

THE ROLE OF THE RESEARCH COMMERCIALIZATION IN THE UNIVERSITIES IN STIMULATING ECONOMIC GROWTH

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Abstract: The university research commercialization is not very well known in today's literature. Traditionally, the university acts as an education agent that carries the additional mission of conducting research and disseminating knowledge. The universities lack resources and business skills to manage commercial activities. However, the commercialization of university research is an important activity in the research environment. Many universities have adjusted their policy and opened the window to welcome business activities. It must to be exploited the opportunities to change and to achieve a better transition from academic to business. University's resources and organizational characteristics play important roles in influencing research commercialization in the universities. To explore how universities can improve their capabilities in facilitating research commercialization, it is then important to understand what are the critical resources and organizational characteristics, and which are the best conditions for research commercialization. With regard to the type of commercialization, there are formal or informal types. As to key factors that affect the commercialization outcomes, there are different focuses, ranging from individual level to institutional level. This article describes the commercialization of university research which represents potential opportunities to stimulate economy growth. There are multiple ways universities can commercialize their knowledge. The main approach has been in the form of technology licensing. The universities can play a significant role in economic development. The academic entrepreneurship is linked to the university's changing role over time and in particular to its increasing mission of commercialization.

Keywords: university, research, resources, commercialization, entrepreneurship.

Introduction

Academic research has become a driving force of economic development. One of the major problems universities have is the lack of business competency. The university education is associated with expertise accumulated over time, and with a mighty force rigorous analysis so that "knowledge generated knowledge" with a high degree of application. The first academic revolution added for academic research a new function, in addition to the teaching. Universities are currently in a "second revolution", incorporating economic and social development as part of their mission. Now, the university integrates entrepreneurial economic development as additional function of teaching and research.

It is accepted that globalization and internationalization amended roles of key agents of social change and economic development in knowledge-based society. Since much of the knowledge are developed within universities, they are seen as having an important role as catalysts for regional economic and social development, through commercialization of research results.

For many universities of U.S. the commercialization of research is an important activity. So, the universities have adjusted their policy and opened the door for a lot of business activities.

The big challenge for universities is how achieve a better transition from academic to business. The commercialization of university knowledge plays in U.S. an important role in supporting economic growth. University's resources and organizational characteristics play important roles in influencing research commercialization in the universities. The commercialization of university knowledge enhances the development of innovation in the universities, provides resources and new business opportunities, facilitates job creation, and promotes the business of communities. Increased involvement of universities in commercial activities is reflected by the number of start-up companies, business incubators or research parks and technology transfer offices. The universities can commercialize their knowledge in the form of technology licensing. So, the university licenses a patented technology to the industry and allows it to commercialize the technology. In exchange, the industry gives the university research funding. So, the commercialization of university research represents a big potential opportunities to stimulate economy growth.

The results of academic research

It is necessary to grant a major importance of university research in science, technology and innovation, respectively, in support of economic growth and improved quality of life. The relationship science - economics - society is a major issue addressed by economic research. Research plays a role as consumer of resources and also the role of creator of resources, strong diversified. The research competes with the other branches of the economy to attract the resources needed to accomplish its purpose and, on the other hand, aims to provide resources just by competing branches. Because the economic results are not obtained directly, the performance net research is not always highlighted.

Now, the university integrates entrepreneurial economic development as additional function of teaching and research. Creating an entrepreneurial culture will encourage creativity and innovation, using intellectual capital, the most important asset of a university. An entrepreneurial university, develops the ability to innovate, recognizes and creates opportunities for teamwork, assumes the risks and responds to challenges.

The results of academic research, on how they are transferred to the external environment can be divided into two categories:

- Communication, education, training, instruction;
- transfer to applications in the economy and society.

The ways of transmitting knowledge through communication and popular education are:

- Conferences;
- Public presentation of posters;
- participation in events of chambers of commerce and industry;
- scientific publications;
- production and dissemination of educational materials: books, questionnaires, kits, software etc.

- internships for students;
- training of students, especially those in senior years;
- public or private research contracts, partnerships and cooperation in research;
- consultancy.

