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## **PROMOTING KNOWLEDGE TRANSFER IN SCIENCE AND TECHNOLOGY: A CASE STUDY OF TECHNOLOGY PARK IN KOSICE, SLOVAKIA**

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### **Abstract:**

*Universities are increasingly involved in the regional economic development and innovation. The paper deals with the promoting knowledge transfer in science and technology through technology science park creation. It is shown that changes have to be introduced to universities existing services if they want to implement and enhanced their regional development mission. Paper also discusses the case study of TECHNIKOM – Technology Park created at Technical University at Kosice, Slovakia as the real example of the successfully transformed university.*

**Key words:** university, technology transfer, science and technology parks

### **INTRODUCTION**

Local and regional development has become an increasingly important activity for national as well as local and regional governments across the world since the 1960s and 1970s. The economics system has become more internationalised, even globalised, knowledge intensive and competitive. The regions should adapt the principles of knowledge creation and continuing education



and transformed them into some form of so-called learning region. The universities plays crucial role in this process. Universities must seek to leave their traditional academic system of values, to act as a catalyst in the process of regional economies. Their role in the process of regional development should go beyond a purely theoretical framework, which ultimately creates a lasting and positive impact on the regional economy only when individual activities are led by universities, along with widely deployed debate at the regional level. At the same time universities must scale back activities on the basis of information which were obtained in this process.

Each university would have to wonder what place in the process of regional development university could play in order to have more active role in the regional economy. An important role will be mutual cooperation between the members of the academic community, businesses and organizations and regional key players. Their mutual stimulation will support the collective learning process. This in turn will affect commercial activities and participation in a mutual process of creating knowledge in the field of regional development.

The process of involvement of universities in regional development should include the following elements. First, it should answered the question how can universities located in cities transformed in the way that they will be engaged in solving economic and social problems arising from industrial decline and environmental degradation. The second question is how universities are transforming increasing amount of knowledge in a regional context, to promote the mutual learning (4). The creation of scientific parks at universities for technology transfer support growth significantly.

## **THE ROLE OF THE UNIVERSITIES IN LOCAL DEVELOPMENT**

The universities became key players in the regional development in the last decades. Their original mission focused on education and research has been extended to provision of the services for local/regional development enhancement (1). The universities are important for regional development for the several reasons. At the most basic level they are major employers, purchasers of local goods



and services, and contributors to cultural life and they built environment of towns and cities. National investment in the infrastructure of a university to support its core business of research and teaching can therefore have a significant passive regional multiplier effect (2). More active contribution of the universities can be broken down into 4 areas:

1. business innovation (research)
2. human capital development (teaching)
3. community development (public service role)
4. institutional capacity (engagement in local civil society)

There are four domains which should be integrated:

1. Regional innovation
2. Human Capital and Skills Development
3. Social and Cultural Development
4. Regional Capacity Building

Then the universities can be seen to be occupying a “proactive” and not just “passive” role in the regional development (3).

## **A CASE STUDY OF TECHNOLOGY PARK AT TECHNICAL UNIVERSITY OF KOŠICE, SLOVAKIA**

The Technical University of Košice was founded in 1952, but its roots must be sought much deeper in the past. As early as 1657 the Universitas Cassoviensis was established in Košice, but technical education in Slovakia was only elevated to higher - education level in 1762, when the Austro-Hungarian monarch Maria Theresa established the Mining Academy in Banská Štiavnica. This provided education and promoted research activity in a group of scientific disciplines ranging from ore mining through to production and processing of metal materials.

The true birth of the Košice Technical College came on 8th July 1952, when the Czechoslovak Government set up three faculties, namely the Faculties of Heavy Engineering, Mining and Metallurgy. These were joined in 1969 by the Faculty of Electrical Engineering



and in 1978 by the Faculty of Civil Engineering. The important event of the renaming of the College into the Technical University of Košice occurred on 13th February 1991. In 1992 the Faculty of Professional Studies was set up in Prešov, which was transformed in 1996 into today's Faculty of Manufacturing Technologies. The year 1992 also saw the introduction of the Faculty of Economics, which meant that the University outgrew its original framework of purely technical disciplines, and it continued in this trend in 1998 with the founding of the present-day Faculty of Arts. The Faculty of Aeronautics of the Technical University of Košice was established on 1st January 2005 as a successor of the Air Force Academy of Milan Rastislav Štefánik in Košice, which has been a prestigious educational institution in Europe and in the world providing university education for pilots and air operating personnel for over 30 years.

Mission of TUKE is to provide environment with scientific and technological knowledge basis, innovation and workforce, in order to form beneficial and sustainable future and high quality of life. This is achieved at TUKE by innovative research and excellent education in all scientific branches of respective University Faculties.

