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THE ROLE OF THE CENTER FOR TECHNOLOGY TRANSFER IN THE COMMUNICATION PROCESS WITH RESEARCHERS AND BUSINESS ENTITIES

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Abstract

In this paper, we investigate the management of communication processes among the Centre for Technology Transfer (CTT) currently operating in the University Science Park – organizational unit of the University of Žilina, and particular divisions of the University Science Park with the focus on its largest one – the Division of Intelligent transport systems, and also among external subjects - business entities. The CTT deals with the procedural issues: a creation and an acquisition of intellectual property (IP) rights, IP protection, and IP commercialization in which the well-running communication flows are of vital importance for a successful technology transfer. The aim of the paper is to provide particular proposals to communicate the relevant research results of the university - internally and externally, which would enhance the cooperation efficiency among CTT and other divisions and also among the University Science Park and business entities in terms of cooperation establishment with its potential partners.

Keywords: commercialization of research results, communication process, technology transfer.

Topic group: Organizational information and communication systems.

INTRODUCTION

Many universities face the challenge of diversifying their funding flows in order to support their research activities. The entrepreneurial activities of a university are, except the state subsidies, an important source of its income and thus they have a significant impact on the operation of the university, as well as its further development. The entire system of research and development funding is closely related to the well-managed system of propagation and commercialization of the university research results, where the process of communication inside the university and outwards is an important aspect of successful application of research results to the market.

There are numerous routes to exploit research results, some of which are:

1. The development, patenting and eventual commercialisation of a technology together with an industrial partner.
2. The development and patenting of the technology for licensing to an industrial partner who will then commercialise the technology.
3. The development and patenting of the technology followed by the formation of a spin-off company to prepare and customize the prototype and place it on the market.

The efficient transfer of Intellectual Property to industry and enterprise partners is a key objective for many universities. Successful communication strategies can lead to a better cooperation between universities and industry.

THEORETICAL PERSPECTIVES

Once the IP is created by the university researchers, appropriate technology transfer routes are usually considered.

Understanding the technology transfer as a communication process

Theoreticians and practitioners define the concepts of technology transfer in many different ways.

For the purposes of this article, technology is defined not only as a process and a product, but also as information that is put to use; and a technology transfer is defined as the iterative movement of applied knowledge and technology via some communication channels from one individual or organization to another.

Communication is a mean by which people in an organization cooperate to achieve a common goal. Communication is the process of transmitting information. According to Sung and Gibson (2015), “the transfer of technology is a particularly difficult type of communication and it often requires collaborative activity between two or more individuals or functional units who are separated by structural, cultural, and organizational boundaries”. Technology transfer as a communication process involves on-going interaction and negotiation of meanings between researchers and clients.

Some of the authors identify the technology transfer with communication process. "The applied technology process is a communication process based on planning, marketing and training." (O´Keefe, Marx, 1986)

Technology transfer offices

Technology Transfer Offices (TTOs) are targeted on providing commercial application of university knowledge and results of research and development into practice. In some cases TTOs are created as one of the university structures, in others there are created as independent business subjects where university has its share or signed a contract on cooperation and a commercialisation of intellectual property of the particular university is created by this organization. (Čorejová, Jarošová, 2015)

TTOs should carry out the following activities by its specialized personnel, as well as by cooperation with external or internal entities aimed at the technology transfer:

a) management of Intellectual Property from the first phase – creation of the subject, its commercialization and development, until the last phase – termination,
b) support when negotiating the conditions of contracts from IP,
c) projects support,
d) consulting on the management of IP and technology transfer to SMEs,
e) cooperation with the Industrial Property Office, centres for technology transfer from other universities and colleges and so on,
f) management of the incubator.

Communication of TTOs with other parties includes:

- publicity management of the project and fulfilling the duty of publicity (communication with the general public),
- communication with the managing authority, researchers and project partners (with superiors, co-workers),
- communication with managers of public procurement, preparation of documents for public procurement (the control body),
- communication with patent lawyers, patent attorneys and patent offices,
- communication with customers (potential and actual).

