

DEVELOPING A BUSINESS INCUBATION MODEL FOR UNIVERSITY INCUBATORS IN THE UPPER CENTRAL REGION OF THAILAND'S HIGHER EDUCATION NETWORK

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Abstract

Purpose: This research aimed to develop a business incubation model for university incubators in the upper central region of Thailand's higher education network.

Study Design/Methodology/Approach: Data were collected from a purposive sample of 400 executives, managers, and staff at UBI centers. Using Structural Equation Modeling (SEM), the study analyzed the factors influencing business success.

Findings: The results revealed that selecting incubators, managing incubators, providing incubator services, and financial support all influence the creation of entrepreneurs. This relationship is mediated by the technology development within the incubated businesses. Of these factors, managing incubators had the greatest influence, followed by selecting incubators.

Originality/Value: University business incubators can use the findings to guide policy development and implementation, thereby fostering the growth of successful businesses and cultivating sustainable entrepreneurs.

Keywords: Business Incubation Model, University Business Incubators, Higher Education Institutions, Thailand

Introduction

Higher education institutions have a key mission to cultivate and develop entrepreneurs and promoting and supporting new entrepreneurs to achieve business success and compete at the national level; promoting and developing students and faculty to develop entrepreneurial potential and skills; encouraging students and faculty to develop research for commercial use; and establishing student entrepreneurship clubs to serve as learning centers and exchange diverse experiences across disciplines and with outside entrepreneurs. Business incubators within higher education institutions aim to support and encourage faculty, students, college personnel, entrepreneurs, and external stakeholders to recognise

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the importance of entrepreneurship and the commercialisation of research. Promoting the integration of research/innovation development, technology, and academic potential within higher education institutions into the business and industrial world; developing new entrepreneurs; and cultivating new entrepreneurs with the potential to seek business development support from government agencies and other financial institutions through government policy and developing competitiveness and robust business growth. The expected outcomes of higher education institutions serving as business incubators include creating new entrepreneurs and strengthening existing entrepreneurs through the incubation of student and faculty research, enabling them to further develop their ideas into commercial products or solutions; and increasing the number of student and faculty projects and research that are notified and patented. However, current data indicate that some higher education institutions are successful in incubating new entrepreneurs and business ventures.

In contrast, others fail to create new ventures that benefit society and the nation. Many institutions have had to close their incubators and ultimately abandon their mission of nurturing new entrepreneurs and supporting the creation of new businesses. Therefore, this research aims to study and develop a successful business incubation model for future application to other business incubators in Thailand.

Objectives

1. To study the business incubation model for business incubator centres of higher education institutions under the Upper Central Network of the Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation (OPMHESI) in Thailand.
2. To study the factors affecting the development of the business incubation model for business incubator centres of higher education institutions under the Upper Central Network of the Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation (OPMHESI) in Thailand.
3. To develop the business incubation model for business incubator centres of higher education institutions under the Upper Central Network of the Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation (OPMHESI) in Thailand.

Literature Review

Incubator Selection

Hackett and Dilts (2004) suggested that the selection policy is related to the way the incubator will provide incubation. Therefore, the selection of incubators must be consistent with the incubator's incubation methods. Incubators that are unclear about the selection of incubators and incubation methods from the beginning often lead to the incubation process failing in the end. However, in terms of responsibility and incubation methods, the incubator will have a structure with a board of directors and an incubator manager who must have expertise in the field of study to provide advice and incubation in line with the

incubator's needs. Most of the selection is conducted through the incubator's website or by utilizing the Canvas Model to transform ideas into businesses (Carvalho & Galina, 2015). Therefore, the process of selecting incubators for business incubators has a significant impact on creating entrepreneurs through the development of information technology, ultimately leading to business success.

H1: The incubator selection process is likely to have a positive impact on creating entrepreneurs through technology development as a business focus.

Incubator Management

The incubator has set its objectives to act as an agency that supports and promotes the incubators to realize the importance of being entrepreneurs and the application of research results to commercial use, promotes the application of research results to the development of innovations, technology, and the academic potential of higher education institutions to connect with the business and industrial world to develop new entrepreneurs, opens up opportunities for the incubators to participate in the activities of the business incubators that have been established and develops them into high-potential entrepreneurs, strengthens and cultivates new entrepreneurs to have the potential to request support for business development from other government agencies and financial institutions according to government policies to develop competitive capabilities and strong business growth. The expected results from the management of the incubators include making the incubators new entrepreneurs and strengthening the original entrepreneurs from the incubation, exchanging perspectives and changing their status to entrepreneurs, increasing the research results of the incubators to commercial production or problem solving, and increasing the number of projects and research results of the incubators to be registered and patented, and cultivating businesses that have an impact on the public in order to reduce social problems (Alzaghal & Mukhtar, 2017). Therefore, the management process of incubators has a significant impact on creating entrepreneurs by leveraging information technology to achieve business success.

H2: The incubator management is likely to have a positive impact on creating entrepreneurs through technology development as a business focus.

