

International Journal of  
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IJEME Vol. 8  
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## International Journal of Education and Management Engineering(IJEME)

**ISSN:** 2305-3623 (Print), **ISSN:** 2305-8463 (Online)

**DOI:** 10.5815/ijeme

**Published By:** MECS Press

**IJEME Vol. 9, No. 5, Sep. 2019**

Cover page and Table of Contents: **PDF** (size: 982KB)

[Contents](#)

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DOI: 10.5815/ijeme.2019.05.02

### **Proposed Risk Management Model to Handle Changing Requirements**

Mohammad D. AlJohani, Rizwan Qureshi

[Abstract](#) | [References](#) | Full Paper: [PDF](#) (Size:821KB), PP.18-25, Pub. Date: 2019-09-08

DOI: 10.5815/ijeme.2019.05.03

### **A Brief Study on Enhancing Quality of Enterprise Applications using Design Thinking**

Suman De, Vinod Vijayakumaran

[Abstract](#) | [References](#) | Full Paper: [PDF](#) (Size:823KB), PP.26-38, Pub. Date: 2019-09-08

DOI: 10.5815/ijeme.2019.05.04

### **The Role of Curriculum and Incubator towards New Venture Creation in Information Technology**

Trianggoro Wiradinata, Tony Antonio

[Abstract](#) | [References](#) | Full Paper: [PDF](#) (Size:334KB), PP.39-49, Pub. Date: 2019-09-08

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## The Role of Curriculum and Incubator towards New Venture Creation in Information Technology

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Received: 08 April 2019; Accepted: 20 June 2019; Published: 08 September 2019

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### Abstract

The number of entrepreneurs in Indonesia in 2017 has increased to 3.1%, which is a good development, compared to the previous years. Some of the factors that are suspected to contribute in this improvement are education and mentoring through various programs, including curriculum and incubator. Although it has increased, but this figure is still behind compared to neighbouring Indonesia's countries such as Singapore, Malaysia, and Thailand. Therefore, it is important to conduct an explorative study of the role of curriculum and incubator. This article will review the curriculum and incubator strategies that help increase the number of entrepreneurs, especially in the field of information technology in Indonesia. A qualitative comparison among several incubators, including Ciputra University approach discussed. This study found that the role of curriculum is to create a formal knowledge about ideation and process of start-up, incubator role is to provide physical co-working space while widen network resources. Another finding shows that there are some similarities and differences between industrial-based and university-based incubator. There are similarities in the resources, networking and guidance. The significance difference is in the curriculum since university has more time to guide but the student has lesser capacity compare to the industrial-based incubator start up, hence both experiences are strongly suggested to increase the success rate of Information Technology based Venture Creation.

**Index Terms:** Entrepreneurship; Technology; Curriculum; Incubator; Mentoring; Training

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## **1. Introduction**

Today universities in many parts of the world have undertaken many entrepreneurship education and training programs through both formal and informal channels. Continuous cooperation among universities regarding entrepreneurship education has begun since two decades ago to design an entrepreneurship curriculum while still referring to the curriculum standards in accordance with the competence of each field of study. Furthermore, several roundtable discussions on entrepreneurship education among universities have been conducted on a regular basis. Over the time, the question of whether entrepreneurship can be taught will gradually be replaced by what to teach and the right method for entrepreneurship education is to enhance entrepreneurial self-efficacy that plays vital role during phases in the process of starting-up a new venture [1].

The focus of this study is to know how the role of the entrepreneurship curriculum and technology incubator can provide support for the creation of New Venture from the university. Technology incubator is characterized as a formalized entity with the infrastructure resources to survive and develop growth. Technology Incubators give support by providing resources such as internal networks and knowledge exchange between entrepreneurial start-up companies within the same co-working space, office space, counseling service, and other basic administration services. Overall, one can argue that technology incubators accelerate the growth of network resources or corporate contact to information, expertise, reputation, as well as input factors from various bases such as repeat customers, long-term suppliers, competitors, R & D groups, and governments [2].

Mian, Lamine, & Fayole [3] restates technology-based start-ups create new start-ups in different areas of industries that contribute to creating nation's wealth and prosperity. The race to develop appropriate policies and curricula to help create and develop areas allowing new technologies for startup is a challenge for policymakers seeking relevance in their planned interventions. Hence, study aims to investigate the role of curriculum and incubator towards new venture creation particularly in Information Technology are important.