The TTO formed at the University of Žilina is specifically named- Center for Technology Transfer (CTT). Therefore, this term is used in the context of the University of Žilina.

Review on the Technology Transfer Models

In respect of communication process, three models of a technology transfer (TT) are most prevalent (Devine et al., 1987):

- The "Appropriability Model" emphasizes the importance of the quality of research and competitive market pressure in achieving a technology transfer. This model assumes that good technologies sell themselves, but the truth is seldom the same in the real world.
- The "Dissemination Model" concentrates on the diffusion of innovation. The perspective is that transfer processes can be successful when experts transfer specialized knowledge to a willing recipient. But one-way communication from expert to user does not characterize the process.

- Most current one is "Knowledge Utilization Model", which emphasizes the importance of (1) interpersonal communication between researchers and users, and (2) organizational barriers and facilitators of transfer. But this model tends to reduce a very complex process to chronologically ordered stages.

Departing from the previous three models, several researchers suggested the Communication Model as a replacement of the earlier TT models. This model perceives TT as a communication and information flow process with full exchanging and sharing of meanings. This model suggests technology as "an on-going process which involves a two-way interactive process (non-linear) by continuously and simultaneously exchanging ideas among the individuals involved". (Williams and Gibson, 1990 In: Wahab et al., 2009)

There are also some less popular models of technology transfer; examples include: the Contextual Collaboration Model, the Material Transfer Model, the Design Transfer Model, the Capacity Transfer Model and others.

All these models were developed and used to make technology transfer successful. A successful transfer of technology, however, might not be guaranteed simply by using a particular model. (Choi, 2009)

The Process of Technology Transfer from the aspect of Communication

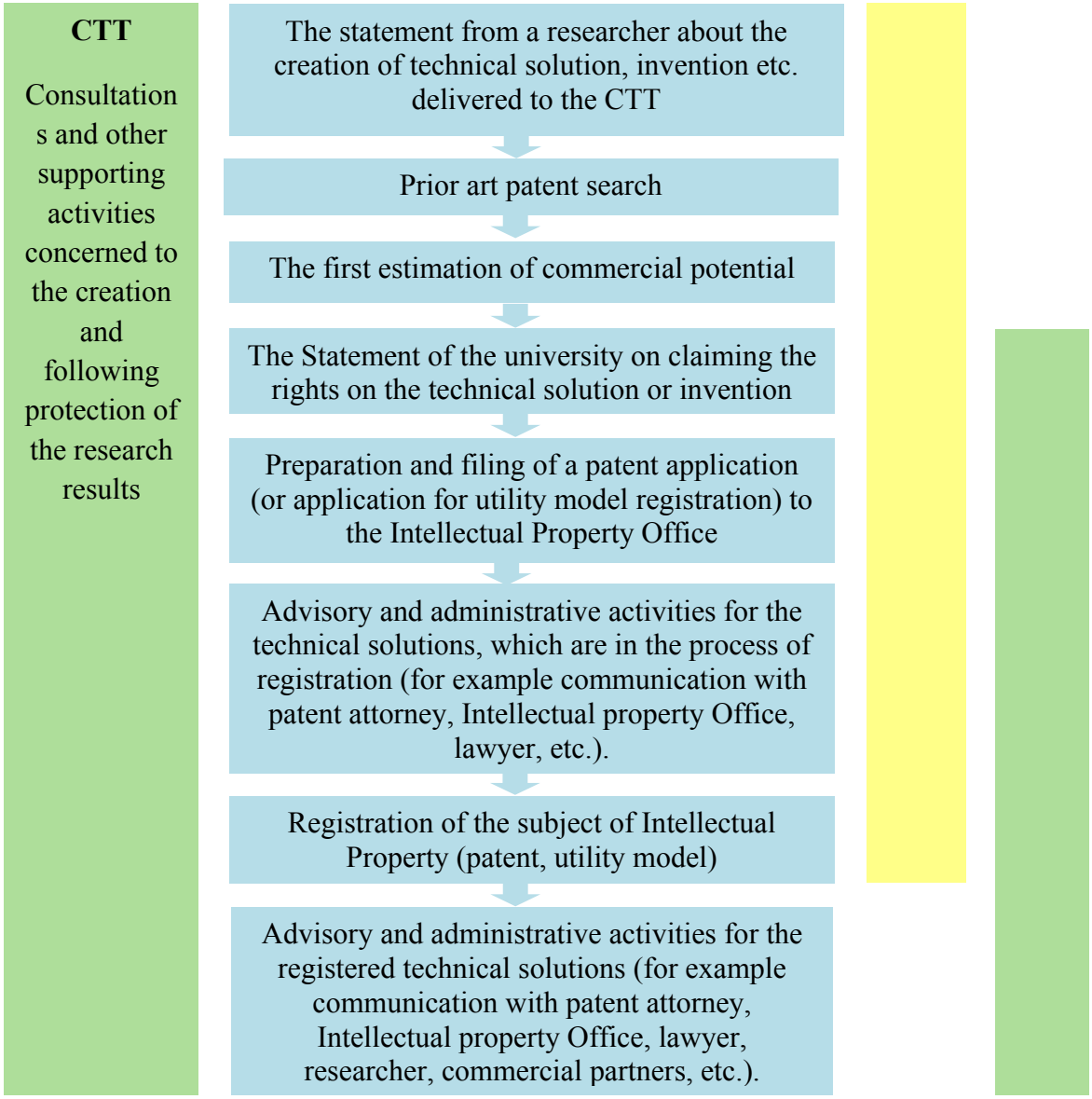
The qualified staff the University of Žilina conducted the Survey on the knowledge transfer process implementation at domestic and foreign universities.