Incubators Providing Services

Bergek and Normann's (2008) study found that physical resources, such as physical space and furniture, are one of the most important services offered, especially in the past and continue to be so today. Along with other support services, incubators must provide tenants with affordable office space, as well as support services, both through internal and external affiliates, to increase the chances of business survival. Elmansori's (2014) study stated that incubators provide services to small businesses and offer physical facilities such as offices, warehouses, and production areas, as well as general loading docks, common boardrooms or meeting areas, kitchens, and common reception areas. These facilities also often include photocopiers, fax machines, audio-visual equipment, and computers. Therefore, the services provided and supported to students have an impact on creating entrepreneurs through the development of information technology, which helps achieve business success.

H3: Incubators providing services are likely to have a positive impact on creating entrepreneurs through technology development as a business focus.

Financial Support

Access to financial resources is one of the key factors for the survival of most startups and the booming business of incubators. It is considered a crucial factor in the effectiveness of these organizations (Grimaldi & Grandi, 2005). The classification of incubator services can be divided into four types of organizations:

1. for-profit organizations involved in incubation, job creation and potential, focusing on entry criteria for incubator companies;
2. public, non-profit or government organizations focused on job creation and economic development and limiting the length of stay of tenants;
3. educational institutions; and
4. hybrid public/private partnerships.

In the conceptual model of effective incubators proposed by Dee et al. (2011), several indicators are used to measure factors of access to finance, such as the ability to access sources of capital or networks of capital sources, the ability to access venture capital, access to internal investment, financial assistance in accessing commercial loans, assistance with accounting or financial management, assistance in accessing specialized funds, and economic knowledge training.

H4: The financial support is likely to have a positive impact on creating entrepreneurs through technology development as a business focus.

Creating Entrepreneurs through Technology Development as a Business Focus

Hoffman (1985) argues that the introduction of ICT tools can significantly enhance an organization's international competitiveness. The use of ICT tools can help expand an organization's business boundaries and enable it to provide more comprehensive customer service and functions. Bafoutsou and Mentzas (2002) note that the use of ICT tools in an organization's processes can save a significant amount of time and money, reduce the need for travel, and enhance the efficiency and effectiveness of decision-making processes. Nowadays, information is a vital component of any organization's processes, encompassing details about customers, markets, competitors, processes, and products. The use of ICT tools can help organizations collect, process, store, and share this information effectively. Previously, ICT tools were divided into three categories: computer technology, internet and telecommunications. Now, ICT encompasses hardware, communication, software, and office equipment, which is a vast domain, as evident from the literature. Li (2012) categorizes ICT tools into five categories: (1) communication, which is divided into two types: synchronous, such as Skype, MSN, etc., and asynchronous, such as email, wiki, etc.; (2) processing, such as spreadsheets, data mining, etc.; (3) course management, such as learning management systems, content management systems, etc.; (4) social networks, such as Facebook, Twitter, etc.; and (5) collaboration, such as project management systems, workflow systems, etc.

Business Incubator Success

Literature review on the success factors of business incubators. From the literature review, it was found that there are important factors as follows:

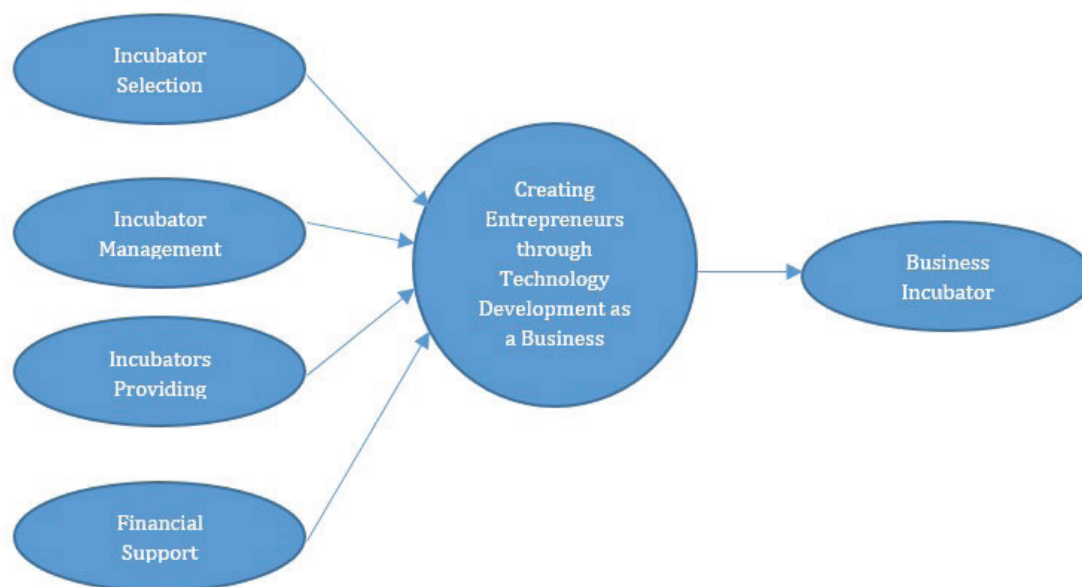
1. **Selection Policy:** One of the most important processes in the success of a business incubator is the incubation method, the selection of companies to be incubated, which may vary depending on the mission and objectives of the incubator. The proposed business incubation model suggests the selection and monitoring of various business services. Any business incubator that aims to be successful and create sustainable companies must have a robust selection policy and criteria for evaluating, recommending, and selecting incubators, which are approved by the board of directors, managers, and the incubator committee's selection process (Smilor, 1987).