Transferring knowledge to applications in industry and society (health, environment, administration, etc.) knows more embodiments but specifically a contract work which involving the researcher in all stages of the process to obtain the product or end-use service. In the case of university knowledge transfer, there will be conflicts between universities and industries and also conflicts between different units in the university. A separate category but with a particularly successful is the "spin offs"¹.

The final decision how to exploit of research results is from the university researcher, who can choose one or more of the possible variants. There is not a error the communication and commercialization of research outputs simultaneously, but in both cases it is necessary to be consulted an expert in intellectual property to avoid compromising the future result in industrial application.

But it must have in mind that during the start of the research until a patent is several years and the desire for communication of results is very high. Certain government or university policies limitate the option of researchers, but is widely recognized that it is their option and depends on incentive offer.

The following figure (no.1) presents the simplified flow of exploitation process of research results from universities to emphasize certain aspects related to communication and industrial exploitation.

¹ The spin-off is a company founded on technological inventions and other intellectual property rights created by one or more members of a research team from a university. University spin-offs have remarkably strengthened the linkage between universities and industry. The number of technology patents and spin-offs coming out of university research has a significant impact on regional economic and social development.

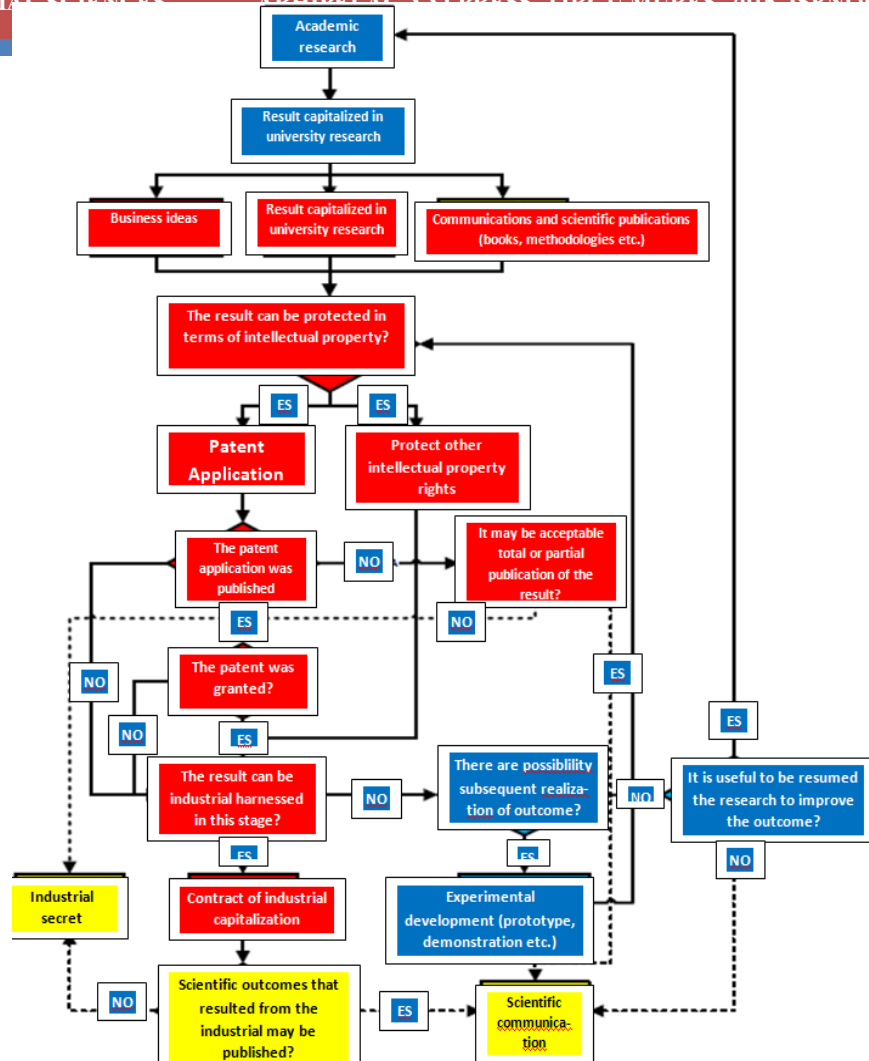


Figure 1 - The simplified flow of exploitation process of research results from universities.

