

Incubation Scheme of the University Spin Off to Commercialize the Invention in Sebelas Maret University

Citra Kusuma, Wahyudi Sutopo, Yuniaristanto, Suryo Hadiyono, Muhammad Nizam

Abstract— University is the huge resources to create inventions of technology for solving the problems in the world through commercialization. In general, an invention of the technology need incubator to accelerate the Technology Readiness Level (TRL) in order to be commercialized. This paper aimed to decide how is the scheme of incubation in university and what is the key point of the mechanism of incubation that have to do in academia. Sebelas Maret University established a Center of Technology Innovation (PIT). PIT needs an incubation scheme of the university spin off to commercialize their invention. We benchmark the mechanism of incubation in the Agency for Assessment and Application of Technology (BPPT) to develop the appropriate scheme of incubation for PIT. PIT has main function as a bridging system of invention from technology development into commercialization. The points of the mechanism of incubation are TRL leverage, tenant incubation, and registration of Intellectual Property Rights (IPR). Incubation scheme for university spin off is consist of pre-incubation, incubation, and post incubation, as similar as an incubation business process in the Agency for Assessment and Application of Technology (BPPT). We proposed TRL leverage, Tenant Incubation and IPR registration as key points of the incubation scheme of the university spin off.

Index Terms—Center of technology innovation, commercialization, incubation scheme, university spin offs.

I. INTRODUCTION

As we know that the entrepreneur can spur the economic growth. The relationship between technology and

This work is supported by program of Electric Vehicle Development, FY 2014 under Program Riset Molina Afirmasi LPDP, Contract No:PRJ-933/LPDP/2014, August 17, 2014).

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economic growth has been captured in a vast number of formal models for almost half a century. The more recent type of models of the endogenous growth literature by Romer (1990), Grossman and Helpman (1991a, 1991b) and Aghion and Howitt (1992) all share the characteristic that a continued increase in the level of resources spent on the creation of new technologies leads to a continued increase in economic growth [1]. Nowadays, we have recognized technopreneur that is combined from entrepreneur and technology. Technopreneur is a person who sets up a business concerned with computers or similar technology [2].

University is the huge resources to create a research, especially based on technology and innovation. In today's technology-enabled knowledge economy, many universities find themselves facing a new challenge: how not only to equip students with an adequate education in their field of study, but also to arm them with the skills and knowledge required to leverage technology effectively in the workplace [3]. The product of technology that created from the research can be commercialized to increase an economic value.

Much of the academic work has been focusing on "technology transfer" from research organizations or universities to the incumbent industry [4]. Conversely, much less is known about "creating new ventures" as a way to commercialize research and technology. This does not mean, however, that creating spin offs for technology transfer purposes, is an entirely new phenomenon [5].

A better option for intrepid entrepreneur is technology incubator. As well as technopreneur, it also needs a technology incubator to accelerate the invention to commercialize. Incubator address the most challenging aspects of building a successful new technology company: access to early capital and expert mentoring to turn ideas into tangible business models [6].

The prior research about commercialization has been done by previous reseacher. Ref. [7] describes how successful technology commercialization education in this leading UK-based technological university is deeply dependent on the state of the university's entrepreneurial ecosystem. Ref. [8] describe the main functions of the business model for the commercialization process of new technology products among small high-technology firms in the municipal region of Kuopio (Finland) within the local innovation environment and technology infrastructure and

define the key business objectives for collaborative business models in the commercialization process to enhance commercialization processes in small technology firms through both internal and external activities [8].

The aims of this paper is to decide how is the scheme of incubation in university spin off and what is the key point of mechanism of incubation to do in academic.

II. METHODOLOGY

Colleges and universities can help raise a region’s human capital levels not only by supplying local graduates, but also by conducting research activities [9]. Colleges place priority on value, application and impact of their research results to business and industry [10]. In order that, Sebelas Maret University established a Center of Technology Innovation. Its function is to commercialize the university research product so that can give an economic value to the inventor.

To make a success spin off, Center of Technology Innovation has to decide the mechanism of incubation exactly. In this research, we analyze that mechanism through exploring activity with the Agency for Assessment and Application of Technology (BPPT).