In terms of the selection criteria for incubators, there are differences between each type of business. There are no fixed selection criteria. However, the study's results found that the incubator's variability in the screening and selection process can lead to the incubation process failing. In terms of responsibility and methods for evaluating new incubators, it is stated that most of the selection process is conducted through the incubator's website or by using the Canvas Model to turn the idea into a business. In some cases, it is supplemented with additional measures.

2. **Collaborative Networking Services:** Due to the development and dissemination of ICT, networking is considered to be one of the most important factors in the success of an incubator. Campbell et al. (1985) explained that the proposed business incubation model includes providing access to the incubator network, which helps the incubator or entrepreneur achieve their business objectives. Entrepreneurship is a dynamic process that requires connections or relationships not only between individuals but also between institutions. Entrepreneurs can access more resources through networks and have a faster chance of correcting mistakes as a result. In support of this view, Hansen et al. (2000) stated that networks are based on the individual or personal constraints of the entrepreneurs who are connected to the network, but can be expanded to include many other companies or organizations, such as regulators, policymakers, and research institutions, across various sectors. Networking is defined as the facilitation of interconnected relationships, where these relationships are considered a set of connections that may be formed between individuals or organizations. Therefore, different types of networks can be defined by playing different roles in the dimensions of network relationships. It is crucial for the survival and growth of new business creation. It provides knowledge, expertise and information as well as reduces the uncertainty that companies face. In addition, networking is a foundation and mechanism for entrepreneurs to maintain relationships that provide access to essential resources, which can be leveraged as part of the incubation, operation, and promotion of business relationships.

H5: Focusing on technology development as a business strategy to create entrepreneurs is likely to have a positive impact on business incubator success.

Conceptual Framework



Unit of Analysis

Business incubator centers in higher education institutions under the upper central region network of the Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation (OPMHESI) in Thailand

Methodology

Quantitative research methods use survey methods by creating measures, such as questionnaires, with an emphasis on designing research instruments. A good measure must be able to measure what it is intended to measure, and must have both validity and reliability in terms of content. The reliability coefficient of the scale used in this research, from a total of 24 questions, using a structured questionnaire with 40 samples from groups that are not the sample groups used in this research, namely executives, managers, and staff of the business incubator center. The Cronbach's Alpha coefficient, which is the value used to measure the reliability or internal consistency of the scale used in this research, has an average correlation value of .980 to .990. The 24 questions have a Cronbach's Alpha coefficient of .988, which means that the scale used as a questionnaire in this research has a high level of reliability and can be used in this research in the future.

Population and Sample

The population consists of executives, managers, and staff of business incubator centers in both public and private higher education institutions under the Upper Central Network, totaling 44 institutions, with Chulalongkorn University as the host institution, according to the list of university business incubators in higher education institutions under the network of the upper central region of Office of the Ministry of Higher Education, Science, Research and Innovation in Thailand.

In considering the sample size for the analysis of causal structure models with latent variables, Hair et al. (2010) proposed that the sample size for the structural equation modeling analysis should not be less than 100 samples and the proportion of the sample size to the number of parameters to be estimated should be 10-12 samples per 1 parameter. The condition is to determine the minimum sample size for the analysis of latent variables ≤ 7 variables and each latent variable is measured from >3 observable variables. The minimum sample size should not be less than 150 samples. In addition, Wiratchai (1999) proposed to consider the Hoelter Value that should be more than 200, then the equation model is considered to be consistent with the empirical data. Therefore, in this research, a sample of 400 samples will be used, which will cover the criteria. In this research, the sampling method was used from executives, managers, and staff of business incubator centers in both public and private higher education institutions under the upper central region network, totaling 44 institutions, in order to obtain a sample size of 400 samples. The calculation of the appropriate number of samples was based on the general rules for selecting the level of confidence coefficient (Alpha Level) and the acceptable error value, which is Alpha = 0.05 and the acceptable error value is 5%, which is considered an appropriate value (Krejcie & Morgan, 1970). Since the exact population size was not known in this research, the proportion of the population to be randomly selected was set at 20% or 0.2 at a 95% confidence level and an error value of 5% or 0.05, using the formula for calculating the appropriate number of samples using the Cochran (1977) formula. The appropriate sample group was 384 samples. However, this research will use a sample size of 400 samples, which will cover the appropriate number of samples according to the Cochran (1977) formula. At the same time, a larger sample size will be obtained, which has advantages in terms of reliability and population representativeness according to the concept of Neuman (1997).