### *1.1. Entrepreneurship in Indonesia*

Ministry of Cooperatives and Small and Medium Enterprises (SMEs) revealed, until 2016 the growth of Indonesian entrepreneurs is still very small, estimated only 1.6 percent of total entrepreneur. The government is targeting that figure to be boosted by up to 2% within two years. The Government of Indonesia through Ministry of Cooperatives and Small and Medium Enterprises gave appreciation to the parties who have helped the government program in encouraging the creation of more new entrepreneurs. This is a step forward for the entrepreneurship sector, especially with help of entities who support government programs to create new entrepreneurs. Based on data from Ministry of Cooperatives and Small and Medium Enterprises, Indonesia still needs about 1.7 million entrepreneurs to reach two percent of the population. In ASEAN countries, like Singapore, the number of entrepreneurs has reach to 7% of the total population, while Malaysia 5%, Thailand 4.5%, and Vietnam 3.3%. The recent development shows e-Marketplace significantly contributes to the increase of entrepreneurs who started their business in online environment [4].

### *1.2. Entrepreneurship Education*

As a member of G20, Indonesia is currently the largest economy in Southeast Asia which growing rapidly. It ranks as the world's fourth most populous and third largest democracy, offering political stability, a large domestic market with rich and diversified natural resources. The young and dynamic workforce encourages high-potential growth, with those under thirty accounting for half of the working population. Poverty has declined substantially, although this remains a challenge for Indonesia. Indonesia has experienced rapid growth since the end of the Asian Financial Crisis in 1998. Recorded until 2014, Indonesia's GDP grows more

than 5% per year, this contributes to significant poverty reduction. However, the slowing growth rate in the past two years shows that many fundamental policies must still be evaluated to ensure inclusive and sustainable growth[5], one of the policies that need to be evaluated is the employment creation strategy, in which the creation of new ventures is closely linked.

Ciputra [6] describes several factors that explain why entrepreneurship education is required: (1) In general the young generation of Indonesia is not raised with entrepreneurship culture, (2) Too many job seekers but lack of job creators, (3) Indonesia's natural wealth have many potential waiting to be explored and developed, (4) To give broader and faster economic impact to the nation. The existing perception among majority of Indonesian is to be a worker, not to create a job has long known as the biggest impediment towards the success of entrepreneurship education. Therefore, the need for entrepreneurship curriculum that can change the mindset of society from seeking job to creating jobs is essential.

The concepts such as entrepreneur, entrepreneurship, and entrepreneurial all continue under active conversation. Researchers and academics have long debated about the definition of entrepreneur [7]. Many entrepreneurship researches also provide slightly different perspective of the word entrepreneur. The terminology in this study will use the definition provided in table 1 below.

Table 1. Terminology and Definition

Terminology	Definition
Entrepreneur	Individual
Entrepreneurship	Process of Starting Up New Venture
Entrepreneurial	Attitude, Skills, Mind-set
Technopreneurship	Technology Entrepreneurship

### 1.3. The rise of Technology Business Incubators

Technology based Business Incubator also known by various names such as technology incubators, business incubators, innovation centers, science/technology parks, and business accelerators. The terminology refers to scope of role, function as well as place/location.

The first concept of Technology based Business Incubator refers to linkage among: technology usage, know-how, entrepreneurial capacity, and assets. Business Incubators are property-based schemes endowing new venture founders with a portfolio of new venture support infrastructure, including business services, networking, link to professional services, university resources, and capital. The further intent is to help start-ups by endowing establishing linkages to help the new ventures survive, scaling up, and mature larger. While the term Business Accelerators refer to a fixed-term, cohort-based coaching and mentoring for venture start-up founders.

In addition, Business Incubators expose new venture founding teams to seasoned entrepreneurs, angel investors, and corporate executives as well as venture capitalists for highly potential new ventures. Therefore, preparing the founders for public pitching events in which they pitch their new ventures to large crowd of potential investors. In practice, Business Incubators serve distinctive services and roles that are costly and often impossible for nascent entrepreneurs to find and obtain during early stages [3].

Another variation to business incubators is co-working. Co-working conditions provide solutions for nascent entrepreneurs who are in early stages of building product prototypes. Inside co-working space, people can meet other entrepreneurs to expand their networking and can get input on the products they create.

