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Role of the Universities in Technology Transfer in Serbia

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Abstract

The basic idea of present paper is to put light on communication between both industry and academia, bringing both "industrial practices into the classroom" and "academic labs into the factory". It aims at delivering a detailed conceptualization and implementation study validating the concept through pilot runs and setting up an extended partnership to promote its future implementation

This involves close cooperation between researchers, students, innovators and entrepreneurs. This can be achieved if the company closely involved in education in order to participate in it and defining its need for highly trained and skilled labour force.

Here we are discussed the most important role of the universities in processes of regional development and technology transfer in Serbia.

Keywords: Technology transfer; Knowledge Triangle; University influence; Regional development;

1. Introduction

Role of the University in technology transfer in Europe Union is described in a guide [1] to help improve the contribution of universities to regional development, with a view to strengthening economic, social and

territorial cohesion, in a sustainable way. The renewed Lisbon agenda aims to turn Europe into a modern, dynamic, outwardlooking knowledge economy. It acknowledges that this is the most effective means of delivering the economic growth and jobs required across Europe. Research, Education and Innovation – Europe's knowledge triangle - lie at the heart of achieving these goals.

The value of the knowledge triangle has been highlighted in many documents of the work of the Expert Groups on research and development and innovation. The substantial increase in funds available to the 7th Framework Programme, the incorporation of new approaches into the programme and the establishment of a European Research Council further recognise the role research, innovation and education can play in achieving the ambitions of the renewed Lisbon agenda. Many reports [2] have also emphasised the means of realising the economic benefits of increasing investments and enhancing the synergy in the knowledge triangle.

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Relating education, science, and production is a substantial prerequisite for economic development and the encouragement of innovative processes [3]. It is difficult to make new technologies, open new positions and enter new markets without the help of universities. That is the reason why the role of the universities are so important.

For instance, each document of the European Union on the strategic economic development plan brings into the focus of politics and measures for encouraging small and medium enterprise development activities aiming at innovations, starting small and medium enterprises, networking, and cluster development in particular. This is a common practice since small and medium enterprises account for 99% of the total number of all economically active subjects on the territory of EU.

2. Serbian Universities in light of EU demands

In Serbia financing research and development activities such as complete financial schemes, payment procedures and the control of infrastructure comes under the responsibility of the Ministry for Education and Science.

Sectors of (former) MSTD are: Department for basic research in natural sciences and medicine, Department for technological development system, Department for international cooperation and European integrations, Department for human resources development in science.

According to Innovation Law, Innovation policy, implemented through innovation activity programmes, is established by the Government for a five-year period, upon proposal of the ministry in charge of the innovation activity. The Ministry maintains electronic and publicly available database and record database on the registered innovation activity subjects, innovation and development projects and innovation activities.

Disintegration of the Universities is one of the biggest problems of the Serbia's academic research and development community in which faculties are independent legal units, which means that the concept of a fully integrated university has still not been embraced. That is why is not possible directly to implement the experience of our partners from the west countries. In spite of that, to universities are given certain integrative functions such as establishment of unified standards of work of departments and services, and unified standards for creating data bases of all units, strategic planning; adoption of study programmes; quality assurance and control; enrolment policy; election of teachers; issuance of diplomas and supplement diplomas; international cooperation; investment planning; etc.

3. Pedagogical Reforms and Technology Transfer Improvement

In the higher education system is needed to develop modules that enable young professionals to manage the entire cycle of enterprise development and implementation of new technologies. From the initial idea development, implementation of necessary technology and research, through creating action strategies, credible marketing and sales materials, construction team of employees, partners and investors, to production management, finance and operations.

Increase of a company or sector profitability, lead to increasing the need for peopl capable for faster adaptation to change, and it is necessary that companies are equipped with business tools to respond to market changes in the application of technological knowledge.

Group of skills and knowledge that should be achieved by studying at universities are:

- Starting and running businesses,
- entrepreneurial business skills,
- marketing and organization of marketing,

- sales and sales organization,
- finance and investment,
- planning,
- management and organization of people,
- project management,
- personal negotiation skills,
- leadership,
- proper decision-making in the business environment,
- the business use of information technology and foreign languages,
- preparation of pre-conditions and ways of applying new technologies,
- and so on.

Young academics should train skills that can help in motivating and leading teams, identifying client needs, applying and obtaining capital for business ideas and plans, easy identification field of the new technologies and ideas etc.

In order to achieve this it is necessary to master the technical knowledge, quantitative financial methods and new management methodology based on scientific research. Special area, which would be necessary in the future to develop, is the knowledge necessary for a successful transfer of technology from concept to practical application.

4. Partnership of all three sides of Knowledge Triangle

One of the key problems of Serbia research and development is inadequate coordination among three basic components of partnership:

- the research and development (R&D) sector,
- the higher education sector, and
- the business enterprise sector.