Sampling Techniques

Using the non-probability sampling method, using the purposive sampling method, by selecting samples from the population of executives, managers, and staff of the business incubator centers in both public and private higher education institutions under the Upper Central Network in 44 public and private higher education institutions under the Upper Central Network, and selecting samples to meet the required number without any criteria for choosing a total of 400 samples.

Research Tools

The research tools are questionnaires that are continuous in the form of Likert-Type Scales (Likert, 1932), which classify the scale values as follows: “Strongly agree” is given a score of 5, representing the highest relationship; “Agree” is given a score of 4, representing a high relationship; and “Unsure” is given a score of 3, representing a low relationship; and “Disagree” is given a score of 2, representing the lowest relationship; and “Strongly disagree” is given a score of 1. The questionnaire was tested for the reliability of each question using 40 samples, which differed from those used in this research, by analysing the correlation coefficient with the Cronbach’s Alpha method (Nunnally, 1978). The reliability coefficient of the scale used in this research was calculated from a total of 24 questions using a structured questionnaire

with a sample of 40 samples from groups that were not the sample group used in this research, namely executives, managers, and staff at the business incubator center. Cronbach's Alpha coefficient, which is a value used to measure the reliability or internal consistency of the scale used in this research, had an average correlation value of .980 to .990. For all 24 questions, the Cronbach's Alpha coefficient was .988, which means that the scale used as a questionnaire in this research has a high level of reliability and can be used in this research further.

The questionnaire was also tested for validity by three executives from the business incubator centre, experts, and entrepreneurs to verify its content validity.

Statistics Analysis

1. Descriptive stage

In this research, the researcher will use statistics to describe variables, including percentages, means, maximums, and minimums, to describe independent variables and a single dependent variable (univariate statistics).

2. Analysis and modelling stage

Use statistics to analyze structural equations (Structure Equation Model) to create a model for testing that with independent variables as latent variables, including selection of incubators, management of incubators, services for incubators, financial support, through mediating variables as latent variables, including entrepreneurship creation through technology development as a business focus, to predict the influence on the dependent variable, which is a latent variable, including the success of business incubators in higher education institutions, to use the model to explain the appropriateness of predicting the influence of independent variables on the dependent variable, how much? Exploratory Factor Analysis (EFA) was used by selecting the Common Factor Analysis (Principal Axis Factoring) method to study and analyze using Kaiser-Meyer-Olkin (KMO) and Barlett's Test of Sphericity. Then, the χ^2 , χ^2/df , CMIN/DF, GFI, TLI, AGFI, CFI, and RMSEA statistics were used to assess the structural validity of the empirical model. Finally, the structural equation model was analyzed to create a forecasting model.

Results

Exploratory Factor Analysis (EFA) by using Common Factor Analysis, Principle Axis Factoring (PAF) method to study and development of a business incubation model for university business incubators in higher education institutions under the network of the upper central region of Office of the Ministry of Higher Education, Science, Research and Innovation in Thailand.

Table 1 Kaiser-Meyer-Olkin (KMO) and Barlett's Test of Sphericity, where the KMO value is 0.979 and Sig. = .000 < 0.05, where the value of $0 \leq \text{KMO} \leq 1$ is close to 1, meaning that all variables are highly related and can be grouped into factors for further factor analysis. Standard components can explain the relationship between variables at a reasonable level (Wanichbancha, 2013).

Table 1 Kaiser-Meyer-Olkin (KMO) and Barlett's Test of Sphericity

Kaiser-Meyer-Olkin (KMO)	0.979
Barlett's Test of Sphericity	
Approx. Chi-Square	652.770
df	365
Significant	.000

Table 2 Statistical Values Assessing the Structural Validity of the Empirical Model.

Index Value	Standard Criteria	Statistical Values
p-value	Greater than or equal to 0.05 (Schumacker & Lomax, 2010)	.055
$\chi^2 = 652.770$, df. = 365, $\chi^2/\text{df.} = 1.788$	Should not exceed 2.0 (Schumacker & Lomax, 2010)	1.788
CMIN/DF	less than 2.0 (Schumacker & Lomax, 2010)	1.998
GFI	more than 0.95 (Kelloway, 2015)	.974
TLI	more than 0.95 (Kelloway, 2015)	.998
AGFI	more than 0.95 (Kelloway, 2015)	.974
CFI	more than 0.95 (Kelloway, 2015)	.966
RMSEA	less than 0.05 (Kelloway, 2015)	.049

From Table 1-2, the value of $\chi^2 = 652.770$, df. = 365, the value of $\chi^2/\text{df.} = 1.788$, p-value = .055, and CMIN/DF = 1.998, which are all less than 2.0, indicate a good level of fit (Schumacker & Lomax, 2010), suggesting that the structural equation model is consistent with the empirical data. In addition, the values of GFI = .974, TLI = .998, AGFI = .974, and CFI = .966 are all greater than 0.95, indicating a good level of model fit. Moreover, it was found that RMSEA = .049 and PCLOSE or p-value = .055, thereby accepting the hypothesis that RMSEA is less than 0.05 (Kelloway, 2015). It can be concluded that the index of consistency between the model and empirical data is by the standard criteria and is at a good consistency level.