## 2. Related Work

### 2.1 Studies Related to Entrepreneurship Education and Business Incubator

Mian, Lamine, & Fayolle [3] published a review from the past thirty years of incubation article, emerging best practices, and forthcoming trends reveals that in spite of continuous debate about their involvement and encounters, the future of technology based business incubator is bode well, and there are numerous research opportunities. Science/Technology parks, incubators, as well as accelerators are technology business incubator methods which believed to be important policy tools to support innovation and technology focussed entrepreneurial growth. The popularity of technology based new venture is grounded on the principle that these methods bestow very important value-added feedbacks which are essential for the growth of innovative Technology-Based new venture. Mian, Lamine, & Fayolle's study concluded the need in determining what kind of technology business incubator methods and policies are the most effective program to achieve the wanted results.

Study by Wirtz & Daiser [8] explains that even though business model innovation has received a lot of importance in the recent studies, there are still limited understandings of this dilemma. However, the conforming scientific study has been previously illustrated by a various understanding of concepts. This condition demands further analysis that summarize and links current scientific understanding, reveals research gaps and undermined areas. It presents a set of definitions that yields an existing business model innovation literature and an integrated definition to promote a common understanding of business model innovation. In addition, this study classified business model innovation into six specific research areas.

Fayolle & Gailly [9] investigated the role of entrepreneurship education programs in influencing participants' attitudes and intention toward entrepreneurship. How is this influence related to past experience and how does it persist? They propose to operationalize the concept of entrepreneurial intention and its antecedents in an attempt to address those issues. The research results show that the positive effects of an entrepreneurship education programs are all the more marked when previous entrepreneurial exposure has been weak or inexistent. On the contrary, for those students who had previously significantly been exposed to entrepreneurship, the results highlight significant counter effects of the entrepreneurship education programs on those participants.

Also based on Fayolle & Gailly [9] observation there has been no significant impact of entrepreneurship education programs, on average, if measured immediately after the programs. However, if we consider the impact of the entrepreneurship education programs as measured six months after the completion of the program, it can be observed that entrepreneurship education programs show a significant positive impact on attitudes and perceived behavioral control. Hence, entrepreneurship education programs should not be measured immediately, consequently it should be designed to be delivered as longer-term programs.

## *2.2 Entrepreneurship Education*

To support entrepreneurial activities, many countries have invested in entrepreneurship education. Most studies have found a positive effect of entrepreneurship education on entrepreneurial intentions. However, some studies have found a negative effect of entrepreneurship education as well [10]. These mixed findings suggest that environmental conditions play a role in the effects of entrepreneurship education. To this end, little are known about how entrepreneurial education outcomes are conditioned by the environmental context.

Based on the theory of entrepreneurial action, the decision to exploit an entrepreneurial opportunity is determined by the individual's beliefs about whether he can achieve the expected outcome with the opportunity and whether it fulfills the original motive of the individual [11]. In other words, the result of entrepreneurial activity comes from the belief in the success of exploiting the opportunities given is feasible and desirable. Entrepreneurship education can play a central role in this context.

## *2.3 Stages of Start-up Incubatio*



There are several types of variations of the term for incubation such as a science park or research park to support a range of functions such as ideation, incubation, and network development, although not all incubations provide the same function. The start-up incubation stages are illustrated in Table 2 below. These variations, however, also leads to inconsistency in terms of definitions, criteria for evaluating effectiveness, determination of how much value a business incubator adds to the start-ups, and determination of key success factors [12].

Table 2. Start-up Incubation Stages

Phase 1	Phase 2	Phase 3
Pre-Incubation	Incubation	Post-Incubation
	Acceleration	
Ideation, Market Validation	Customer Validation, Critical Network Resources, Seed Funding	Extended Network Resources, Next Round Funding

During the pre-incubation phase, early start-up should pass the ideation stage and market validation before they decide to enter the next phase which is Incubation or Acceleration. During the second phase start-ups must be able to pass customer validation and expand their market with the help of critical network resources. This is the crucial task that every successful business incubator must provide. Seed funding is also closely linked to the role of incubator in attracting early investors to give early funding. The customer validation objective is to recognize what assumptions need to be validated, hence start-ups may avoid common mistakes businesses make during early phase. Customer validation helps start-ups avoid building a product that no one wants [13]. The process of customer development is shown in figure 1 below.

