

Role of Science and Technology Park LIPI in Development of Research-Based Industry Needs: Lesson Learned from Technology Transfer Process

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Abstract

This paper aims to describe the role of Science and Technology Park (STP) Indonesian Institute of Sciences (LIPI) that managed by Center for Innovation, to facilitate the flow of inventions arising from research and transforming them into innovation that can be used by industry more efficiently and effectively. The existence STP LIPI is endorsing a major change in how research in LIPI should be done. Research in this institution were used to be ended only as scientific articles or prototypes. Now they are endorsed to be utilize by industries and stakeholders, moreover the number of utilized inventions or intellectual properties also recognized as a key performance indicator for this institution. This research uses qualitative method with descriptive analysis. The research and development process is carried out while evaluating the technology and exploring the possibility of industrial collaboration so that the final output can be quickly provided by STP and applied by industry. STP LIPI plays important roles in enhancing technology transfer performance of LIPI by endorsing the establishment of new technology based firms, job creation, and shifting research approach in LIPI research centers from research push to fifth generation of innovation process.

Introduction

The establishment of 100 Techno Park (TP) / Science Park (SP) / Science and Technology Park (STP) in Indonesia has announced by the Jokowi regime in 2015. This was impelled by the urge to deliver research results and intellectual property (IP) to industries and stakeholders and to assist in the establishment of new technology based firms. This program also is known for its ability to increase the nation's competitiveness.

Prior to this, there were at least 5 institutions that already known in Indonesia as TP/SP/STP, which are Pusat Pengembangan Iptek (Puspiptek), Solo Techno Park, Bandung Techno Park, Sragen Techno Park and Center for Innovation LIPI. Although most of them are not in the complete form of TP/SP/STP, they have played an important role in shifting the first generation of the innovation process (research push) into the fifth generation of innovation process (market pull / two ways) in Indonesia.

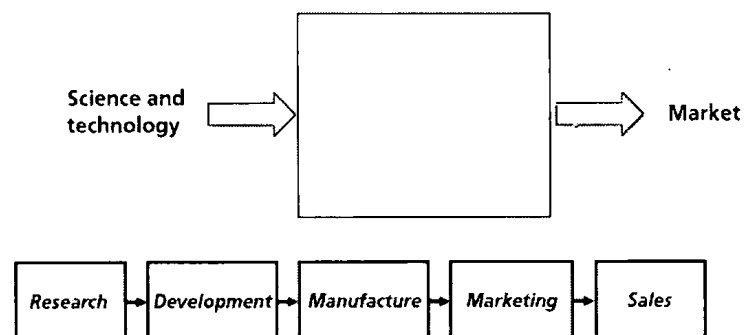


Fig. 1. First-generation innovation process – research push¹

First generation approach was that innovation was a linear process, beginning with scientific discovery, invention, engineering and then continuing into manufacturing activities, before ending with the marketing of a new product (Fig. 1)¹. In this approach, research results were not often accepted by industry and often not marketable. In contrast, the fifth generation approach is more concerned with changing and turbulent markets and the process is going in two directions, not linear (Fig. 2)¹. In this approach, the research institute has to adapt to market and industry needs and should listen to customers, suppliers and innovation communities.

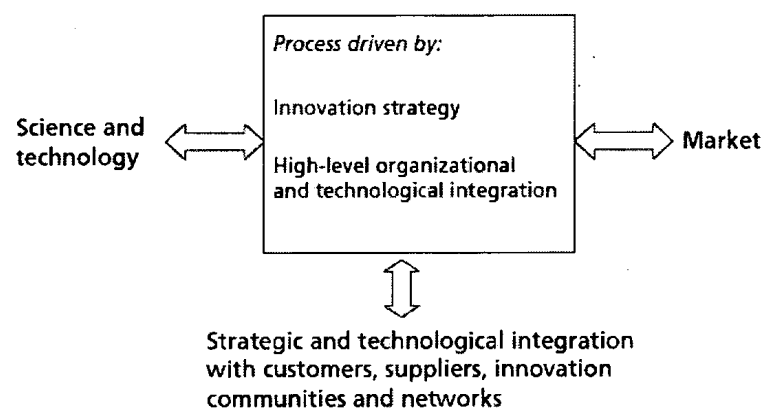


Fig. 2. Fifth-generation innovation process¹

Universities and government research institutes commonly implement the first generation approach, and some of their only goals are to produce scientific articles and prototypes, so that research results are not ready to be transferred to stakeholders. They aim at making some breakthroughs as inventions but that

is very difficult, rarely happens and takes time. So, now the demanded is for them to produce some incremental inventions that are easier to be transferred to stakeholders.

STP LIPI establishment

Center for Innovation has seen the need for the establishment of a TP/SP/STP before the central government announced the program in 2015. The establishment of STP LIPI was started in 2012 with the concept of a Technology Business Incubator as the core of a STP. The incubator began its operations in 2013 with the mission of establishing and nurturing robust New Technology Based Firms (NTBF /spin offs). The performance of this incubator has gradually increased, and was within 3 years it able to established 14 NTBFs covering a wide range of technology based businesses.