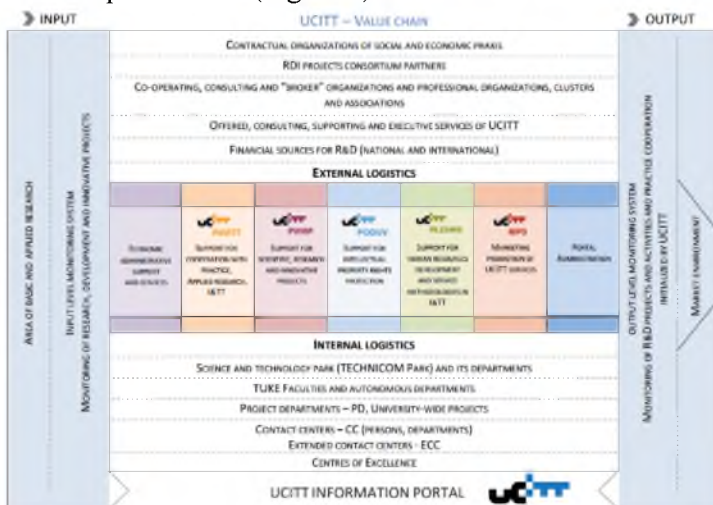
The number of students currently attending nine TUKE faculties is 10 643. Out of this number there are 8 728 full-time students (5 293 Bachelor students, 3 435 Master students and 672 Postgraduate students). More than 700 professors, associate and assistant professors work here, and the same number of research and administrative staff.

TUKE caters for a wide range of educational needs not only in the East-Slovak region, but throughout Slovakia and Central Europe, as in many specializations it is the only centre of education and research in this area. TUKE closely co-operates with other universities and with industrial organizations throughout the region and the Slovak Republic.

In 2012, upon completion of a project bearing the same name, a new body was established at the Technical University of Košice –

**University Centre for Innovation, Technology Transfer and Intellectual Property Protection (UCITT).** The tasks and the services that the centre provides include cooperation with industries in the field of applied research, innovations and technology transfer (ITT) from academy to industries, support for research, scientific and innovation projects, support for intellectual property protection (IPP) of results of the scientific activities conducted at TUKE, support for human resources development and methodology of services for the abovementioned fields, promoting achievements in ITT using a portal information system. The mission of the UCITT centre is to create a relevant virtual environment at the university that will permanently support R&D in terms of cooperation between scientists and practice, and to ensure efficient transfer of knowledge, products and technologies into society and economy. Using its network of Slovak and international connections and open architecture of its information platform, UCITT facilitates effective proliferation of its services in national, regional and international research, social and economic area. Currently, the most intensive activity is the preparation of patent activity in the field of IPP supported by updated internal legislation within TUKE.

The mission of UCITT is undertaken in line with the proposed “value chain” conceptual model (Figure 1).



*Figure 1. UCITT - Value Chain*



The model specifies UCITT's external and internal relations interconnected by its services; which, in the horizontal direction, ensure the value added flow from research, development and innovation base towards effective outputs in its scope of influence in the social and commercial practice.

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In the context of the value chain, the concept of the UCITT mission focuses above all on the following activities:

- Supporting the efficiency of research, development and innovation (RD&I) conducted at the University by its direct and active connection with the needs and requirements of the industrial practice, small and medium enterprises and the social sector,
- Contributing to the identification and valorisation RD&I projects and project outputs that have the potential for further active cooperation or can be utilized in the social and economic practice,
- Supporting the identified RD&I outputs and projects and their extension by means of:
  - joint (cooperative) RD&I projects,
  - innovation projects for practice,
  - knowledge transfer, or transfer of technologies to respective organizations in the social and economic sectors,
- Providing complete intellectual property protection services to University staff and students,
- Supporting development and effectiveness of national and especially international cooperation in the field of RD&I projects, including projects in which organizations from social and economic practice are involved.
- By means of its network-based organization structure, UCITT will facilitate cooperation between RD&I Faculty-



level units and/or autonomous departments and the coordination unit on the University management level and thus create an integrated and flexible organization and management structure of UCITT within the University.

- Establishing the integrated network architecture of UCITT as an open platform that enables UCITT to provide services to cooperating external/contracted national and international organizations and organizations evincing interest in cooperation. These include especially organizations in the areas of:
  - academic and scientific institutions,
  - social and business practice,
  - consulting, innovation intermediation and technology transfer.
- Supporting and contributing to initiatives and processes related to creating science and technology park and business incubator for innovative companies and facilitating sustainable cooperation with these institutions.