On the basis of the analysis of internal regulations, the management of knowledge transfer processes have been developed and incorporated into the Internal directive on the management of intellectual property in conditions of the University of Žilina.

Communication process, which is the essential element of the proposed knowledge transfer process and its successful application, is shown in the following figure.

The core of the proposed knowledge transfer process is a continual cooperation among the CTT and researchers to achieve the common goal - the implementation of inventions or new technical solutions to the marketplace.

Figure 1: Schematic diagram of the process of IP protection and IP commercialization in the conditions of the University of Žilina (IP policy)



METHODS, FINDINGS

Conducted studies and contributions concerned to the directives on the operation of the University Science Park of the University of Žilina (USP UNIZA) showed the need for the intensive communication with researchers.

Despite the fact that many empirical studies and theories have specified the communication requirements in organizations targeted on innovations, a specific example from the university environment is needed to understand the complex context of a technology transfer, in which the participants are located in different organizational units, countries and cultures.

In this article we use available information and knowledge of the communication processes from other universities in our country and abroad. The result is the systematization of knowledge providing particular proposals to communicate the relevant research results of the

university with internal and also external subjects which would help the CTT formulate more effective methodology concerned to the internal communication processes of the USP UNIZA as well as to the external communication with business entities in terms of cooperation establishment with its potential partners.

The efficiency of communication process, that forms a part of the knowledge transfer process used in the University of Žilina, was verified in several specific cases. For the purpose of this article we choose one particular case study from the area of the Intelligent transport systems.

DISCUSSION

Once the IP is adequately protected, technology transfer routes are usually considered. The most efficient method of generating income from this patented technology must be identified. As the concept matures, the decision whether and how the technology should be protected is made by the university, ideally with the assistance of the researchers. But not every invention will necessarily lead to further patent applications, therefore the IP valuation provide some information to make these decisions.