Table 3 Regression Weights

Relationship of Variables			Estimate	S.E.	C.R.	P	Label
INFORM	<---	INCUB	.174	.078	2.240	.025	
INFORM	<---	FUND	.535	.053	10.043	***	
INFORM	<---	SELECT	.185	.065	2.846	.004	
INFORM	<---	MANAGE	.207	.065	3.166	.002	
PERFORM	<---	INFORM	.925	.046	20.151	***	
SL1	<---	SELECT	1.000				
SL2	<---	SELECT	.938	.059	15.947	***	
SL3	<---	SELECT	1.077	.071	15.203	***	
SL4	<---	SELECT	1.013	.065	15.501	***	
MS1	<---	MANAGE	1.000				
MS2	<---	MANAGE	1.007	.065	15.512	***	
MS3	<---	MANAGE	1.037	.069	15.026	***	
MS4	<---	MANAGE	.647	.076	8.454	***	
IM1	<---	INCUB	1.000				
IM2	<---	INCUB	1.139	.067	17.097	***	
IM3	<---	INCUB	1.090	.059	18.398	***	
IM4	<---	INCUB	.800	.057	14.033	***	
FS1	<---	FUND	1.000				
FS2	<---	FUND	1.043	.063	16.458	***	
FS3	<---	FUND	1.234	.064	19.204	***	
FS4	<---	FUND	1.245	.065	19.294	***	
ICT1	<---	INFORM	1.000				
ICT2	<---	INFORM	.939	.043	21.970	***	
ICT3	<---	INFORM	.974	.039	24.697	***	
ICT4	<---	INFORM	.987	.040	24.473	***	
UIP1	<---	PERFORM	1.000				
UIP2	<---	PERFORM	.826	.043	19.357	***	
UIP3	<---	PERFORM	1.017	.040	25.521	***	
UIP4	<---	PERFORM	.764	.040	18.921	***	

Table 3 C.R. value > 1.96 indicates that the factor weight is not equal to 0 or P = p-value < 0.05, which is very close to zero. Therefore, it can be concluded that all factor weights are not equal to zero.

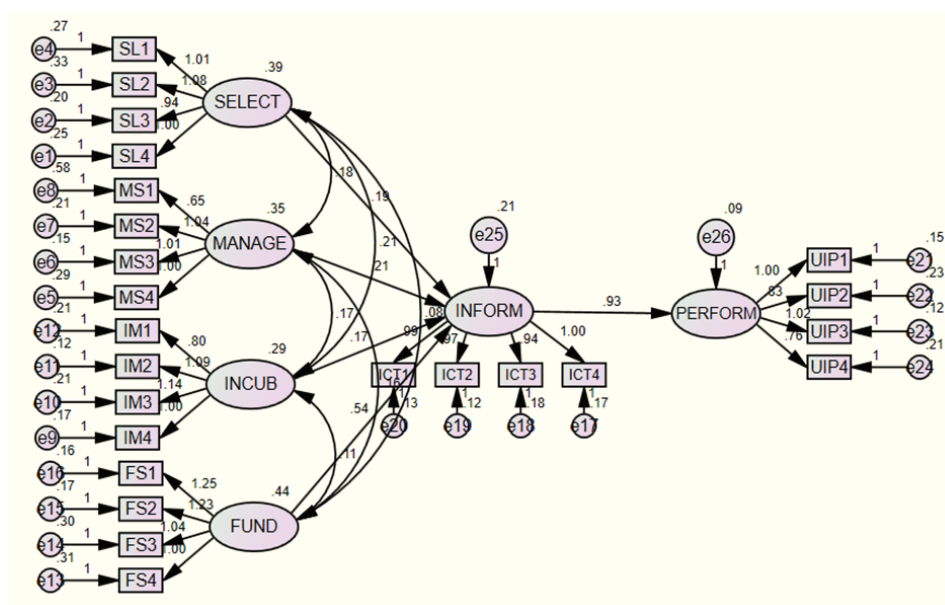
Table 4 Covariances

Relationship of Variables			Estimate	S.E.	C.R.	P	Label
SELECT	<-->	MANAGE	.183	.026	7.056	***	
SELECT	<-->	INCUB	.213	.025	8.574	***	
SELECT	<-->	FUND	.076	.024	3.169	.002	
MANAGE	<-->	INCUB	.173	.023	7.600	***	
MANAGE	<-->	FUND	.164	.026	6.369	***	
INCUB	<-->	FUND	.114	.022	5.280	***	

Table 4 shows the covariance between each pair of latent factors, along with testing the hypothesis that the covariance is zero or not. The C.R. value is > 1.96 , and the $P = p$ -value is less than 0.05. Therefore, the covariance between the variables, the selection of incubators, the management of incubators, the provision of incubation services, and the financial support is not equal to zero.