The mission of UCITT in the field of its activity is to create a virtual environment facilitating continued support for the development of mutually beneficial RD&I cooperation between research and practice. Its aim is to contribute to the effective transfer of knowledge, products and technologies into the social and commercial sector. Using its relations and support from the open architecture of its own information platform, UCITT ensures pertinent and efficient proliferation of its services and suitable products in the national and international research, social and business environment. These features of UCITT mission will also contribute to the European innovation policy (expressed e.g. in the "**PRO INNO Europe®**" **initiative**

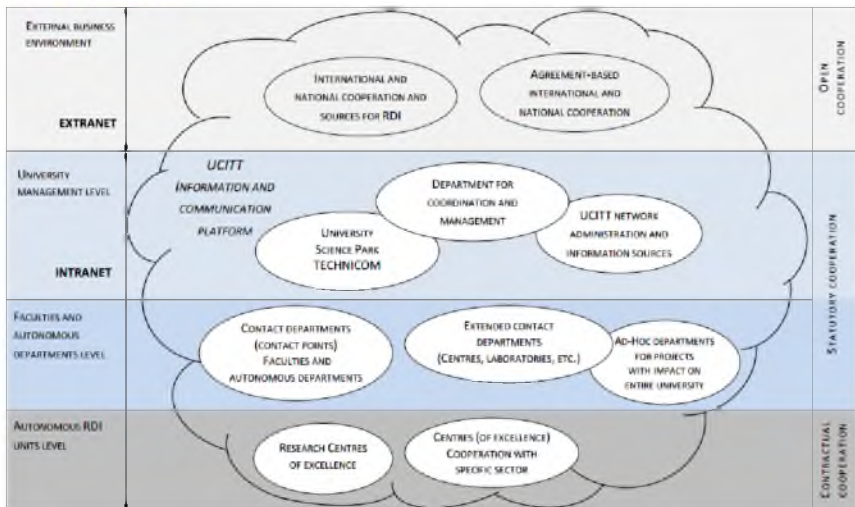
<http://www.proinno-europe.eu/>).

UCITT is based on an open and flexible conceptual framework of organization and management structure, which minimizes risk factors and creates conditions for the following:

- forming a flexible and open organization and management structure of UCITT,

- purposeful and specialist-oriented distribution of competencies in UCITT service provision,
- direct contacts and connections between operational research units / research workers and industries,
- purposeful content and competence oriented departments aiming at achieving high professionalism, commitment and motivation among workers,
- flexibility and accessibility of services supporting commercialization of R&D outcomes and adequate intellectual property protection for all stakeholders.

UCITT NETWORK STRUCTURE



*Figure 2. Network structure of UCITT*

The personnel and network organization structure of UCITT is based on the following principles:

- autonomy of functional UCITT organization units (departments) is guaranteed by internal contractual relationships,
- all units are adequately represented in UCITT scientific, executive and controlling institutes,





- active participation in the development, financing and management guaranteed in consensually accepted UCITT organization rules,
- protection of intellectual property and copyright,
- compliance with TUKE Statute and relevant regulations,
- protection and development of tangible and intangible property and shared infrastructure.

Within the UCIT the project on science park creation has been submitted under the title “University science park TECHNICOM for innovation applications supported by knowledge technologies”. Project is funded by Operational Programme Research and Development, Priority axis 2 – Support to research and development, Measure 2.2 Transfer of knowledge and technology from research and development into practice, Call OPVaV-2012/2.2/08-RO. Total funding is EUR 41,984,703.52 and project duration is from June 2013 till July 2017. University of Pavol Jozef Šafárik in Košice and Prešov University in Prešov are the project partners.

USP TECHNICOM covers and creates conditions for further development and practical existence of various R&D outputs, and in this context, the newly formed branches arising at TUKE in the implementation of projects in the field of research and development, technology transfer and other relevant areas arising from the operation TUKE and UCITT.

