

Implication of Technology Push and Market Pull in Commercialize Patent of Technology Innovation Case Study: ITB

Indriany Ameka¹ and Wawan Dhewanto²

Technology-based innovation, comes from market needs (market pull) then obtained the discovery of new innovation technology to help meet the needs of the community or of the new invention which was later adapted by the community (technology push) that become useful new needs.

The purpose of this paper to determine the implications that what works better between technology push or market pull in technological innovation carried out by researchers in creating new technologies. In this paper, the study used the example of one of the universities in Indonesia, the ITB because it has a research institute that more active than any other university in Indonesia. Sample taken from the new product invention that have been successfully commercialized or not. Is successfully commercialized inventions are more likely depart from the market pull or technology push.

From the results of a survey conducted in dept interviews by the researchers in ITB, the results of technology innovation only patented and that already be commercialized and used by many people will be the difference. How do these researchers discovered the idea, implementing it, and look for the market to commercialize their product innovation.

Keywords: Market needs, Technology Push, University Patent, Technology Innovation and Commercialization

Track : Innovation Management

Introduction

Commercialization of university patents is becoming an important agenda, leading to new manifestations towards entrepreneurial university. The importance of commercialization of university patents can be seen through the contribution of university spin-offs towards local economic development (Etzkowitz, 2002; Etzkowitz, 2003; Shane, 2004). Universities keep patenting their invention even though the ratio of exploited patents is small compared to unexploited patents.

As stated, technology push and market pull cannot be declared as the right or the wrong way to sustainable innovations. It depends on assorted variables—such as the specific industry, the company's history, etc.—which strategy suits best. Some

¹ Indriany Ameka, School of Business and Management, Institut Teknologi Bandung, Indonesia, indriany.ameka@sbm-itb.ac.id

² Wawan Dhewanto, School of Business and Management, Institut Teknologi Bandung, Indonesia, w_dhewanto@sbm-itb.ac.id

companies are still on the right track by focusing on technology or market needs only. (Brem A. et al 2009).

This paper try to discuss the issue which marketing theory are best to be implied in starting to make a technology innovation product in university as a guideline for every inventors when they start to think about inventing a new invention. The success of this product technology innovation is measured from the successful commercialization of the products that have been patented.

The research question for this paper is what are the factors that involved the success of commercialization the new innovation product that has been patented by the inventor?

Literature Review

Individual Characteristics, Motivations and Ability to Recognise Opportunities of University Patent

The main factor that pushes inventors towards being entrepreneurial is the desire to see their inventions being commercially exploited and only then followed by their desire for wealth creation and independence (Blair and Hitchen, 1998; Shane, 2003; Shane, 2004).

According to the research before, for those inventors whose patents were not exploited, some do possess entrepreneurial traits (Ismail, 2007, Ismail et al 2010).

The other factors that influence are the inventors background, their motivation to commercialize, opportunity recognition and industrial experience, the stage of technologies, and the roles of TTO (Technology Transfer Office) that university has. But because of the main purpose of those research is to find the factors that influencing the inventors to commercialize the technology, only use the theory to find and conclude the type of patent model they developed. The exploited patent divided into two type, the patent that commercialize to spin-off company and the patent that commercialize to establish company and the factors that involving the unexploited patent (Ismail et al 2011).

In this paper, to see the pattern of the inventors about how to think the initial creation of a new product and what will they do to the results of their discovery. Everyone departs from a different mindset. Some people will see what is needed by the community first, then try to find a product that can meet and satisfy the needs of that market. People who like this trying to make innovation based on market needs.

Some others will be thinking with their high imagination about what you think will be required by the public/community, a product that can be useful for many people. While people who think in this way, their invention departs from technology push. Both have different characteristics in view of the market. So the research in this paper, which is more successful to be applied in the discovery of an innovation in the university.

Market Needs vs Technology Push

Generally, there are two common ways innovation impulses differ (Boehme, 1986; Brockhoff, 1969; Bullinger, 1994; Schoen, 1967):

- (i) Market pull/demand pull/need pull: The innovations' source is a currently inadequate satisfaction of customer needs, which results in new demands for problem-solving ('invent-to-order' a product for a certain need). The impulse comes from individuals or groups who (are willing to) articulate their subjective demands.
- (ii) Technology push: The stimulus for new products and processes comes from (internal or external) research; the goal is to make commercial use of new know-how. The impulse is caused by the application push of a technical capability. Therefore, it does not matter if a certain demand already exists or not.