Therefore, the correlation coefficient between each pair of latent variables is positive, indicating that they are related in the same direction. The factor of incubator selection and provision of incubation services has the highest correlation, with a correlation coefficient of .213, followed by the selection of incubators and the management of incubators, with a correlation coefficient of .183.

In conclusion, the model in Figure 1 is consistent with the empirical data at a significance level of 0.05 (as shown in Figure 1) (Wanichbancha, 2013).

**Figure 1** Structural Equation Model

Remarks: $\chi^2 = 652.770$, $df = 365$, $\chi^2/df = 1.788$, p -value = .055, $CMIN/DF = 1.998$, $GFI = .974$, $TLI = .998$, $AGFI = .974$, $CFI = .966$

Table 5 presents the results of the path coefficient test for the factors influencing the development of the business incubation model in business incubator centres at higher education institutions. This study focuses on those under the network of the upper central region of the Office of the Permanent Secretary, Ministry of Higher Education, Science, Research, and Innovation in Thailand. Additionally, it examines the consistency of the model with empirical data.

Table 5 The Path Coefficient Test of the Variable

Latent Variable (Independent Variable)	Latent Variable (Outcome Variable)	Estimate	S.E.	Z-test	<i>p</i>	R ²
X ₁ = Incubator Selection	Y = Creating Entrepreneurs	.185	.065	2.846	.004	79.8
X ₂ = Incubator Management	through Technology	.207	.065	3.166	.002	
X ₃ = Incubators Providing Services	Development as a Business Focus	.174	.078	2.240	.025	
X ₄ = Financial Support		.535	.053	10.043	***	
Y = Creating Entrepreneurs through Technology Development as a Business Focus	Z = Business Incubator Success	.925	.046	20.151	***	77.7

From Table 5 results of the covariance test between each pair of latent variables, along with testing each hypothesis for each pair to see if the covariance is zero or not. The test results are consistent with all hypotheses. In conclusion, the covariance between the latent variables (independent variables) namely X₁ = selection of incubators, X₂ = management of incubators, X₃ = services for incubators, X₄ = financial support has an influence on the latent variable (median variable), Y = creation of entrepreneurs through technology development as a business focus, with the variable X₂ = management of incubators having the highest influence, followed by X₁ = selection of incubators. The three independent variables can explain the mediating variable by 79.8%. The latent variable Y, which represents entrepreneurship creation through technology development as a business focus, influences Z, the success of higher education institution business incubators, and can explain the latent variable, serving as the mediating variable and dependent variable, by 77.7 percent.

Discussion

A study on the business incubation model for business incubator centres of higher education institutions under the Upper Central Network of the Office of the Permanent Secretary of the Ministry of Higher Education, Science, Research and Innovation in Thailand found the following:

1. The selection, management, and services for incubators influence the creation of entrepreneurs through the development of technology that is the focus of the business. The management of incubators has

the highest influence, followed by the selection of incubators. This is consistent with the study of Campbell et al. (1985) who found that the policy of selecting students and alums to participate in the incubation is considered the most important process in the success of the incubator center, including the incubation method, the selection of students, alumni, interested persons, or companies that want to be incubated, which may differ according to the objectives of each incubator center. However, with the mission and objectives of the incubator center in the business incubation model that suggests that the selection and monitoring of the application of various business services, one of the key points of successful incubation is the incubator must have a good selection policy and rules for evaluating, recommending and selecting incubators through a selection process by interview and approval from the incubator board and by the study of Hackett and Dilts (2004) who suggested that the relevant selection policy is related to the way the incubator will provide incubation. Therefore, the selection of incubators must be consistent with the incubator's incubation methods.

2. Creating entrepreneurs through the development of Information and Communication Technology (ICT), which is a business focus, has an influence on the success of the incubator of higher education institutions, which is consistent with the study of the World Bank (2009) who proposed a survival model for startups in the development of information and communication technology which is a business focus. The success factor is "ICT startups are important for business development because they are necessary for the progress of all industries. It is a worthwhile investment and takes less time to implement." In addition, Hoffman (1985) reasoned that the use of ICT tools can enhance the competitiveness of entrepreneurs by leveraging these tools to expand the organisation's size. Therefore, the university's business incubator should promote the development of entrepreneurs by focusing on technology that is central to their businesses, thereby enhancing the incubator's success and helping entrepreneurs achieve success in their ventures.

3. The selection of incubators consists of observed variables, including the selection policy of the business incubator centre, the selection method, the qualifications of the incubator, and the incubator's intention. The selection method has the highest influence, followed by the selection policy of the business incubator centre. This finding is consistent with the results of Smilor (1987) study, which stated that one of the most important processes in the success of a business incubator centre is the incubation method, specifically the selection of companies to be incubated, which may vary depending on the mission and objectives of the incubator centre. The suggested business incubation model involves selecting and monitoring various business services. Any business incubator aiming to succeed and foster sustainable companies must have a robust selection policy and clear rules for evaluating, recommending, and selecting incubatees. The board should approve these rules for the selection of directors, managers, and the incubator centre's selection committee.