Until late 2015, STP LIPI has only 2 main facilities, which were Incubator and Office Building (5,000 sq.m.), and Workshop (1,000 sq.m.). It was planned to have 11 facilities in total, including apart from the: Incubator–Office building and Workshop building, a Pilot Plant building, a Convention–Exhibition Center, a Networking building, 5 buildings for Industrial/Anchor Tenant–post-incubation, and a Guest House.

This research used qualitative methods with intensive interviews that involved STP LIPI managers, combined with participatory observations. Intensive interviews relied on open-ended questions, so that it would give a wider perspective to the research. Instead of asking standard questions in a fixed order, intensive interviewers allow the specific content and order of questions to vary from one interviewee to another. Data was analyzed using descriptive analysis.

Technology transfer in STP LIPI

There are 3 types of technology transfer that have been carried out by the Centre for Innovation /STP LIPI. They are a. Noncommercial, b. Commercial–Technology Business Incubation/TBI/NTBF/Spin off and c. Commercial – IPR Licensing. Noncommercial technology transfer activity is being conducted by STP LIPI to use technology for solving problems faced by society, without expecting financial returns or profits. An example is the implementation of geotechnology solutions to find ground water and renewable energy and distribute the water using jet pumps to solve the drought problem in Garut.

In the Commercial-TBI program STP LIPI has annually facilitated 5-10 technopreneur candidates to

establish their NTBFs. The facilitation includes funding, assistance, mentoring, training, low rate office space rent, access to workshop equipment, testing and certification and also promotion.

STP LIPI has had many difficulties regarding licensing LIPI’s IPR to stakeholders, leading to a low success rate. By early 2016, only 7 (1.36%) of the 512 IPs of LIPI had been licensed. The difficulties faced were a. most of the research results are still research push without concerning market needs, b. most of the research results had not been designed for technology transfer and c. only a small number of industries in Indonesia implements open innovation, with the majority relying on internal innovation from their own R and D department.

The institution in its technology transfer activities has had a higher success rate on the incubation process rather than in noncommercial and licensing. There has been significant growth over time as shown in Chart 1.

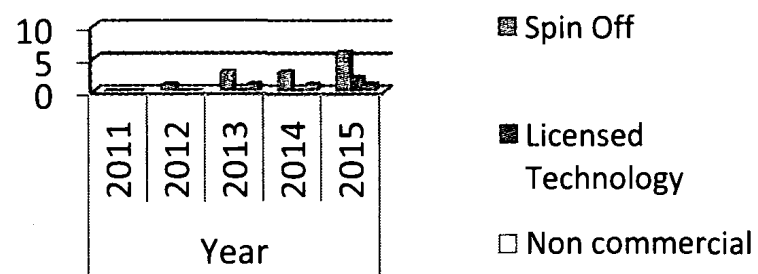


Chart 1. No. of technologies transferred by Center for Innovation /STP LIPI 2011 – 2015 (primary data)

Chart 1 shows that spin off / NTBF have increased rapidly since STP LIPI began operation in 2013, while technology transfer through licensing and noncommercial increased only slightly.

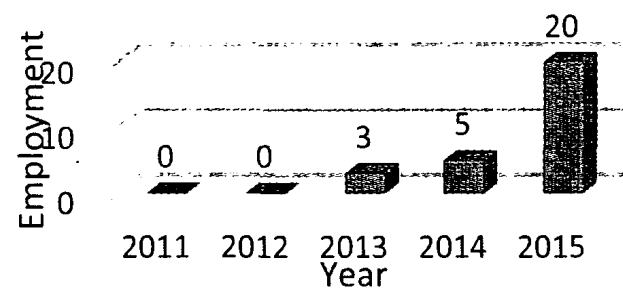


Chart 2. No. in Employment in NTBFs 2011-2015
Source : primary data

Role of STP LIPI in shifting research approach in LIPI

Most of the LIPI research centers had adopted a research push approach, where research is based on the researcher’s ideas or problems that the researcher identifies without concerning market or industry needs. Before 2012, the Center for Innovation also adopted first generation innovation process combined with Cooper’s Five Stage Gate in conducting technology transfer activity (Fig. 3 and 4.).