The post-incubation phase helps incubated start-ups with expanding network to larger scale. The most common service offered in post-incubation phase are (1) diagnostics to analyze gaps and strengths, once start-ups shift to post-incubation, they are walking on their own and needs to focus more on managerial tasks, (2) intellectual property and technology transfer trainings, (3) taxation and internationalization, and not to forget (4) the alumni gathering event where they can get updates from other start-ups as well as established scaled-up ventures.



Fig. 1. Customer Validation Process [13]

## *2.4 Factors Influencing the success of Incubation*

### *2.4.1 Selection of Participants*

There were several methods of participant selection methods. Pettersen et al. [2] shown a model of participant selection in one of the Norway non-profit business incubator which set the criteria for enrollment as tenants which are the start-ups in ways identified as knowledge-intensive and show potential for stable growth. Participant term of occupancy in the incubator is usually limited up to 3 years. The incubator will support all tenants with business coaching and mentoring services in order to strengthens incubated start-ups and facilitate them to focus on the commercialization aspect and market acquisition of the incubated venture.

Another example of selection method of participants implemented by Ciputra University in Indonesia which uses a collaborative assessment. As a university supported incubator, the selection was made by the office of Networking and Partnership based on the recommendation from mentors. Most participants have experienced at least five semester entrepreneurship subjects before they can be proposed to join business incubators.

Proposition 1: Business incubator should adjust the method for participant selection based on the context of organization

### *2.4.2 Value Propositions*

Value proposition describes a brief statement that a venture formulates to explain quickly why someone should obtain or use a certain product or service. Value proposition is identified using empathy map. This statement convinces potential consumers that one particular product or service will add higher value or better way to solve problems compared to other similar offerings. Companies make use of this statement to target customers who will benefit most from using the company's products or services. Value proposition uses business model innovation, which gained substantial importance in recent years. Business model innovation as a method for creating new business models or service offers a method to evaluate if an existing business model is in place or not. Business model innovation describes the design process for the creation to a novel business model on the market, which is translated by the adjustment company's value proposition and/or the value arrangement and aims at generating or securing a sustainable competitive advantage [8], [14].

Proposition 2: Business incubators should examine and carefully help developing value proposition of the start-ups incubated to enhance the possibility of reaching maturity phase.

### *2.4.3 Services*

Based on the President of the Republic of Indonesia decree number 27 year 2013 regarding the Development of Entrepreneurship Incubator, the implementation of Incubation program, facilitate and provide services in the form: (1) provision of space; (2) support of office facilities; (3) guidance and consultation; (4) research and business development assistance and access to technology use; (5) training and skills development; (6) access to funding; (7) creation of business networks and cooperation; and (8) management of Intellectual Property Rights.

Proposition 3: Business incubators provides services beyond co-working space, particularly Curriculum.

### **3. Methodology**

This study uses a qualitative approach to generate descriptive data derived from interviews and observations conducted in several business incubators, including business incubators National University of Singapore, Blk71 Singapore, IdeaBox, Start Surabaya, and Ciputra University. This study uses a qualitative descriptive approach with the aim of describing and summarizing the role of business incubator in assisting start-ups for scale-up. Observations are made on the conditions or situations experienced by participants and business incubator managers. The object of this study is entrepreneurship curriculum and business incubator, subjects were chosen using purposive sampling with relevant criterion to this study. The subjects of this study are business incubator managers and experts in the field of entrepreneurship curriculum.

Data collection in this study are using both primary and secondary data. Primary data was sought for their proximity to the truth and its control over error, while secondary data is inserted between the event and its recording [15]. The data was obtained through interview and documentation from the managers of business incubators mentioned above. The documentations of this study are in the form of informants' data, interview transcripts, interview recordings, images, and annual report. In this study, data source triangulation will be applied by comparing the observations, interview results, and supporting articles to ensure the consistency.

### **4. Result and Discussion**

In this section we analyze the information synthesized from the data collected at several incubators initiated by both University and Corporation. First, the external networks were described as the new ventures that go up and beyond the incubator. Pettersen et al. [2] tenants' private path-dependent trajectory of personal or professional relations. Then, explaining the internal networking within the incubator; finally, focusing on extended network resources endowed by the management of technology incubator. In the analyses, emphasis to general experience of the start-ups and attempt to revealing the network opportunities both within and beyond the incubator are discussed.