4. Management, promotion, and development of incubators consisting of observation variables: management of incubation activities for incubators, further development of research and development

of incubator products, management of patents and trademarks, with the management of incubation activities for incubators having the highest influence value, followed by further development of research and development of incubator products. This is consistent with Alzaghal and Mukhtar (2017) who presented the results of the study that the incubator center acts as an agency that supports and promotes incubators to realize the importance of being entrepreneurs and applying research results to commercial use, promoting the application of research results to develop innovations, technologies, and academic potential of higher education institutions to connect with the business and industrial world to develop into new entrepreneurs. In addition, it is consistent with Campbell et al. (1985) who proposed that the business incubator center has a mission to manage incubators, such as providing opportunities for incubators to participate in the activities of the incubator center that have been established and develop them into high-potential entrepreneurs, strengthening and nurturing new entrepreneurs to have the potential to request support for business development from other government agencies and financial institutions by government policy to develop competitive capabilities and strong business growth. As for the expected results from management such incubators include making incubators into new entrepreneurs and strengthening existing entrepreneurs from incubation, exchanging perspectives and changing their status to entrepreneurs, resulting in incubators' research work being further developed into commercial production or problem solving, and having more projects and research work of incubators being registered for patents, and incubating businesses that have an impact on the public in order to reduce problems.

5. Providing incubation services consisting of observed variables: physical services, consulting services, business space services, entrepreneurial network services, with the provision of business space having the highest influence value, followed by consulting services. Consistent with the study by Bergek and Normann (2008), physical resources, such as physical space and furniture, are among the important services offered, especially in the past and continuing to the present, along with other support services. The incubator must provide affordable office space to tenants, as well as space and support services to both internal and external groups through affiliated companies, to increase business opportunities and enhance the survival of these entities. In addition, the study of Elmansori (2014) stated that the incubator has provided services for small businesses and provided physical facilities such as offices, warehouses and general loading areas, ports, common board or meeting areas, kitchens and common reception areas, as well as photocopiers, faxes, audio-visual equipment, and often computers, which are developments that promote the growth and advancement of incubators for entrepreneurial success. There is also a study by Navavongsathian and Rungruang (2020) that found all incubators will offer consulting services. As a mentor or advisor, he is a senior with diverse perspectives and valuable work experiences that can positively influence people in the early stages of their professional lives. Moreover, show a different role from colleagues or advisors. In addition, Lichtenstein (1992) commented that mentoring is very important because entrepreneurs need to be trained and taught how to "play" the game and how to use information technology tools effectively. Consulting experts in the incubator allows entrepreneurs to receive new

ideas and suggestions from mentors and incubator managers, considered one of the most effective ways to develop entrepreneurial needs and ideas. De Beer (2012) noted that mentoring involves an informal process of communication, often characterised by face-to-face interactions and sustained over the long term. The time between the advisor, who is a person with knowledge, wisdom, entrepreneurial skills, and relevant experience, and the incubator, as an entrepreneur who will receive the transfer of knowledge, experience, and entrepreneurial strategies that will be successful in the future, is a “short-cut” learning method to pave the way to success in a short time.

6. Financial support, with observed variables including support for incubators to be able to access sources of funds, introducing networks of sources of funds to support access to businesses, investors to access investment within the organization, helping to find funds and access commercial credit by assisting in preparing loan proposals to financial institutions, helping to manage finances to access specialized funds, with support for incubators to be able to access sources of funds. The highest influence value, followed by the introduction of a network of financial sources, supporting access to businesses, allowing investors to access investment within the organization, has the highest influence value, consistent with the study of Grimaldi and Grandi (2005) who found that access to financial resources is an important factor for the survival of most startups for the booming business of the incubator center and is considered one of the effectiveness factors of the incubator center. The study results are consistent with Dee et al. (2011) who stated that the conceptual model of the success indicators of an effective business incubator includes indicators of access to finance of the incubator participants, such as the ability to access sources of funds or networks of financial sources, the ability to access businesses, allowing investors to access investment within the organization, capital assistance in accessing commercial loans, assistance with accounting or financial management, assistance in accessing specialized funds, and economic knowledge training, etc.

Conclusions

1. Business incubator selection, management, and services influence entrepreneurship through the development of technology that businesses focus on. Business incubator management has the most significant impact, followed by incubator selection and incubator location. Business incubators must have sound selection policies and criteria to assess, recommend, and select incubators. These selection policies are related to how the incubator will provide incubation services. Therefore, incubator selection must be consistent with the incubator’s incubation methods.

2. Entrepreneurship creation through Information and Communication Technology (ICT) development, a business focus, influences the success of higher education incubators. The survival model for startups developing information and communication technology, a business focus, is a key success factor: “ICT startups are crucial for business development because they are essential to the advancement of all industries. They represent a worthwhile investment and require minimal time to implement.” Using

ICT tools can enhance entrepreneurial competitiveness by leveraging them to expand the organisation's scale and reach. Therefore, university incubators should promote entrepreneurship development, focusing on technology that is central to the business. This will enhance the success of the incubator and help entrepreneurs succeed in their own businesses.

