establishing connections is deemed necessary to facilitate the expansion of juvenile businesses as

exemplified by favorable outcomes attained by the program.

The hard measures of the incubation program attained an overall mean of 4.08. These benefits are further validated by the responses from the incubatees, "This Project helped in boosting my sales since we are able to display and advertise our product in public. The partner agencies' events indeed aided us to be connected to new clients"; "My production has increased by 10% because Tinukib ordered more items from me. I am really pleased that I have been part of this incubation Project"; and "I met new clients in the event conducted by a partner institution. Now, my production has risen by 15%."

Sixteen incubatees shared information on their performances, specifically on hard measures such as sales increase, sales outlets, partnership, employees/workers, and investors. All incubatees calculated an increase in sales by up to 5% (37.5%) and up to 10% (62.5%). Ten of them (62.5%) were able to open new sales outlets, an increase of up to 15% versus current outlets. Fourteen (87.5%) of the incubatees were able to seal new partnerships. There was an increase in the number of employees/workers employed for 11 of the incubatees (68.75%). Fourteen incubatees (87.5%) also saw an increase in the number of investors. Table 6 shows a summary of the hard measure indicators as reported by the incubatees.

Based on the monitoring reports and terminal reports, the incubatees reported that they developed three ready-to-market products with 10 contracts closed in the new market network. In total, the reported direct and indirect jobs generated is 15.

The results of the hard measures largely adhere with the mainstream findings positing that an incubator's performance is determined

through enterprise growth, reduced dependence on incubation support, number of graduates or enterprises completing the incubation, ability to create employment opportunities, increase in production, and sales, revenue growth (Stephens and Onofrei 2012; Masutha and Rogerson 2015; Mian 1997; Hackett and Dilts 2004b; Al-Mubarak et al. 2015). For entrepreneurs, the establishment and expansion of a funding network also play a significant role in enhancing their businesses since financing is often perceived as a crucial setback, especially for start-ups and early-stage ventures (World Bank 2014).

*Results Based on Soft Measures*

As suggested by Dewson et al. (2000), soft indicators underscore the clients’ progress and exhibit a more factual depiction of success. To establish the project’s competence in terms of soft measures, semi-structured interviews among participating incubatees were carried out. Incubatees were allowed to rate each soft measure indicator based on their personal viewpoints from 1 to 5, with 1 as the lowest score and 5 as the highest. The scores given by each incubatees were pooled to obtain the mean value for each soft criterion (Table 7).

The effectiveness of partnership was rated the highest (mean score=4.56), denoting that this

indicator was considered the most significant soft benefit of the incubation procedure. This can be attributed to the appropriate affiliations established with other institutions. The partnership has allowed incubatees to avail themselves of funding resources, marketing assistance, and technical support, thereby promoting the expansion of their respective businesses. Positive publicity, increased confidence in self and business, and improved information technology was also perceived as the most important soft outcome, with mean scores ranging from 4.310 to 4.440 This implies that the project was able to fulfill the following: create a better stance and publicity for the enterprise, render knowledge and skills, and enhance the competencies and know-how of the staff. By and large, positive responses were also recorded for other measures such as “increased professionalism” and “relevance to its mission/objectives”. The soft measures of the incubation program attained an overall mean of 4.292. Several remarks to the questions signify positive reception of the incubation process: “The one-year project was very useful to me because the project team went to our production area and made recommendations. The effectiveness of the partnership involved made our incubation project successful” and “I am now confident to sell my

**TABLE 5** Hard measures indicators mean table

Indicators	Mean	Standard deviation	Remarks	Rank
Growth of enterprise	4.31	0.70	Best	1
Financial standing	4.06	0.68	Better	2
Funding network	3.88	0.89	Better	3
Overall mean				4.08

**TABLE 6** Hard measures indicators reported by incubatees

Indicators	Increased by							
	0%/No change		Up to 5%		Up to 10%		Up to 15%	
	F	%	F	%	F	%	F	%
Increase in sales	0	0.00%	6	37.50%	10	62.50%	0	0.00%
Increase in sales outlets	0	0.00%	4	25.00%	2	12.50%	10	62.50%
Increase in partnership	2	12.50%	8	50.00%	5	31.25%	1	6.25%
Increase in employee/staff	5	31.25%	6	37.50%	4	25.00%	1	6.25%
Increase in investors	2	12.50%	8	50.00%	4	25.00%	2	12.50%



**TABLE 7** Soft measures indicators mean table

Soft measures indicator	Mean	Standard deviation	Remarks	Rank
Effectiveness of partnership	4.560	0.51	Best	1
Positive publicity	4.440	0.63	Best	2
Increased confidence in self and business	4.375	0.72	Best	3
Improved incubatees' it skills	4.310	0.70	Best	4
Increased professionalism	4.190	0.54	Better	5
Relevance to its mission / objectives	3.875	0.86	Better	6
Overall mean				4.292

products since I was given a chance to pitch my products in front of my co-incubatees, target clients, and other stakeholders.”