The observation activity from this study exposes several common services such as (1) business coaching and mentoring to support start-ups and navigates them to focus on the commercialization aspect and market acquisition, (2) organizes seminars on relevant topics, such as how to prepare for investors, choice of intellectual property rights strategy, selling, and contracting, (3) social and professional environment with other start-ups, office space ("below market" rent), other relevant infrastructure (e.g., Internet), and access to the incubator's extended network, (4) providing business development, communication advisors who work part-time, and one student on internship, (5) collaborates closely with an extended network of organizations supporting and fostering innovation (e.g.: technology transfer office, etc.) which located within close proximity, (6) connects entrepreneurs with potential investors during specific events, and lastly (7) collaborates with a wider regional network of organizations and networks supporting innovation, other regional incubators, and regional industry clusters.

Exploration pioneered by Soetanto & Jack [16] compare types of business incubators and found differences in their networking activity. Concerning policy recommendations, their study shows network support for incubator slightly differ from one to another. Hence, any study concerned with developing Business Incubator policy need to recognize and appreciate that not all business incubator has the same needs. This particularly should be taken into account when developing network support. In this study, two different approach has been identified, the university backed business incubator and industry led incubator.

4.1 University backed Business Incubator

One of the prominent universities in Indonesia with Entrepreneurship vision is Universitas Ciputra, hence it is important to have a close look towards the entrepreneurship curriculum implementation from this institution. Based on its founder, Mr. Ciputra, Entrepreneurship is defined as the ability to convert waste into gold (turning something useless to something useful). Ciputra believes that there are three factors that influence people to be entrepreneurs, namely: birth, practice, and environment. Toward birth, a child already has the talent and DNA of an entrepreneur born from entrepreneur parent. As with the environment, someone since childhood who has seen and learned many of the entrepreneurial practices from surroundings. In fact, not everyone has the privilege of being born and has an entrepreneurial environment, and therefore practice, train and education is the only way to climb the path of entrepreneurs for them. On top of the influence, Ciputra also believes that there are three main characters that an entrepreneur needs to master, which are creativity & innovation, opportunity creation, and calculated risk taking. All three characters are adopted by Ciputra University and transformed to the curriculum.

The term 3 RMs refers to the right method, the right mentor and the right mentee which are a requirement to have the right results of the teaching and learning process. The right method means that the university should design an appropriate curriculum that will meet the needs of students to become self-employed. On the other hand, content delivery methods must also adjust with the purpose of building student’s life skills. Definitely, the right mentor means careful selection and training should be given to the class mentors to run the program. Ultimately, the right mentee indicates that not all students are able to become entrepreneurs when they finished their study period, some will seek out an intrapreneur career and working for other corporations.

Illustrated in figure 2 below, starting from semester 1 to 5, students will learn several cycles of starting up a new venture. This entrepreneurship 1-5 subjects comprises of 15 credits out of 144 (three credits each) of the total credits in Informatics department. Each entrepreneurship subject follows the DCRAH cycle which starts from Discovery, followed by Concept Development, Resourcing, Actualization, and Harvesting/Revise. By experiencing the start-up cycle several times, students will increase their entrepreneurial self-efficacy [10].

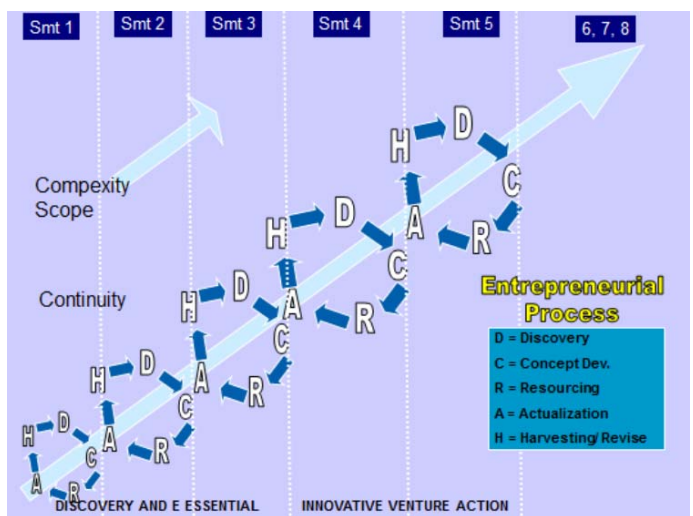


Fig. 2. Curriculum Model for University backed Incubator

Apart from the approach of Universitas Ciputra, findings from Malmström & Johansson [17] support the argument that during the early stages of start-up management, an entrepreneur needs to gain a richer understanding of the whole entrepreneurial process, recognizing resource activity is crucial. Their study highlights that cash and technical competence appears to be important focus in managing start-ups in the early stages. The study also found that entrepreneurs could create a resource scarcity that allows businesses to excel in particular competitive positions in the marketplace by focusing on the business model design and management.