Therefore, technology push can be characterized as creative/destructive, with new/major improvements; market pull, however, is a replacement or substitute (Walsh et al., 2002).

At the strategy formulation level, the deficiencies and shortcomings become even clearer (see Table 3).

Table 3. Summary of deficiencies and shortcomings of technology push and market pull (Burgelman and Sayles, 2004)

Technology push	Market pull
Risk of starting with what can be researched and evaluated easily	Risk of looking only at needs that are easily identified but with minor potential
Risk of addressing the needs of the atypical user	Continuing to change the definition of the 'opportunity'; 'miss the opportunity'
Potential for getting locked into one technical solution	Lack of being a 'champion' or 'true believer'

Moreover, there is certain proof that other key factors influence product innovation adoption as well: for instance, the entrepreneurial attributes of pro-activeness and risk-taking (Salavou and Lioukas, 2003). Therefore, successful products and services rely on the targeted combination of market pull and technology push activities (Hauschildt, 2004) In order to achieve this, for instance, networking competence is identified as a fundamental success factor (Gemünden and Ritter, 2001).

Burgelman and Sayles (2004) suggest three fundamental elements for an enduring linkage between technology push and market pull in order to define viable new business opportunities:

- (i) Technology sources: Research only works if the researcher's personal interests are being adequately considered, combined with existing corporate expertise, and

supplemented with continuing the overview of new technological developments. 'Bootleg research' is a way of pursuing an idea against all organizational odds, but if there is no applicable workflow processing afterwards, this kind of research should be avoided.

(ii) Market demand: Marketers must do a permanent search, especially in all areas of customer dissatisfaction. Moreover, ongoing evaluations regarding future potential of new need satisfaction are crucial.

(iii) Relevant problem: Relevant problems are initial impulses from internal or external sources for innovation, such as ideas and trends. Other sources or origins of relevant issues are problems of the operating divisions, as well as new opportunities created by external events.

Methodology

The paper is based on a single case study in one of the universities in Bandung. Two types of patents were selected: exploited and unexploited patents.

We analyze the individual characteristic, motivations and ability to recognize opportunities from dept-interview survey. The survey will show us which kind of innovation product that successfully be commercialize after being patented. Is it the patent that depart from market needs or from technology push by the inventor.



From the figure above is a frame work according to Ismail et al 2011, but in this paper we will only examine until the stage of unexploited and exploited patent. Because we defined the unexploited patent as technology that can not be commercialize and exploited patent as a technology that has been commercialize.

We determine that an innovation that comes from the project of inventors in every university as a market demand. Project in here means, that the new idea to invent a new product innovation comes from other person or other company, the inventor only develop the needs to be a new innovation but the basic idea of what the market need not comes from his / her own observations . Even the innovation does not come from the ideas of each inventor himself, but the idea is developed with the knowledge that they had.

Findings

From the data that we obtained, there are 31 patents that are listed in the university. From the 31 patents, we found that most of the patents are unexploited patent. And almost all of the patent depart from technology push.

The interviews conduct to some of the inventors that the product technology has been patented and the inventors that their innovation product has not been patented. The results from the interviews showed that most inventors in university always depart their product innovation based on projects they've got. The project can be

from government or from independent company. They pay the university inventors to developed their basic idea of a new product they wanted.

Once the product is completed and ready to be commercialized, a new emerging innovations show up in technology. Then the results of these innovations become the property of company or government agency. So the inventors are not really concerned about the patent of the product, since it is not them who need to commercialize of that product.

From the focus group discussion that we conduct with other junior researchers and inventors say that most of the inventors depart their new technology innovation is based on project is because it is hard to depart their product innovation from technology push. Because when they depart from the technology push they have to think how to commercialize it to gain the achievement and wealth. But if they depart the new product from market pull, they only will fulfill the market need in a short term. Because the community needs is always change rapidly. Meanwhile if they depart the new product from technology push and they successfully commercialize it the life cycle of that product will be longer stay in community than the product comes from market pull.