Contrary to hard measures, soft measures are mainly intangible benefits delivered by the project, which are largely subjective and trickier to gauge but are relevant in the skills development of the incubatees (Voisey et al. 2006). Soft measures may include fostered business knowledge and capacities, increased business awareness, and expansion of client networking, which may be useful in future entrepreneurial endeavors (Hackett and Dilts 2004b; Voisey et al. 2006). Based on the monitoring reports and the terminal reports, the incubatees cited that they developed significant entrepreneurial competencies, skills, and values. The most frequently cited were communication skills, passion, innovativeness, basic digital marketing skills, basic financial statement preparation, resourcefulness, and self-confidence.

## Conclusion and Recommendation

This study encompassed the performance measures of a multi-sectoral incubation project through the lens of participating incubatees. As the pioneering technology business incubator in Western Visayas, Philippines, the project aimed to: (1) institutionalize the first technology business incubator, (2) accelerate entrepreneurial development, and (3) promote enterprise expansion in consonance with technological advancement. It has provided the four basic components for incubation as outlined by World Bank (2010): infrastructure support, business

services, people connectivity, and funding. This study provided a measurement process that captures the usefulness of incubation through hard and soft indicators. In terms of hard measures, incubatees indicated that the growth of enterprise and improved financial standing were achieved through establishing formal ties with local institutions, educational systems, business associations, local clubs, organizations, and individuals. Looking through the soft measures, the findings indicate that the personal development of the incubatees and forging effective partnerships are valuable results of the incubation process. For the participating entrepreneurs, enriching their technical skills, confidence, professionalism, constructive publicity, and professional networks has a beneficial impact on their businesses. The result of the project shows that the majority of the incubatees improved their communication skills, passion, innovativeness, basic digital marketing skills, basic financial statements preparation, resourcefulness, and self-confidence, which they gained in the trainings. The training included the preparation of the business plan, which fostered increase in their sales and products marketing. Based on the overall mean scores, participating incubatees were more perceptive of the hard measures than soft outcomes because the former provided more tangible effects (i.e. increase in sales, increase in sales outlets, increase in partnership, increase in employees/workers, and increase in investors). Soft measures, on the other hand, are more subjective, with indeterminate and less tangible results. Hence, they are more difficult to assess. Nonetheless, the success of an incubation process cannot be captured using hard

measures alone. The inclusion of soft measures offers a more comprehensive framework to evaluate the outcomes of business incubation. The study used the modified version of the framework developed by Vosiey et al. (2006), providing a suitable holistic approach to assess the performance of the incubation process.

One limitation of the study is that it only encompassed the project's success through the viewpoints of the incubating businesses. The outcomes can also include the development experienced by the faculty and trainers of the incubation project. Therefore, further studies involving the trainer's/facilitators' perception would capture the diversity of incubation experiences and improve understanding of business incubation outcomes. The study also recommends the conduct of a personal entrepreneurial competency test among the trainers and the incubatees to determine the skills developed and if the incubation process was able to enhance their mindset. This would substantiate the outcomes of business incubation.

Given the insights amassed from the present work, the study proposes that a comprehensive strategic plan tailored to the digital landscape of the project must be developed beforehand. Based on the results, incubatees consider this as one of the imperative topics that must be mulled over. Taking into account the importance of affiliations, an incubation facility must also invest in different kinds of connections. The government plays a significant role in this realm by encouraging business and venture principals to capitalize on the nascent entrepreneurs' trades. This can be done by granting tax reductions or exemptions on the earnings from start-up investments, along with a lowered corporate income tax rate. A classic example of this is the recent ratification of Republic Act No. 11337, or the Innovative Start-up Act, a new law that seeks to provide tax benefits to all registered start-up companies in the Philippines.

Application of the framework developed by Voisey et al. (2006) is highly recommended in determining the impact of business incubations as it considers both internal and external factors of the facility. To gather more diversified results, it is suggested that more factors be added to the

conceptual framework. The use of other statistical tools to analyze the relationship between variables and to determine their contribution to the incubation project's success is also proposed. A few good research subjects relevant to the topic are recommended. Detailed case studies focusing on technology-based enterprises that successfully sustained operations even after an incubation project can be conducted. Documenting the processes undergone by enterprises while incubated in the TBI, challenges experienced, and lessons gained from these start-ups will help future ventures in adopting the best practices.

It is also important to undertake in-depth research about the ideal environment needed to accelerate technology commercialization in academic and R&D institutions. To effectively encourage innovation, the incubator should be pitched to other elements in the ecosystem, like venture capitalists and the entrepreneurs themselves (Aerts et al. 2007). This research study provides an example of an incubation project approach that captures the value and relationships of business incubation and thus should be useful to incubators, investors, incubatees, government agencies, and academe. Finally, comparative research highlighting the differences in performance of a start-up managed by a team versus that of an individual can also be carried out.