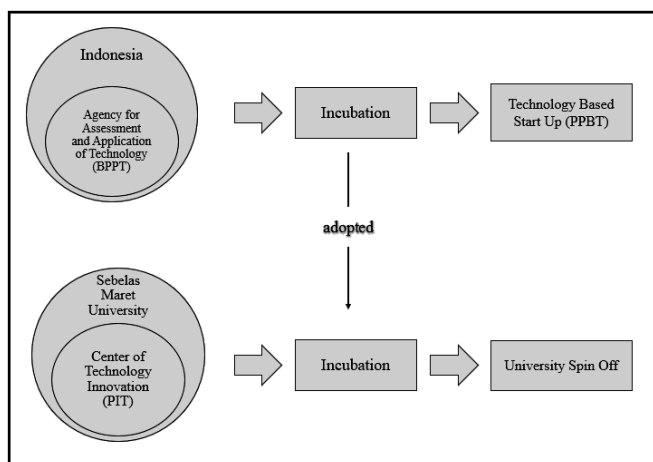


Fig 1. Research methodology

Figure 1 describe that Indonesia has an Agency for Assessment and Application of Technology (BPPT). Through incubation process, it can produce Technology Based Start Up (PPBT). BPPT start to do incubation since 2001 and already has more than 50 tenants. In Sebelas Maret University, it has a Center of Technology Innovation (PIT). PIT has been established based on the rector decree number 178A/UN27/OT/2014 on the 11st of March 2014. PIT has to create technopreneur culture and develop the Technology Based Start Up in Sebelas Maret University. In this case, PIT must create a spin off university through the right mechanism of incubation. We benchmark the mechanism of incubation in the Agency for Assessment and Application of Technology (BPPT) to develop the appropriate scheme of incubation for PIT. Sebelas Maret University can adobt it to success the tenant of incubation.

Most of the data collected were qualitative, which can be highly useful for obtaining a holistic overview of the context of investigated phenomena [11]. In this paper describe what

is the scheme of incubation in university spin-off and what is the key point of the mechanism of incubation to do in academic.

III. CENTER OF TECHNOLOGY INCUBATION AS A BRIDGING SYSTEM

In Sebelas Maret University, there are some technology development results but no one has succeeded in commercialized [12]. It is occurring because there is no bridge that can safe the invention from the valley of death. The first valley of death occurs early in the development of a technology, as breakthrough research and technological concepts aim to achieve commercial proof-of-concept. At this stage, innovators and entrepreneurs conducting basic and applied research need further capital to undergo a process of developing, testing, and refining their technologies in order to prove to private funders that these technologies will be viable in markets beyond initial success in the laboratory [13].

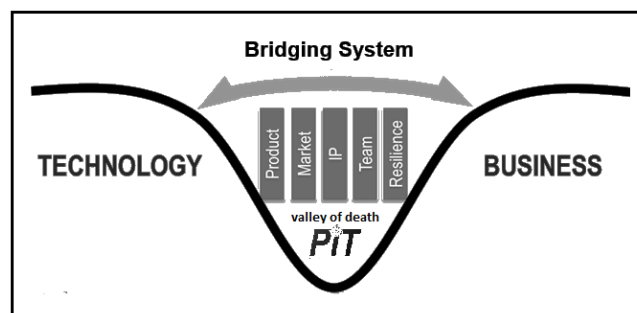


Fig 2. The Center of Technology Innovation as a bridging system in Sebelas Maret University

Fig 2 shows that between technology development and technology commercialization/business, there are bridging system to commercialize research product so that it can't drop into the valley of death. In Sebelas Maret University, there are Center of Technology Innovation (PIT) as a bridging system which can prevent the research product of academician in Sebelas Maret University drop into the valley of death.

Sebelas Maret University already has three inventions that are incubating in PIT and being a candidate of university spin off. There are Kuns Corp with the product is acoustic panel, Java Software with the product is financial software, and Smart UNS with the product is baterai lithium ion. Kuns Corp and Java Software are co-incubation between the Technology Incubator Office (BIT) in the Agency for Assessment and Application of Technology (BPPT) and the Center of Technology Innovation (PIT) in Sebelas Maret University. Collaborating can enable a firm to obtain necessary skills or resources more quickly than developing them in-house [14] and reduce the commercial and technological risks by sharing the cost of commercialization and development [8]. While Smart UNS is being incubated in the Center of Technology Innovation (PIT) by itself.