There are many factors inside and outside the university that give them trouble with the bureaucracy if they want to patent their new product. Besides, the university does not have a TTO (Technology Transfer Office) whose function is to commercialize every new product innovation that the inventors inside the university made. The university has only organization to patent the new product innovation without help in the matter of commercialize the new products. So basically every inventors have to think their own market of their product to be commercialize.

Conclusion

Most of the patents that listed on, depart from technology push as the findings of technology innovation. Almost all of the patents is also unexploited patent. In other words, we can conclude that new product innovation that depart from technology push is hard to commercialize. It is because of many factors inside the university make them difficult to commercialize their innovation product.

If an inventor can not see the opportunities of the market then it would be better if they depart their technology innovation from market pull or from projects that offered to them by the government or independent company.

Conversely, if an inventor wants depart their technology innovation from technology push, they have to be smart in analyze the market first to know where they have to commercialize their product. So, even they depart their technology innovation from technology push, they still have to understand the market needs.

It is easier to them to depart their technology innovation product from market pull that has been analyze by other parties. It is easier for the inventors if the university has TTO to accomodate their technology push product, who will help them to find which market segment will appreciate and accept their product

Limitation of the Study

This study has provided important insight into the decision making process of strategy in making new technology innovation product. However, there is some limitation in this study. This research only conduct for single case study, we do not know the implication of market need and technology pus in other university, which impact the generalisation of the conclusion.

Another limitation is that one individual in a company or a research group has provided the data. Although the respondents are comprised of inventor-entrepreneurs and heads of the research groups, whowere responsible for the management and development of the firm and the projects, the possibility that acommon response bias might have inflated the findings of this study cannot be ruled out.

According to the patent holder in the institution at the university said that not all the new product innovation patent to them, it makes the data bias. Because many inventors who have patented their product did not report back on how the commercialization of its products.

There is also a potential non-response bias. Many of inventors that refuse or too busy to be interviewed. That is why further research is open to be conduct. To see the implementation in all places, to gain more reliable conclusion.

Reference

Blair, D. M. and Hitchen, D. M. W. N. (1998) *Campus Companies - UK and Ireland*, Brookfield, USA: Ashgate Publication.

Brem, A., Voigt, K. (2009). Integration of market pull and technology push in the corporate front end and innovation management—Insights from the German software industry. *Technovation* 29 (2009) 351–367

Etzkowitz, H. (2002). *MIT and the Rise of Entrepreneurial Science*, London: Routledge.

Etzkowitz, H. (2003). Research Groups as 'quasi-firms': the Invention of the Entrepreneurial University. *Research Policy*, 32, (1),109-121.

Ismail, K (2007). *Commercialisation of University Patents: A case study*. PhD Thesis University of Stratchlyde.

Ismail, K., Cooper, S., Omar, WZ., and Majid, A., (2010). University Spin-off Formations: How decision making process has been made? *Journal of Business and Social Science*, 1, (2), November 2010.

Ismail, K., Omar, WZ., and Majid, A., (2011). Commercialization of University Patents : A Case Study. *Journal of Marketing Development and Competitiveness* vol. 5(5)

Shane, S. and Khurana, R. (2003). Bringing Individuals Back in: The Effect of Career Experiences on New Firm Foundings. *Industrial and Corporate Change*, 12, (3), 519-543.

Shane, S. (2004). *Academic Entrepreneurship : University Spin-offs and Wealth Creation*, Cheltenham: Edward Elgar.

Walsh, S.T., Kirchhoff, B.A., Newbert, S., 2002. Differentiating market strategies for disruptive technologies. *IEEE Transactions on Engineering Management* 49 (4), 341–351.

Burgelman, R.A., Sayles, L.R., 2004. Transforming invention into innovation: the conceptualization stage. In: Christensen, C.M., Wheelwright, S.C. (Eds.), *Strategic Management of Technology and Innovation*. McGraw-Hill, Boston, pp. 682–690.

Salavou, H., Lioukas, S., 2003. Radical product innovations in SMEs: the dominance of entrepreneurial orientation. *Creativity and Innovation Management* 12 (2), 94–108.

Hauschildt, J., 2004. *Innovationsmanagement*. Vahlen, München.