## References

- ÁCS, ZOLTAN J., AND WIM NAUDÉ. 2013. "Entrepreneurship, Stages of Development, and Industrialization." *Pathways to Industrialization in the Twenty-first Century* 373–392. <http://dx.doi.org/10.1093/acprof:oso/9780199667857.003.0014>
- ADEGBITE, OYEYEMI. 2001. "Business Incubators and Small Enterprise Development: The Nigerian experience." *Small Business Economics* 17(3): 157–166. <https://www.jstor.org/stable/40229178>
- AERTS, KRIS, PAUL MATTHYSSENS, AND KOEN VANDENBEMPT. 2007. "Critical Role and

- Screening Practices of European Business Incubators.” *Technovation* 27(5): 254–267.
- AL-MUBARAKI, HANADI, AND MICHAEL BUSLER. 2010. “Business Incubators: Findings from a Worldwide Survey, and Guidance for GCC States.” *Global Business Review* 11(1): 1–20. <http://dx.doi.org/10.1177/097215090901100101>
- . 2011. “The Development of Entrepreneurial Companies through Business Incubator Programs.” *International Journal of Emerging Sciences* 1(2): 95–107. [https://www.researchgate.net/publication/215477335\\_The\\_Development\\_of\\_Entrepreneurial\\_Companies\\_through\\_Business\\_Incubator\\_Programs](https://www.researchgate.net/publication/215477335_The_Development_of_Entrepreneurial_Companies_through_Business_Incubator_Programs)
- . 2013. “Incubators Best Practices in Developed and Developing Countries: Qualitative Approaches.” *Asian Journal of Empirical Research* 3(7): 895–910. [https://www.academia.edu/42280861/Incubators\\_Best\\_Practices\\_in\\_Developed\\_and\\_Developing\\_Countries\\_Qualitative\\_Approaches](https://www.academia.edu/42280861/Incubators_Best_Practices_in_Developed_and_Developing_Countries_Qualitative_Approaches)
- AL-MUBARAKI, HANADI, AND HOLGER SCHRÖLD. 2011. “Measuring the Effectiveness of Business Incubators: A Four Dimensions Approach from a Gulf Cooperation Council Perspective.” *Journal of Enterprising Culture* 19(04): 435–452. <http://dx.doi.org/10.1142/S0218495811000842>
- AL-MUBARAKI, HANADI, ALI HUSAIN MUHAMMAD, AND MICHAEL BUSLER. 2015. *Innovation and Entrepreneurship: Powerful Tools for a Modern Knowledge-Based Economy*. SpringerBriefs in Business.
- ALINSUNOD, JENNIFER, FRANCISCO ESPONILLA III, HASMIN IGNACIO, HERONAFINE DE GUZMAN, KEVIEN DELA CRUZ, AND IRA VALENZUELA. 2019. “Best Practices of Technology Business Incubators in the Philippines.” *International Journal of Advanced Trends in Computer Science and Engineering* 8(5): 2315–2321. [https://www.researchgate.net/publication/338421695\\_Best\\_Practices\\_of\\_Technology\\_Business\\_Incubators\\_in\\_the\\_Philippines](https://www.researchgate.net/publication/338421695_Best_Practices_of_Technology_Business_Incubators_in_the_Philippines)
- ALLEN, DAVID AND VICTOR LEVINE. 1986. “Nurturing Advanced Technology Enterprises: Emerging Issues in State and Local Economic Development Policy.” New York: Prager.
- ALLEN, DAVID AND RICHARD MCCLUSKEY. 1991. “Structure, Policy, Services, and Performance in The Business Incubator Industry.” *Entrepreneurship Theory and Practice* 15(2): 61–77. <https://doi.org/10.1177/104225879101500207>
- ALLEN, DAVID N, AND SYEDUR RAHMAN. 1985. “Small Business Incubators: A Positive Environment for Entrepreneurship.” *Journal of Small Business Management* 23(3): 12–22. <https://www.econbiz.de/Record/small-business-incubators-a-positive-environment-for-entrepreneurship-allen-david/10001033583>
- AKCOMAK, SEMIH, 2009. “Incubators as Tools for Entrepreneurship Promotion in Developing Countries.” *MERIT Working Papers 2009-054*. United Nations University: Maastricht Economic and Social Research Institute on Innovation and Technology (MERIT). <https://ideas.repec.org/p/unm/unumer/2009054.html>
- AMEZCUA, ALEJANDRO S. 2010. “Boon or Boondoggle? Business Incubation as Entrepreneurship Policy,” PhD diss., (Syracuse University, 2010). *Public Administration - Dissertations* 80. [https://surface.syr.edu/ppa\\_etd/80](https://surface.syr.edu/ppa_etd/80)
- BERGEK, ANNA AND CHARLOTTE NORRMAN. 2008. “Incubator Best Practice: A Framework.” *Technovation* 28(1–2): 20–28. <https://doi.org/10.1016/j.technovation.2007.07.008>
- BØLLINGTOFT, ANNE AND JOHN P. ULHOI. 2005. “The Networked Business Incubator—Leveraging Entrepreneurial Agency?” *Journal of Business Venturing* 20(2): 265–290. <https://doi.org/10.1016/j.jbusvent.2003.12.005>
- BUYS, ANDRE AND PATIENCE NOKULUNGA MBEWANA. 2007. “Key Success Factors for Business Incubation In South Africa: The Godisa Case Study.” *South African Journal*