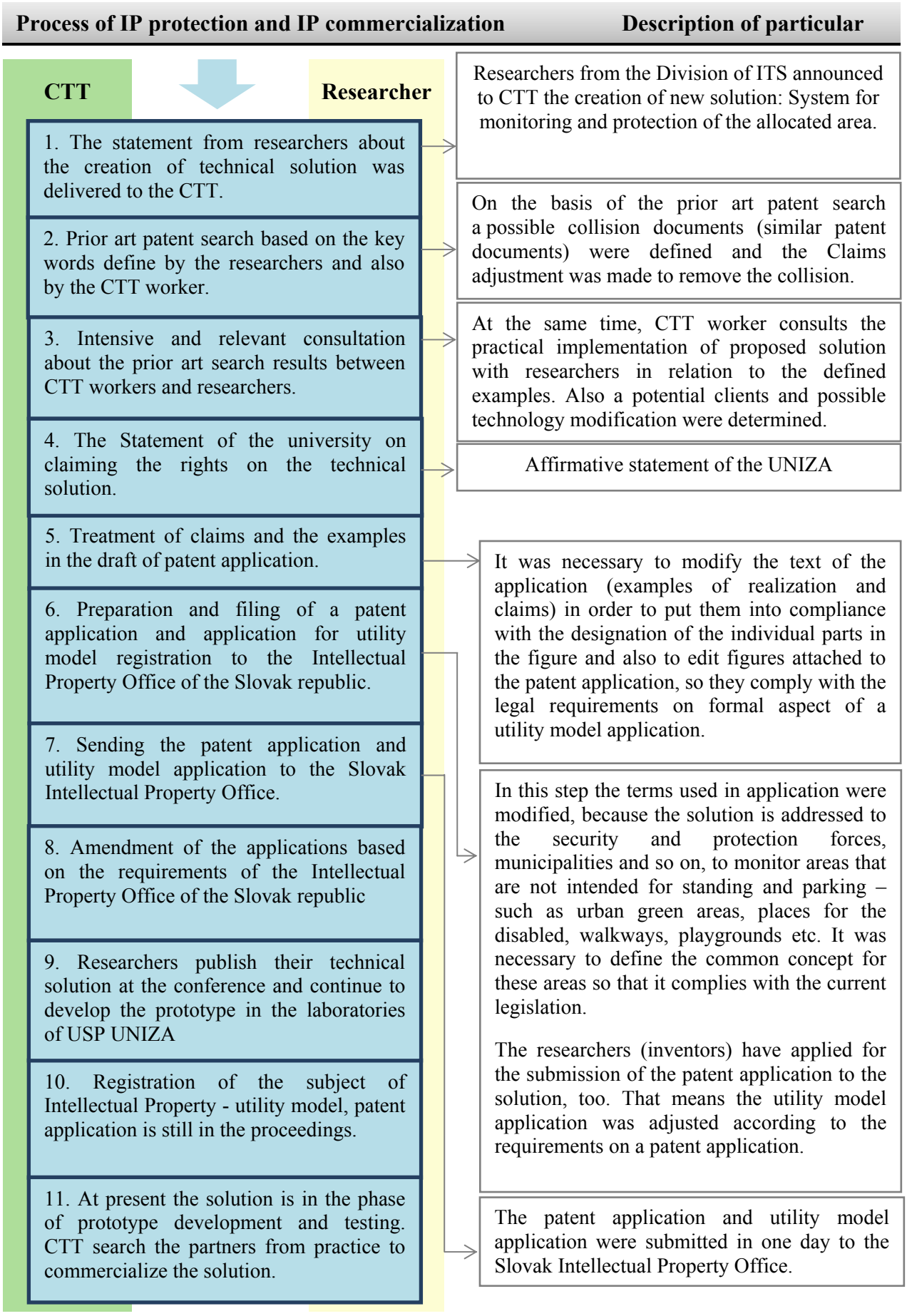
Case study: Research in the area of Intelligent transport systems in the University science park

The USP UNIZA has four divisions - Intelligent transport systems (ITS), Intelligent manufacturing systems, Development of new advanced materials and technologies and Information and communications technologies. The present case study deals with the solution for the monitoring systems in the field of Smart Cities which was developed within the ITS Division.