Source: Strenc A.C. Popescu M.,Capitalization of research findings from universities. Intellectual property and business plan, Publisher Univ. "Lucian Blaga" Sibiu 2011

The research spinning-out

The universities choose a new approach, research spinning-out, in which inventors of a technology start a company of their own and share the ownership of the company with interested parties. In this case of spinning-out, inventors either leave their positions in the university to run the company full time or work on academic and business ventures at the same time.

The advantages in this case are the technology is commercialized by the individuals that are most familiar with the invention, and all business activities are tailored to fit with the technology.²

The inventors have two possibilities: leave their positions in the university to run the company full time or work on academic and business ventures at the same time.

There are also many downsides:

- the university limits its ability to manage a business;

a researcher can solve technical problems easily, but not have the business skills required to run a company;

- the culture of university is non-commercial organization;

- the university have the mission of conducting research and disseminating knowledge;

- the universities lack resources and business skills to manage commercial activities;

- the researchers could be too occupied by academic activities to contribute their time to the development of a new product or a new business;

- the reward system in the university does not create enough incentives for researchers to engage in commercial activities;

- the researchers in the universities are trained to be professional scientists and not businessmen;

- it is necessary to come someone with business experience from the industry to manage the company;

- the universities and companies do have different goals. Therefore, direct use of the company's research commercialization process as the ideal value stream is not feasible.

² Yu, Zhou, *Investigation of Research Commercialization at a University: A Case Study*, <http://vtechworks.lib.vt.edu/handle/10919/52037?show=full>, date.accessioned 2015 -11-20T15:26.

- in this case of spinning-out are conflicts between the research and the university, because when a researcher devotes a large proportion of his time to the business, he will be not capable of fulfilling his or her academic responsibilities.

It is necessary to note a new barrier: the conflict between the academic entrepreneur and the manager of a start-up company.

The categories of resources necessary for the commercialization of university research

There are four categories of resources necessary for the commercialization of university research³. One of the four types of resources is technological resource, which refers to the technical aspects of the research. The second category, human resource, includes the personnel involved in the commercialization activities. the knowledge. A third category is social resource which relates to the two main relationships an organization needs to keep with its external environment. One is networking with the industries and the other is connection with financial contacts. The last category, financial resource, refers to all types of funding needed to commercialize the knowledge.

The different commercialization processes require different types of resources. also, the importance of resources varies at different stages. An organization's capability of fully integrating needed resources into its business development plan plays an important role in determining the organization's commercialization outcomes⁴.

The capabilities of universities to identify and analyze new business opportunities and to transform these new ideas into commercial products are important.

Universities need not only the resources but also developed internal procedures to support their knowledge transfer process. The need to better understand a university's capabilities of managing its resources and activities in commercialization calls for detailed analysis of the university knowledge transfer process.

³ Ph. Mustar, et al. *Conceptualising the heterogeneity of research-based spin-offs: A multi-dimensional taxonomy. Research Policy*, 35(2), 2006

⁴ Andy, Lockett, at al. *Resources, capabilities, risk capital and the creation of university spin-out companies. Research Policy*, 34(7), 2005, pp. 1043-1057

Therefore, to ensure that a university's commercialization efforts are successful, universities should pay attention not only to bring in resources to develop business essentials in the academic field, but also to enhance the capability of managing the commercialization activities.

Conclusions

Universities are currently in a "second revolution", incorporating economic and social development as part of their mission.

The inventor is the best candidate to promote a new product to the market. Inventors should actively interact with the industry at early stages.

The greatest motivation to commercialize an invention comes from personal pursuits.

When evaluating an invention for commercialization, more emphasis can be given to its market value and market readiness.

The involvement of people from business functions is very important for a product development project.

The most important resources to facilitate a new product are the customer input and feedback.

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