- of Science* 103(9): 356–358. [https://www.researchgate.net/publication/294303000\\_Key\\_success\\_factors\\_for\\_business\\_incubation\\_in\\_South\\_Africa\\_The\\_Godisa\\_case\\_study](https://www.researchgate.net/publication/294303000_Key_success_factors_for_business_incubation_in_South_Africa_The_Godisa_case_study)
- CAMERON, ALAN. 2007. “Farmers' Markets as Small Business Incubators and Safety Nets.” *International Journal of Entrepreneurial Behavior & Research* 13(6): 367–379. <http://dx.doi.org/10.1108/13552550710829179>
- CAMPBELL, DONALD J. 1988. “Task Complexity: A Review and Analysis.” *Academy of Management Review* 13(1): 40–52. <https://doi.org/10.2307/258353>
- CENTRE FOR STRATEGY & EVALUATION SERVICES (CSES) AND DIRECTORATE-GENERAL FOR INTERNAL MARKET, INDUSTRY, ENTREPRENEURSHIP AND SMES (EUROPEAN COMMISSION). 2002. “Benchmarking of Business Incubators. Centre for Strategy and Evaluation Services.” *Publications Office of the European Union*. <https://op.europa.eu/en/publication-detail/-/publication/5f01aafc-ef62-457d-9316-c85e7fc2509e>
- CHANG, JANE AND ALISON RIEPLE. 2013. “Assessing Students' Entrepreneurial Skills Development in Live Projects.” *Journal of Small Business and Enterprise Development* 20(1): 225–241.
- CHEN, CHUNG-JEN. 2008. “Technology Commercialization, Incubator and Venture Capital, And New Venture Performance.” *Journal of Business Research* 62(1): 93–103.
- COLOMBO, MASSIMO G. AND MARCO DELMASTRO. 2002. “How Effective Are Technology Incubators?: Evidence from Italy.” *Research Policy* 31 (7): 1103–1122. [https://doi.org/10.1016/S0048-7333\(01\)00178-0](https://doi.org/10.1016/S0048-7333(01)00178-0)
- COOPER, CHRISTINE E., STEPHANIE A. HAMEL, AND STACEY L. CONNAUGHTON. 2012. “Motivations and Obstacles to Networking in a University Business Incubator.” *The Journal of Technology Transfer* 37(4): 433–453. <https://doi.org/10.1007/S10961-010-9189-0>
- DAL MAS, FRANCESCA, MAURIZIO MASSARO, PAOLA PAOLONI, AND AINO KIANTO. 2021. “Translating Knowledge in New Entrepreneurial Ventures: The Role of Business Plan Development.” *VINE Journal of Information and Knowledge Management Systems*. <https://www.sciencegate.app/document/10.1108/vjikms-04-2021-0060>
- DEE, NICOLA J., FINBARR LIVESEY, DAVID GILL, AND TIM MINSHALL. 2011. “Incubation for Growth: A Review of the Impact of Business Incubation on New Ventures with High Growth Potential.” *NESTA Marketing Innovation Flourish*. <https://si-per.eu/siper-wAssets/repository/2011-10.pdf>
- DETTWILER, PAUL, PETER LINDELÖF, AND HANS LÖFSTEN. 2006. “Utility Of Location: A Comparative Survey Between Small New Technology-Based Firms Located On And Off Science Parks—Implications For Facilities Management.” *Technovation* 26(4): 506–517. <https://doi.org/10.1016/j.technovation.2005.05.008>
- DEWSON, SARA, J JUDITH ECCLES, NII DJAN TACKEY, AND ANNABEL JACKSON. 2000. *Guide to Measuring Soft Outcomes and Distance Travelled*. United Kingdom, Brighton: Institute for Employment Studies. [https://library.uniteddiversity.coop/Measuring\\_Progress\\_and\\_Eco\\_Footprinting/Softoutcomesanddistancetravelled.pdf](https://library.uniteddiversity.coop/Measuring_Progress_and_Eco_Footprinting/Softoutcomesanddistancetravelled.pdf)
- ESPONILLA II, FRANCISCO D., JENNIFER P. ALINSUNOD, HASMIN T. IGNACIO, HERONAFINE C. DE GUZMAN, EMMANUEL LUIS G. BORJAL, KEVIEN C. DELA CRUZ, AND IRA C. VALENZUELA. 2019. “Issues and Challenges of Technology Business Incubators in the Philippines.” *International Journal of Emerging Trends in Engineering Research* 7(9): 353–359. <http://dx.doi.org/10.30534/ijeter/2019/20792019>
- ETZKOWITZ, HENRY. 2002. “Incubation of Incubators: Innovation as a Triple Helix of