ITS are sophisticated multimodal interdisciplinary tools integrating advanced technologies from different fields applied in transport and traffic in order to develop solutions that are significantly improving mentioned quality of life. European Union including the Slovak republic is facing many challenges in relation to the enormous increase in the transport of goods and people. Services of the Intelligent Transport Systems can be understood as the functional data output applications of intelligent transport systems which contribute to the safety of users of transport infrastructure, increase efficiency, improve living conditions, save time and money in the economic activities of the company, improve the environment - to fulfil the vision of Smart Cities.

When reporting the developed IP, researchers have to provide cooperation and support during the whole process of IP evidence.

Figure 2: Case study



Communication with researchers during the above mentioned phases was rich in knowledge for both parties. Researchers familiarized the CTT workers with new technical terms and explained them the nature of their solutions application in practice as well as preconditions for the further development. On the other hand, the CTT workers explained to the researchers the terms and conditions of their technical solutions protection, instructed them in the deadlines and documents that have to be drawn up and submitted.

At present, the search for partner is conducted to cooperate in the prototype development and its testing. It will be probably realized in the form of the contract research.

Compliance provision

The Inventor is required to submit the Statement about the creation of the subject matter of IP with all the relevant documentation and supporting documents concerned to the subject matter of IP. They will be helpful when assessing the options of IP protection and considering the commercial potential of IP.

At the same time, inventor is required to provide compliance with the university and also to provide the information concerned to IP if the CTT, statutory representative of the University or legal representative of the University ask for them.

In the case the University decides to protect the announced subject matter of IP as a patent, the Inventor provides compliance and all required information, especially in the following phases:

1. When detecting the state of the art in the field of invention, defining the keywords for prior art patent search.

2. When fulfilling the document "the Description of Invention", Annotation and Claims which are parts of the Patent Application, namely:
   - in the context of "The description of Invention" the Inventor provides the cooperation particularly by:
     a) detection of the technical field of invention,
     b) definition of the state of art (using the precise citation from the relevant documentation if it is possible),
     c) explanation of the nature of the invention and its advantages (and disadvantages, alternatively) in the comparison with the prior art,
     d) brief representation of figures (if they are annexed to the Application),
     e) description of an example how to realize an invention,
     f) determination of the method of the industrial applicability of the invention,

   - in the context of patent claims preparation the Inventor provides the cooperation particularly by:
     a) defining the product characteristics which should be protected or
     b) defining the characteristics of a production method which should be protected,

   - in the context of preparing an Annotation the Inventor provides the cooperation by summarizing the relevant facts that are listed in the Description of Invention, patent claims and possibly in figures.

CONCLUSION AND IMPLICATIONS

The commercialisation of technologies as one of the main roles of the TTO is increasingly important to generate university income. One of the most important challenges of our TTO is "to acquire the habit" of using the TTOs services by researchers in the whole process of IP protection and commercialization of the research results.

Recommendations to improve the efficiency of the internal communication in technology transfer are concerned with an increase of number and range of active mechanisms and a diffusion of more broadly and effectively passive mechanisms of communication. These are:

- to identify clearly and give authority to persons to monitor, receive, and appropriately disseminate new technologies;
- to emphasize the importance of knowledge and technology transfer activities and to increase awareness of successful cases of knowledge and technology transfer;
- the necessity of continuous communication among researchers (inventors) and TTO workers, providing compliance with the university and representatives of the TTO by researchers, providing all relevant information concerned to the IP;
- communication must be smart, targeted, not annoying.

Further actions are also needed from the point of view of the external communication process. The major issues that should be considered for effective technology transfer are:

- the research results must be presented in such a language and a form that is easy to understand for potential partners, and
- benefits of the solutions must be clearly perceived.

Therefore the "Announcement letters", in which the technologies are described in an understandable manner for general public, are currently being prepared in the USP UNIZA.

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