IV. IDENTIFY THE INCUBATION PROCESS IN THE AGENCY FOR ASSESSMENT AND APPLICATION OF TECHNOLOGY (BPPT)

The incubation process of the Agency for Assessment and Application of Technology (BPPT) is consist of three parts. That are pre-incubation, incubation, and post-incubation.

A. Pre-Incubation

Pre-incubation is the activity where is the talent scouting and developing relationship between academicians (inventors), business (technology user), and government (regulator) was happening. Talent scouting is to find the potential tenant and product of technology. The activities in talent scouting are technopreneur camp, roadshow, publication, and customer relations office. The activities in developing a relationship are business gathering, relationship synergy, business plan, and incubation agreement.

B. Incubation

Incubation is the core process to create the success beginner firm of technology. Tenant will be associated with Agency for Assessment and Application of Technology (BPPT) intensively to maturing the product and its business so that can be autonomous as beginner firm of technology. In incubation process, that is technology and business transfer where the technology was dominated by inventor before. Then it will be transferred to the tenant so that the business can be driven by tenant.

The activities in incubation are incubation preparation, training and mentoring, production test, mentoring certification, market access, monitoring and evaluation.

C. Post-Incubation

The association to tenant that have been graduate still can be done after the incubation is finished. The aim of the post-incubation is to give a chance for the graduated firms to get advantages from the Agency for Assessment and Application of Technology (BPPT)'s services. But it is different from incubation step. The service that is offered in post incubation can be used for the incubator's capital sources. The activities of post-incubation are monitoring, mass production accessibility, managerial capacity enhancement, and network development accessibility.

V. INCUBATION SCHEME IN THE CENTER OF TECHNOLOGY INNOVATION

Figure 3 shows that, there are three key points of the mechanism of incubation which have to do in academic. The first key point is Technology Readiness Level (TRL) Leverage. TRL is the measurement of technology readiness level that mean the technology can be applied or adopted by the user or user candidate [15]. The invention must have 7 for TRL score, it is mean that the demonstration of system prototype is already applied in the real environment. The second is tenant incubation. In academic, especially Sebelas Maret University, the tenant is coming from students or the alumni of Sebelas Maret University. And then, the third is registration of Intellectual Property Rights. The Center of Technology Innovation has an obligation to bring the

invention to be registered in Intellectual Property Rights.

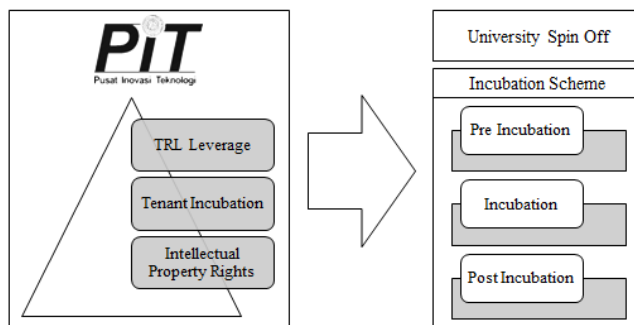


Fig 3. Key point and incubation scheme of the Center of Technology Innovation

The products of such research must also be registered Intellectual Property Rights (IPR) of its so products that would become the subject of a business have legal clarity regarding the relationship between wealth with inventors, creators, designers, owners, users, intermediaries who use, work areas utilization and are receiving as a result of the use of intellectual property for a specified period. It also gives awards for the success of the effort or the effort to create an intellectual work and to provide protection against the possibility imitated because of the guarantee of the state that the implementation of intellectual work is only given to the beneficiary [16-18].