- University-Industry-Government Networks.” *Science and Public Policy* 29(2): 115–128. <https://doi.org/10.3152/147154302781781056>
- EVELEENS, CHRIS P., FRANK J. VAN RIJNSOEVER, AND EVA MMI NIESTEN. 2017. “How Network-Based Incubation Helps Start-up Performance: A Systematic Review Against the Background of Management Theories.” *The Journal of Technology Transfer* 42(3): 676–713. <https://link.springer.com/article/10.1007/s10961-016-9510-7>
- GUPTA, PRIYA DHAMIJA, SAMAPTI GUHA, AND SHIVA SUBRAMANIAN KRISHNASWAMI. 2013. “Firm Growth and Its Determinants.” *Journal of innovation and entrepreneurship* 2(1): 1–14. <http://dx.doi.org/10.1186/2192-5372-2-15>
- HACKETT, SEAN M. AND DAVID M. DILTS. 2008. “Inside the Black Box of Business Incubation: Study B—Scale Assessment, Model Refinement, and Incubation Outcomes.” *The Journal of Technology Transfer* 33(5), 439–471. <https://link.springer.com/article/10.1007/s10961-007-9056-9>
- . 2004A. “A Real-Options Driven Theory of Business Incubation.” *Journal of Technology Transfer* 29: 41–54. <http://dx.doi.org/10.1023/B:JOTT.0000011180.19370.36>
- . 2004B. “A Systematic Review of Business Incubation Research.” *Journal of Technology Transfer* 29(1): 55–82. <http://dx.doi.org/10.1023/B:JOTT.0000011181.11952.0f>
- HANNON, LANCE. 2003. “Poverty, Delinquency, and Educational Attainment: Cumulative Disadvantage or Disadvantage Saturation?” *Sociological Inquiry*. <https://doi.org/10.1111/1475-682X.00072>
- HANSEN, MORTEN T., HENRY CHESBROUGH, DONALD SULL, AND NITIN NOHRIA. 2000. “Networked Incubators: Hothouses of the New Economy.” *Harvard Business Review* 78(5): 74–84. <https://pubmed.ncbi.nlm.nih.gov/11143156/>
- IKEBUAKU, KENECHUKWU AND MULUGETA FITAMO DINBABO. 2018. “Beyond Entrepreneurship Education: Business Incubation and Entrepreneurial Capabilities.” *Journal of Entrepreneurship in Emerging Economies* 10(3). <http://dx.doi.org/10.1108/JEEE-03-2017-0022>
- ITO, YUKIKI AND DURREEN SHAHNAZ. 2019. “Road Map for Strengthening Social Entrepreneurship in the Philippines.” *Asian Development Bank*. <https://dx.doi.org/10.22617/BRF190127>
- KURATKO, DONALD F. AND WILLIAM R. LAFOLLETTE. 1987. “Small Business Incubators for Local Economic Development.” *Economic Development Review* 5(2): 49.
- LAI, WEN-HSIANG AND CHIU-CHING LIN. 2015. “Constructing Business Incubation Service Capabilities for Tenants at Post-Entrepreneurial Phase.” *Journal of Business Research* 68(11): 2285–2289. <https://ideas.repec.org/a/eee/jbrese/v68y2015i11p2285-2289.html>
- LALKAKA, RUSTAM. 2002. “Technology Business Incubators to Help Build an Innovation-Based Economy.” *Journal of Change Management* 3(2): 167–176. <https://doi.org/10.1080/714042533>
- LEWIS, DAVID A., ELSIE HARPER-ANDERSON, AND LAWRENCE A. MOLNAR. 2011. *Incubating Success. Incubation Best Practices that Lead to Successful New Ventures*. Ann Arbor, Michigan: University of Michigan Institute for Research on Labor, Employment, and the Economy. <https://www.nist.gov/system/files/documents/ineap/Incubating-Success-Report.pdf>
- LINDELÖF, PETER AND HANS LÖFSTEN. 2002. “Growth, Management and Financing of New Technology-Based Firms—Assessing Value-Added Contributions of Firms Located on And Off Science Parks.” *Omega* 30(3): 143–154. [http://dx.doi.org/10.1016/S0305-0483\(02\)00023-3](http://dx.doi.org/10.1016/S0305-0483(02)00023-3)
- LUKES, MARTIN, MARIA CRISTINA LONGO, AND JAN ZOUHAR. 2019. “Do Business Incubators Really Enhance Entrepreneurial