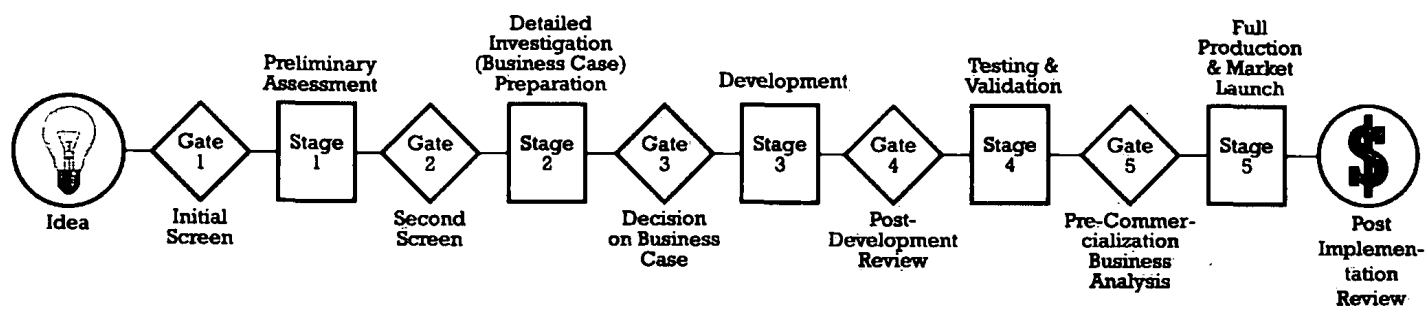


Fig. 3. Cooper's Five Stage Gate³

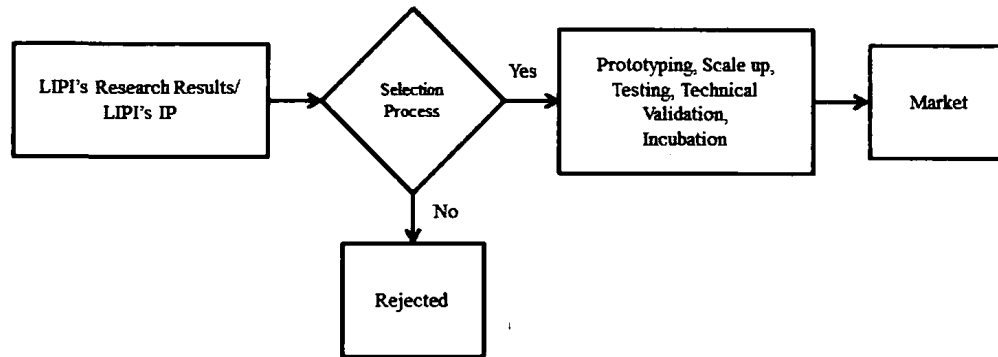


Fig. 4. Innovation process in the Center for Innovation (Primary data)

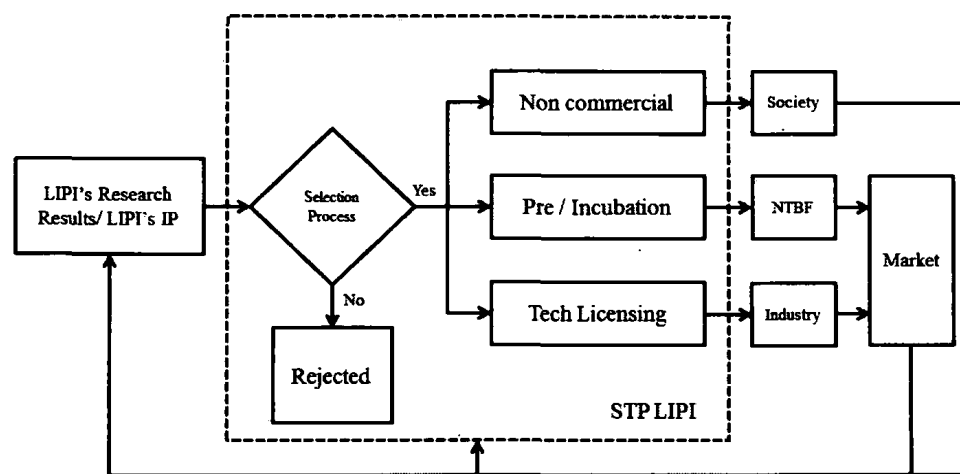


Fig. 5. Innovation process in STP LIPI (Primary data)

This process had a low rate of success in transferring technology, because the Center for Innovation was not supported by adequate facilities, such as incubator facilities and workshop and other resources. After the establishment of STP LIPI, managers had arrived at a concept for a new approach for the innovation process more concerned with market and industry needs (Fig. 5). This concept was formulated by adopting the open innovation concept and the fifth generation innovation process to modify the existing approach learning from the 4 years of experience in transferring technology at LIPI. With this approach STP LIPI has been able to enhance their technology transferring performance.

In general, STP LIPI influenced LIPI's research centers to change their perspective and culture to generate and execute market oriented research activities, with shifting LIPI's research policy. Researchers and high rank officers in LIPI's research centers that are involved in STP LIPI are being urged to listen to market and industry needs.

This[#] has changed the research approach in several LIPI's research centers in just 2 years

Conclusions

This research shows that STP LIPI has an important role in increasing the number of NTBF and thereby creating more job opportunities. In addition, STP LIPI has successfully shifted the research approach of several LIPI's research centers by changing the culture and attitudes of researchers and high rank officers on executing research activities and generating IP without radically shifted LIPI's research policy.

References

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