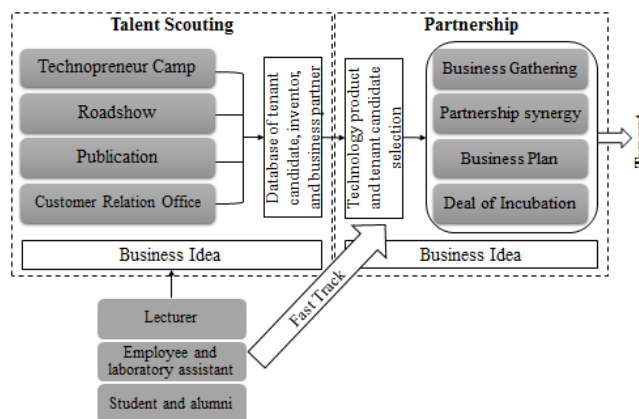


Fig 4. The scheme of pre incubation process in PIT

Incubation scheme for university spin off is consist of pre-incubation, incubation, and post incubation, as similar as an incubation business process in the Agency for Assessment and Application of Technology (BPPT).

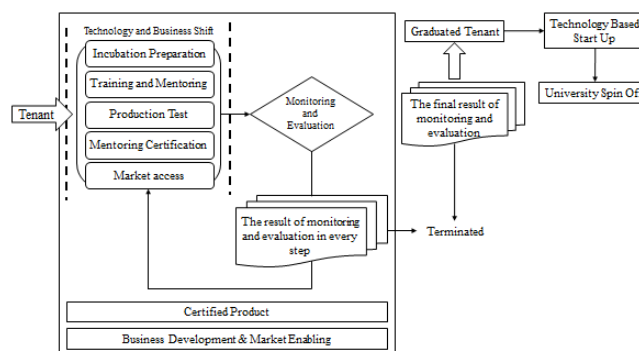


Fig 5. The scheme of incubation process in PIT

ACKNOWLEDGMENT

This work is supported by program of Electric Vehicle Development, FY 2014 under 'Program Riset Molina Afiriasi LPDP, Contract No:PRJ-933/LPDP/2014, August 17, 2014).

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Figure 4 is the scheme of the pre incubation process in the PIT. In this scheme, business idea is come from lecturer, employee and laboratory assistant, and student or alumni. It is different with the business idea of BPPT. In BPPT, the source of business idea is come from academia, business, and government.

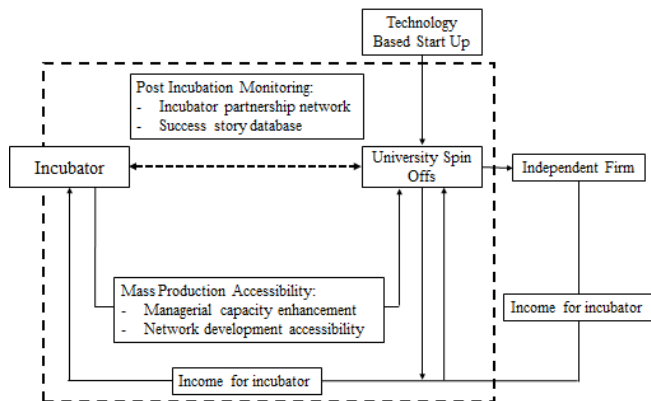


Fig 6. The scheme of post incubation process in PIT

Figure 5 shows the scheme of incubation in the PIT. It is as same as with BPPT's. The activities consist of incubation preparation, training and mentoring, production test, mentoring certification, market access, monitoring and evaluation. The graduated tenant will become technology based start-up, in the form of university spin off. While figure 6 shows the scheme of the post incubation process in the PIT. It is exactly same with the BPPT's. The service that is offered in post incubation can be used for the incubator's capital sources. The activities of post-incubation are monitoring, mass production accessibility, managerial capacity enhancement, and network development accessibility.

VI. CONCLUSION

Technopreneur need a technology incubator to accelerate the invention to commercialize. Incubator address the most challenging aspects of building a successful new technology company: access to early capital and expert mentoring to turn ideas into tangible business models. In Sebelas Maret University, there are Center of Technology Innovation (PIT) as a bridging system which can prevent the research product of academician in Sebelas Maret University drop into the valley of death. Beside that, PIT also has a role as a technology incubator that can support the invention to be commercialized.

There are three key points of the mechanism of incubation which have to do with academic, they are TRL leverage, tenant incubation, and registration of intellectual property rights. Whereas the incubation scheme which will be applied in PIT that appropriate to university spin off is as similar as with the BPPT's. It consists of pre-incubation, incubation, and post-incubation. We proposed TRL leverage, Tenant Incubation and IPR registration as key points of the incubation scheme of the university spin off.