- Growth? Evidence from a Large Sample of Innovative Italian Start-ups.” *Technovation* 82: 25–34. <https://doi.org/10.1016/j.technovation.2018.07.008>
- MACDONALD, STUART AND RICHARD JOSEPH. 2001. “Technology Transfer or Incubation? Technology Business Incubators and Science and Technology Parks in the Philippines.” *Science and Public Policy* 28(5): 330–344. <http://dx.doi.org/10.3152/147154301781781327>
- MASUTHA, MUKOVHE AND CHRISTIAN ROGERSON. 2015. “Business Incubation for Small Enterprise Development: South African Pathways.” *Urban Forum* 26(2): 223–241. <http://dx.doi.org/10.1007/s12132-014-9242-4>
- MATTHEWS, JANA AND MARK P. RICE. 1995. *Growing New Ventures, Creating New Jobs: Principles and Practices of Successful Business Incubation (Entrepreneurship, Principles & Practices)*. Westport, Connecticut: Praeger.
- MAS-VERDÚ, FRANCISCO, DOMINGO RIBEIRO SORIANO, AND NORAT ROIG-TIerno. 2015. “Firm Survival: The Role of Incubators and Business Characteristics.” *Journal of Business Research* 68(4): 793–796. <https://ideas.repec.org/a/eee/jbrese/v68y2015i4p793-796.html>
- MAYNE, JOHN AND ELLIOT STERN. 2013. *Impact Evaluation of Natural Resource Management Research Programs: A Broader View. ACIAR Impact Assessment Series Report No. 84*. Canberra: Australian Center for International Agricultural Research. <https://www.aciar.gov.au/sites/default/files/legacy/ias84.pdf>
- McIVER-HARRIS, KATHRYN AND AERIAN TATUM. 2020. “Measuring Incubator Success during a Global Pandemic: A Rapid Evidence Assessment.” In *The Tenth International Conference on Engaged Management Scholarship*, 10-13 September 2020. Cleveland, Ohio, USA: Case Western Reserve University <http://dx.doi.org/10.2139/ssrn.3687712>
- MERRIFIELD, D. BRUCE. 1987. “New Business Incubators.” *Journal of Business Venturing* 2(4): 277–284. [https://doi.org/10.1016/0883-9026\(87\)90021-8](https://doi.org/10.1016/0883-9026(87)90021-8)
- MIAN, SARFRAZ A. 1996. “Assessing Value-Added Contributions of University Technology Business Incubators to Tenant Firms.” *Research Policy* 25(3): 325–335. [https://doi.org/10.1016/0048-7333\(95\)00828-4](https://doi.org/10.1016/0048-7333(95)00828-4)
- . 1997. “Assessing and Managing the University Technology Business Incubator: An Integrative Framework.” *Journal of Business Venturing* 12(4): 251–285. [https://doi.org/10.1016/S0883-9026\(96\)00063-8](https://doi.org/10.1016/S0883-9026(96)00063-8)
- MIAN, SARFRAZ, WADID LAMINE, AND ALLAIN FAYOLLE. 2016. “Technology Business Incubation: An Overview of the State of Knowledge.” *Technovation* 50-51: 1–12. <https://doi.org/10.1016/j.technovation.2016.02.005>
- MOSELMAN, MARCO AND YVONNE PRINCE. 2004. “Review of the Methods to Measure Effectiveness of State Aid to SMES. Final Report to the European Commission.” *EIM Business and Policy Research*.
- NOLAN, ALISTAIR. 2003. “Public Policy on Business Incubators: An OECD Perspective.” *Journal of Entrepreneurship and Innovation Management* 3(1): 22–30. <http://dx.doi.org/10.1504/IJEIM.2003.002216>
- NOWAK, MICHAEL J. AND CHARLES GRANTHAM. 2000. “The Virtual Incubator: Managing Human Capital in the Software Industry.” *Research Policy* 29(2): 125–134. [http://dx.doi.org/10.1016/S0048-7333\(99\)00054-2](http://dx.doi.org/10.1016/S0048-7333(99)00054-2)
- O’NEAL, THOMAS. 2005. “Evolving a Successful University-Based Incubator: Lessons Learned from the UCF Technology Incubator.” *Engineering Management Journal* 17(3): 11–25. <http://dx.doi.org/10.1080/10429247.2005.11415293>
- O’SHEA, RORY, THOMAS J. ALLEN, ARNAUD CHEVALIER, AND FRANK ROCHE. 2005.