3. Business incubator selection policies, selection methods, and qualifications of business incubators and the incubator's intentions. The selection method has the highest influence, followed by the incubator's selection policy. One of the most crucial processes in the success of a business incubator is the incubation method, specifically the selection of companies to be incubated. This can vary depending on the incubator's mission and objectives. This recommended incubation model involves selecting and monitoring various business services. Any incubator that aims to be successful and build sustainable companies must have strict selection policies and criteria for evaluating, referring, and selecting incubatees. The board should approve these criteria for selecting directors, managers, and committee members of the incubator.

4. Management of incubation activities for the incubator: Development of incubator product research and development; Management of patents and trademarks. The management of incubation activities for the incubator has the most significant influence, followed by the further development of the incubator product and research and development. Business incubators serve as agencies that support and encourage entrepreneurs to recognise the importance of entrepreneurship and the commercialisation of research results. They promote the use of research results to develop innovation, technology, and the academic potential of higher education institutions. They connect with business and industry to create new entrepreneurs. Business incubators' missions include providing opportunities for incubators to participate in the activities of established incubators and develop them into successful businesses.

Recommendations

The results of the study on the business incubation model for business incubator centres of higher education institutions in the upper central region of the Office of the Ministry of Higher Education, Science, Research, and Innovation in Thailand. Led to the following suggestions from the research:

1. Selection and monitoring of the application of various business services: One of the key points of successful incubation is that the incubator must have a robust selection policy and clear rules for assessing, recommending, and selecting incubators through a thorough selection process, including interviews and approval from the board of the business incubator centre. The selection policy is related to the method the incubator will provide business incubation. Therefore, the selection of incubators must be consistent with the incubation method used by the incubator centre.

2. The use of Information and Communication Technology (ICT) tools can improve the competitiveness of entrepreneurs. Using ICT tools can help expand the organization's size. Therefore, university business incubators should promote the development of entrepreneurs by focusing on technology that is central to their business, thereby enhancing the success of incubators and helping entrepreneurs achieve success in their ventures.

3. One of the most important processes in the success of the business incubator centre is the incubation method, which involves selecting companies to be incubated. This process may vary depending on the incubator's mission and objectives. The proposed business incubation model suggests the selection and monitoring of various business services. Any incubator that aims to be successful and create sustainable companies must have a robust selection policy and criteria for evaluating, recommending, and selecting incubators, which are approved by the board of directors, managers, and the incubator committee's selection process.

4. The incubator has a mission to manage incubators, such as providing opportunities for incubators to participate in the activities of the incubator that have been established and develop them into high-potential entrepreneurs, strengthening and nurturing new entrepreneurs to have the potential to request support for business development from other government agencies and financial institutions by government policies to develop competitive capabilities and strong business growth. The expected results from the management of incubators include making incubators new entrepreneurs and strengthening existing entrepreneurs from incubation, exchanging ideas and changing their status to entrepreneurs, increasing the research results of incubators to commercial production or problem solving, and increasing the number of projects and research results of incubators to file patents, and incubating businesses that have an impact on the public in order to reduce social problems.

5. The incubator must provide inexpensive office space for tenants. Areas and support groups, both internally and externally, to increase business opportunities and enhance survival. Additionally, the incubator offers services to small businesses. It provides physical facilities such as offices, warehouses, and production areas, general loading docks, common board or meeting areas, kitchens, and common reception areas, as well as photocopiers, fax machines, audio-visual equipment, and often computers, which are designed to promote the growth and advancement of the incubators, ultimately supporting entrepreneurial success. All incubators offer mentoring services, featuring senior mentors or advisors who bring diverse perspectives and extensive work experience. These individuals can influence people in the early stages of their working lives and play a distinct role compared to their peers or advisors. Mentoring is very important because entrepreneurs need to be trained and taught how to "play" the "game" and how to use information and technology tools effectively. Consulting with experts in the incubator to receive new ideas and suggestions from mentors and incubator managers is one of the most effective ways for entrepreneurs to develop their needs and ideas. Mentoring refers to an informal process of communication, often involving face-to-face and long-term contact, between a mentor—a person with knowledge, wisdom, entrepreneurial skills, and relevant experience—and an entrepreneur who will receive knowledge, experience, and entrepreneurial strategies that will lead to future success. It is a "short-term" learning method to pave the way to success in a short time.

6. Access to financial resources is an important factor for the survival of most startups. For the booming business of the incubator, it is considered one of the key factors of effectiveness. The conceptual model of the success indicators of an effective business incubator includes indicators of the incubator's

access to finance, such as the ability to access sources of funds or networks of sources of funds, the ability to access businesses, investors can access internal investment, capital, assistance in accessing commercial loans, assistance in accounting or financial management, assistance in accessing specialized funds, and economic knowledge training, etc.

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