#### *4.2 Industry Leader founded Business Incubator*

Ideabox is a sample of industry leader founded business incubator in Indonesia, which is a joint venture amongst Indosat Ooredoo, Mountain Partners, and Kejora to elevate Indonesia Startup scene through early stage investment fund and award-winning tech accelerator focusing on internet and telecommunication sectors. With this new company, startup founders can join the incubation through two categories namely Ideabox Ventures for a more mature digital based startups or Ideabox Alpha accelerator program for earlier phase startups.

Gradually, recent development has point out that a specific type of incubator, called a networked business incubator, represents a fundamentally new and possibly more durable operational model uniquely suited to growing start-ups. The networked business incubator also provides rapid and targeted access to a network of potential partners, suppliers and customers. Such incubators seem to formalize their support by having systems primed to encourage networking and help firms develop networks with other tenants and potential allies [18].

Our study also shows that there are similarities and differences between Industry leader-based and university-based incubator. Both types provide resources and networking. Resource and network to other disciplines is very important since the startup projects always relate to other discipline other than technical issues. To mention the other disciplines are finance, legal and government regulations. Industrial-based incubators relies on their networking to find resources while university gains many good resources from the professors and graduates. Both share a good access to financial institution but in different capacities. The university-based incubator mostly relies on the CSR fund and government or NGO projects. In term of guidance, the two types have an intensive program either it is a regular meeting or a periodic mentoring program. Related seminar also provided to enrich the founder and member of the incubator. All types also provide conducive atmosphere although in a different nuance.

Some differences observed are in the time spent, curriculum design and project exposure. Student in university still bound to lecture and final project while those in the industrial-based incubator are full timer startup players. The university-based has a privilege to design curriculum since the first stage of the incubator. Most of the students come with less experience therefore, the incubator needs a comprehensive curriculum from the beginning, while the other types based the guidance on the need of each start up. The opportunity to expose the startup project depends on the network of the incubator, university-based incubator has limited network to expose.

### **5. Conclusion and Recommendation**

This research has investigated the services commonly offered by business incubators and curriculum supporting the creation of new venture. There is no limit on the range of geographical areas that can be studied to further our knowledge and understanding of the role of curriculum and business incubator in fostering entrepreneurship. Suggesting further study recommendation, there are two main areas in which

future study seems to be promising: (1) reconsidering whole university resources as incubation, and (2) the possibility of online incubation.

In addition to the above findings, Auerswald [19] mentioned about enabling the entrepreneurial ecosystem. Entrepreneurship ecosystems show a close relationship among organizations at different types from startups, established companies, government, universities, as well as research institutions. Ideal ecosystems generate ideas that flow from several types of organizations, namely starting new businesses, consolidating existing ones, and associating innovation together.

Finally, this study should not be considered an absolute result. There were other factors, whether at the individual, social, or government policy level, which still need to be addressed in order to determine whether they contribute a role in this process. This article offers the opportunity to start dispatching the role of curriculum and business incubator, which should not only be limited to its incubation phase, but also pre and post incubation. The deeper the exploration, the clearer the perspective that will be gained about this phenomenon; researchers will be able to provide policy makers with useful information that will lead to understanding and supporting universities and business incubators, ultimately benefiting not only the entrepreneurs, but also their communities as well [20].

### **Acknowledgements**

This article publication and its supporting materials were made possible by research grant program from Indonesian Ministry of Research, Technology, and Higher Education.

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**How to cite this paper:** Trianggoro Wiradinata, Tony Antonio, "The Role of Curriculum and Incubator towards New Venture Creation in Information Technology ", *International Journal of Education and Management Engineering (IJEME)*, Vol.9, No.5, pp.39-49, 2019. DOI: 10.5815/ijeme.2019.05.05