- “Entrepreneurial Orientation, Technology Transfer and Spinoff Performance of US Universities.” *Research Policy* 34(7): 994–1009. <https://doi.org/10.1016/j.respol.2005.05.011>
- OBAJI, NKEM OKPA, ASLAN AMAT SENIN, AND CAMERON KEITH RICHARDS. 2014. “The Nigerian Business Incubation Programme: The Moderating Role of Government Policy.” *Industrial Engineering and Management Systems* 13(3): 330–341. <https://doi.org/10.7232/iems.2014.13.3.330>
- ÖRNEK, ALI ŞAHİN AND YASIN DANYAL. 2015. “Increased Importance of Entrepreneurship from Entrepreneurship to Techno-Entrepreneurship (Start-up): Provided Supports and Conveniences to Techno-Entrepreneurs in Turkey.” *Procedia-Social and Behavioral Sciences* 195: 1146–1155. <http://dx.doi.org/10.1016/j.sbspro.2015.06.164>
- OZDEMIR, ÖMER ÇAĞR AND YASIN ŞEHITOĞLU. 2013. “Assessing the Impacts of Technology Business Incubators: A framework for Technology Development Centers in Turkey.” *Procedia-Social and Behavioral Sciences* 75: 282–291. <http://dx.doi.org/10.1016/j.sbspro.2013.04.032>
- PETERS, LOIS, MARK P. RICE, AND MALAVIKA SUNDARARAJAN. 2004. “The Role of Incubators in the Entrepreneurial Process.” *The Journal of Technology Transfer* 29(1): 83–91. <http://dx.doi.org/10.1023/B:JOTT.0000011182.82350.df>
- PETTERSEN INGER BEATE, JARLE AARSTAD, ØYSTEIN STAVØ HØVIG, ANITA ELLEN TOBIASSEN. 2015. “Business Incubation and the Network Resources of Start-ups.” *Journal of Innovation and Entrepreneurship* 5(1): 7. <https://innovation-entrepreneurship.springeropen.com/articles/10.1186/s13731-016-0038-8>
- PHAN, PHILLIP, DONALD S. SIEGEL, AND MIKE WRIGHT. 2005. “Science Parks and Incubators: Observations, Synthesis and Future Research.” *Journal of Business Venturing* 20: 165–182. <http://dx.doi.org/10.1016/j.jbusvent.2003.12.001>
- PLOSILA, WALTER H., AND DAVID N. ALLEN. 1985. “Small Business Incubators and Public Policy: Implications for State and Local Development Strategies.” *Policy Studies Journal* 13(4): 729. <http://dx.doi.org/10.1111/j.1541-0072.1985.tb01612.x>
- PORTER, MICHAEL E. AND MARK E. KRAMER. 2011. “Creating Shared Value.” *Harvard Business Review* 89(1/2): 62–77. <https://www.hbs.edu/faculty/Pages/item.aspx?num=39071>
- PRICE, RUSS. 2004. “The Role of Service Providers in Establishing Networked Regional Business Accelerators in Utah.” *International Journal of Technology Management* 27(5): 465–474. <https://doi.org/10.1504/IJTM.2004.004283>
- PRICewaterhouseCoopers. 2017. *Off to Great Start—The Philippine Start-up Ecosystem*. <https://www.pwc.com/ph/en/publications/ceo-insights-surveys/201philippine-start-up-survey.html>
- RICE, MARK P. 2002. “Co-Production of Business Assistance in Business Incubators: An Exploratory Study.” *Journal of Business Venturing* 17(2): 163–187. [https://doi.org/10.1016/S0883-9026\(00\)00055-0](https://doi.org/10.1016/S0883-9026(00)00055-0)
- RUBIN, TZAMERET H., TOR HELGE AAS, ANDREW STEAD. 2015. “Knowledge Flow in Technological Business Incubators: Evidence from Australia and Israel.” *Technovation* 41-42: 11–24. <https://doi.org/10.1016/j.technovation.2015.03.002>
- RUHIU, RUTH WANJIRU, P. KARANJA NGUGI, AND GICHUHI A. WAITITU. 2014. “Effects of Managerial Skills on the Growth of Incubated Micro and Small Enterprises in Kenya.” *International Journal of Social Sciences and Entrepreneurship* 1(12): 474–485. [http://ijsse.org/articles/ijsse\\_v1\\_i12\\_474\\_485.pdf](http://ijsse.org/articles/ijsse_v1_i12_474_485.pdf)
- SÁ, CRESO AND HANA LEE. 2012. “Science, Business, and Innovation: Understanding Networks in Technology Based Incubators.” *R&D Management* 42(3): 243–253. <https://doi.org/10.1111/j.1467-9310.2012.00681.x>