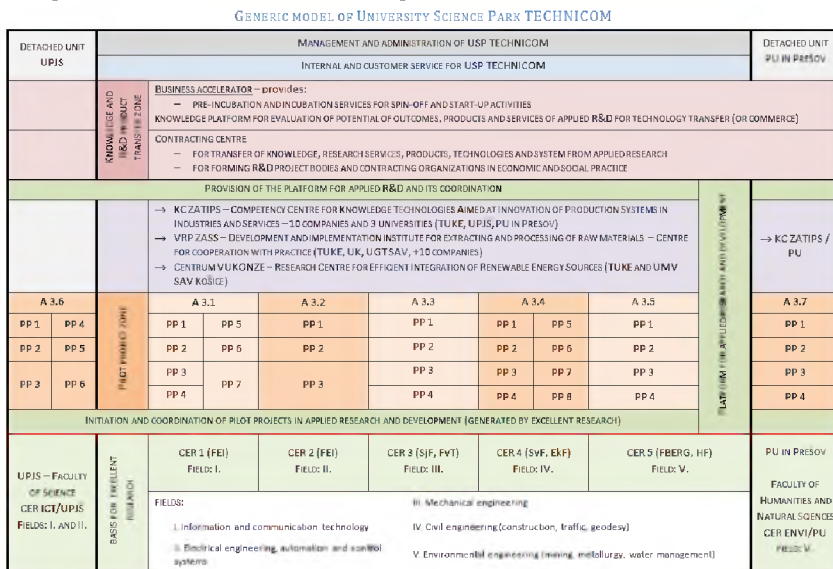
A generic model of the park is built on three aspects:

1. Flexible collaboration with advanced research, which guarantees a permanent "repository" of innovative initiatives and products used by USP, as for the targeted applied R&D, and potential acceleration of innovative entrepreneurship.
2. Effective platform for (targeted) applied R&D, which supports both the academic departments and centres, as well as joint R&D centres based on mutually effective collaboration between the academic and commercial or public institutions.



Effective portfolio of business services for the efficient business transfer of R&D products and services into practice and to initiate the progressive acceleration of innovative entrepreneurship based on professionally-selected R&D output. The actual process of incubation of new hi-tech companies will be provided by external partner incubators.

The generic model of USP is at Figure 3.



**Figure 3. Generic model of TECHNIKOM**

The following projects are currently being implemented within the platform for applied research and development:

- Centre for research on the effectiveness of combined systems integration of renewable energy sources (abbreviated as VUKONZE Centre)
- Competence Centre for Knowledge Technologies Aimed at Innovation of Production Systems in Industries and Services (abbreviated as CC ZATIPS).

After completion of the project, USP TECHNICOM will serve as the executive department of UCITT, which after establishing in the R&D



experience can be taken out of the organizational structure of UCITT as a separate organizational TUKE unit or as a separate legal entity.

## Conclusion

There is the rapid dispersion of the science and technology parks all over the world. The exponential growth in last two decades has been observed. The Universities are taking a more active role in creating (smaller) science and technology parks. The private sector is also more involved in park creation. The higher level of integration between science and technology parks and metropolitan/regional strategies exists (5). There are several challenges for universities that have to be overcome. The full package approach has to be introduced which consists of 5 elements:

- Regional Entrepreneurship, Networks, Clusters; local industrial policy
- Incubation, Science Parks, Transfer Desks
- Entrepreneurial Ecosystems, Infrastructure for Entrepreneurship
- Entrepreneurship Education
- Triple Helix Paradigm

The scientific park often does not have clear vision and mission. They are short on human resources and management is unable to provide support to start-ups and growing ventures. There is no supportive network created around the centre and no alignment and lack of communication between center management, municipal authorities and other share- and stakeholders exists. The scientific and technology parks therefore should have explicit goals and values shared by all stakeholders (6).

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## **ПРОБЛЕМИ НАФТОГАЗОВИДОБУТКУ ТА МОЖЛИВІ ШЛЯХИ ЇХНЬОГО ВИРІШЕННЯ**

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За доведеними запасами вуглеводнів Україна займає третє місце в Європі, поступаючись лише Великобританії та Норвегії. Промислова розробка нафти під Бориславом почалася ще в 1886 р. У 1908-1910 рр. надра нинішньої Івано-Франківської та Львівської областей давали 1,5...2,0 млн т нафти щорічно (третій показник після США та Росії). Із тієї пори в Україні видобуто понад 385 млн т сировини, в тому числі 95 – за роки незалежності. Але це в рази менше, аніж у тих же Великій Британії та Норвегії.

Із другої половини 1970-х і до 1992 р. видобуток в Україні скорочувалася на 9...10 % щорічно. У середині 1990-х його вдалося стабілізувати на рівні 18 млрд куб. м газу і 4,0...4,2 млн т нафти з газовим конденсатом, що становило тоді приблизно 18 % від потреби в цих енергоносіях. І хоча на початку 2000-х видобуток зростає (на 1...3 % на рік), його обсяги жодного разу не відповідали плановим показникам Національної програми «Нафта і газ України до 2010 року» та всім редакціям Енергетичної стратегії України. У 2009-2011 рр. через фінансову кризу ситуація погіршилася, а в останні два роки (особливо після збільшення рентних платежів) стала катастрофічною. Спроби хоч якось загальмувати скорочення видобутку шляхом збільшенням обсягів експлуатаційного буріння та виявлення