- SARLIJA, NATAŠA, SANJA PFEIFER, MARINA JEGER, AND ANA BILANDŽIĆ. 2016. "Measuring Enterprise Growth: Pitfalls and Implications." *World Academy of Science, Engineering and Technology International Journal of Mechanical and Industrial Engineering* 10(6): 1810–1817. <https://publications.waset.org/10004475/measuring-enterprise-growth-pitfalls-and-implications>
- SCHWARTZ, MICHAEL AND CHRISTOPH HORNYCH. 2008. "Specialization as Strategy for Business Incubators: An Assessment of the Central German Multimedia Center." *Technovation* 28(7): 436–449. <http://dx.doi.org/10.1016/j.technovation.2008.02.003>
- SHANE, SCOTT. 2009. "Why Encouraging More People to Become Entrepreneurs Is Bad Public Policy." *Small Business Economics* 33(2):141–149. <http://dx.doi.org/10.1007/s11187-009-9215-5>
- SHERMAN, HUGH AND DAVID S. CHAPPELL. 1998. "Methodological Challenges in Evaluating Business Incubator Outcomes." *Economic Development Quarterly* 12(4): 313–321. <https://doi.org/10.1177/089124249801200403>
- SIEGEL, DONALD, PAUL WESTHEAD AND MIKE WRIGHT. 2003. "Science Parks and the Performance of New Technology-Based Firms: A Review of Recent U.K. Evidence and an Agenda for Future Research." *Small Business Economics* 20(2): 177–184. <https://link.springer.com/article/10.1023/A:1022268100133>
- SMILOR, RAYMOND W. 1987. "Commercializing Technology through New Business Incubators." *Research Management* 30(5): 36–41. <https://doi.org/10.1080/00345334.1987.11757061>
- SOETANTO, DANNY P. AND SARAH LOUISE JACK. 2016. "The Impact of University-Based Incubation Support on the Innovation Strategy of Academic Spin-Offs." *Technovation* 50: 25–40. [https://www.research.lancs.ac.uk/portal/en/publications/the-impact-of-universitybased-incubation-support-on-the-innovation-strategy-of-academic-spinoffs\(436597df-4da9-44e2-8e22-94efa0499826\)/export.html](https://www.research.lancs.ac.uk/portal/en/publications/the-impact-of-universitybased-incubation-support-on-the-innovation-strategy-of-academic-spinoffs(436597df-4da9-44e2-8e22-94efa0499826)/export.html)
- SONNE, LINA. 2012. "Innovative Initiatives Supporting Inclusive Innovation in India: Social Business Incubation and Micro Venture Capital." *Technological Forecasting and Social Change* 79(4): 638–647. <https://doi.org/10.1016/j.techfore.2011.06.008>
- STAL, EVA, TALES ANDREASSI AND ASA FUJINO. 2016. "The Role of University Incubators in Stimulating Academic Entrepreneurship." *RAI Revista de Administração e Inovação* 13(2): 89–98. <https://doi.org/10.1016/j.rai.2016.01.004>
- STEPHENS, SIMON AND GEORGE ONOFREI. 2012. "Measuring Business Incubation Outcomes: An Irish Case Study." *International Journal of Entrepreneurship and Innovation* 13(4): 277–285. <http://dx.doi.org/10.5367/ijei.2012.0094>
- THOMPSON, JOHN L. AND RON DOWNING. 2007. "The Entrepreneur Enabler: Identifying and Supporting Those with Potential." *Journal of Small Business and Enterprise Development* 14(3): 528–544. <http://dx.doi.org/10.1108/14626000710773592>
- TÖTTERMAN, HENRIK AND JAN STEN. 2005. "Start-ups: Business Incubation and Social Capital." *International Small Business Journal* 23(5): 487–511. <http://dx.doi.org/10.1177/0266242605055909>
- TRITOASMORO, IWAN IWUT, UDISUBAKTI CIPTOMULYONO, WAWAN DHEWANTO, AND TATANG AKHMAD TAUFIK. 2022. "Determinant Factors of Lean Start-up-Based Incubation Metrics on Post-Incubation Start-up Viability: Case-Based Study." *Journal of Science and Technology Policy Management*. <https://www.emerald.com/insight/content/doi/10.1108/JSTPM-12-2021-0187/full/html>
- VOISEY, PAM, LYNNE GORNALL, PAUL JONES, AND BRYCHAN THOMAS. 2006. "The Measurement of Success in a Business Incubation Project." *Journal of Small Business and Enterprise Development* 13(3): 454–468. <http://dx.doi.org/10.1108/14626000610773592>



org/10.1108/14626000610680307

WESTHEAD, PAUL. 2002. "R&D 'Inputs' and 'Outputs' of Technology-Based Firms Located on and off Science Parks." *R&D Management* 27(1): 45–62. <http://dx.doi.org/10.1111/1467-9310.00041>

WORLD BANK. 2010. *Global Good Practice in Incubation Policy Development and Implementation*. Washington, DC. <https://openknowledge.worldbank.org/handle/10986/12866>

---. 2014. *An Evaluation and Impact Assessment of Business Incubation Models in Eastern Europe and Central Asia*. Washington, DC. <https://openknowledge.worldbank.org/handle/10986/11866>

XAVIER, SIRI ROLAND, DONNA KELLEY, JACQUI KEW, MIKE HERRINGTON, ARNE VORDERWÜLBECKE. 2014. *Global Entrepreneurship Monitor (GEM) 2012 Global Report*. Global Entrepreneurship Monitor. <https://www.gemconsortium.org/file/open?fileId=48545>

ZUO, LI, KAI-JIE YOU, AND SHUANG LIU. 2014. "Research on Incubation of Characteristic Industry in Nationalities." In *2014 International Conference on Management Science and Management Innovation (MSMI 2014)*, 14-15 June 2014. Changsha, China: Atlantis Press <http://dx.doi.org/10.2991/msmi-14.2014.24>

**ANNEX 1** Soft and hard measures indicators questionnaire

Statement	Poor	Fair	Good	Better	Best
<b>Hard measures indicators</b>					
My business has increased its link with potential donors/funders, lowered its financial and credit market risks, and improved its funding networks.					
My business has increased its profit to sustain its operations, and my cash flows have improved.					
My business has increased its operating capacity, grown its number of employees, and expanded its market.					
<b>Soft measures indicator</b>					
My business knowledge, communication and relationship skills, and work and professional ethics have increased.					
My skills in operating digital devices, communicating, finding, or sharing information, creating basic content, using productivity software (e.g., word processing, spreadsheets) and online platforms (e.g., Facebook and Instagram) and boosting my business page online have improved.					
My ability to successfully accomplish different tasks accurately has increased and when making decisions about my business, I feel assured that I am making the right choice and that I can confidently say yes to it.					
The media impressions, content analysis, and social media mentions pertaining to my products/services and my business have improved.					
I have established appropriate affiliations with other institutions and formed a mutually beneficial partnership that increased the likelihood of success for both parties.					
My business defines the organization's purpose and instills a sense of belongingness, ownership, and identity in the employees.					