This lack of coordination become responsible for:

- low efficiency of commercialization of R&D results;
- low demand for the potential capacity of the academic and higher education sectors of science;
- lack of special training of the personnel for particular areas of innovation activity;

Education is at the heart of business concerns. In other parts of the world, one meets students with a sense of urgency to finish their education in order to make a difference in their societies and to create value for themselves and for others. In Europe, and specially in Serbia, this spirit is seldom met and the educational programmes at European universities seldom help students to gain that spirit. European universities are focused on research as their main task. Higher education is viewed mostly as an individual project. High quality teaching for competencies rather than the mere acquisition of knowledge, and especially teaching from which students develop their competencies and attitudes in innovation and business, is scarce. Translating scientific discoveries into products is a unique talent and therefore demands new forms of teaching and learning.

The success and future position of the university, and the economy with it, depends on the creation and use of shared knowledge. In this sense it is said that one of the safest measures to strengthen economic development is to take care of knowledge transfer between universities and industry. The role is not new, nor is it genuine own, but it is necessary and it's no easy to achieve, as it should be developed not only for future needs but also for motives of knowledge transfer. The university should be always ready to promote the transfer of knowledge to the industry not only because of social obligations but also for financial implications.

However, it does not mean that only the finance is motive of existence of cooperation. There is certainly not only a legal but also a moral obligation. This collaboration certainly depends largely on the established traditions and needs. In some societies, it even has a status, in addition to teaching and scientific research, the third mission of universities, which indicates the importance and the need of it.

It turned out that just the obligation to cooperate is not enough, if there is not a real and genuine interest, which not only binds but also integrate partners. In this sense, transfer of academic knowledge should be understood as an activity with the aim of enabling and facilitating industry to adopt and effectively use it, so it is very important to create mechanisms that will assist with improving knowledge transfer.

The Universities shall, instead of emphasis to learning, the most urgently transform their orientation: connect learning to research and put it into a function of the economy.

Industrial organizations are both the generators of new knowledge through research and development implemented in the corporate sector and the subject of demand for developments created in the environment being external for organizations that are in the research and development sector.

In order to improve the partnership between universities and business it is necessary, as already noted, to define a methodology of development of knowledge and training of specialists in marketing and sales, management, finance, organization and project management, the transition from idea to innovation, the legal protection of innovations, preparation and patent protection and so on. Also, it is necessary to have the skills required for planning, management and organization of human resources. Training professionals with mentioned knowledge are need both in universities and in enterprises.

To increase the effect of the University contribution to regional development, it is necessary to take into account the ways to overcome barriers, capacity building, implementation of partnership and connecting partners in the regional innovation system. These methods should be developed systematically in the form of instructions, so that they can represent practical tool and methodological support to designers of national and regional policies responsible for creating and implementing innovative strategies, of which all regions should benefit particularly in the area of university mergers research experiences with growth of competitiveness of the regions.

These instructions seek to:

- provide an analysis of how universities can impact upon regions and how they can be mobilized for regional economic, social and cultural development,
- illustrate (by use of examples from around the EU) some of the potential delivery mechanisms that can be used to maximize the contribution of universities to regional growth,
- outlines the key success factors in building university-regional partnership, particularly the drivers and barriers on both sides behind such partnership is working, and how these barriers may be overcome.

In order to effectively engage universities, public authorities need to understand the principles underlying why universities can be important agents in regional development. There is also a range of mechanisms available to support engagement, many of which are already being deployed. However, it is the strategic coordination of these within a wider policy context that will produce the maximum impact.

It is important to recognize that there may well be a series of complex barriers and challenges to be overcome, both internal to the universities and in the wider enabling environment.

While these instructions should be focuses on what the region can ‘get’ from its universities, it should be recognized that this is a two way process and the university benefits from its presence in the region as well. Universities should appreciate and maximize the potential of the opportunity that their region presents and

shows interest for their research.

In addition to this universities should serve regions to accurately present their capabilities for easier connection with the universities themselves and with relevant international institutions. Also, it is of crucial interest to link the main points of knowledge transfer, which are education, research and innovation, the so-called knowledge triangle.

It is necessary to analyse how universities can influence the development of the region, what mechanisms are needed to maximize the impact of universities on regional development, how to remove barriers to building partnerships on both sides, and how to mobilize the capacity of the university to have a positive effect on regional development. In order to achieve that, it is necessary to know the principles that emphasize the importance of universities in regional development and successful application of new achievements in technological development. It is also important to realize that this is a two-way process and that universities certainly have an interest in connecting with companies.

It is necessary to focus on developing the capabilities and skills in all education, research and business.

In education should focus on the transformation of existing education programs involving innovative and entrepreneurial skills and knowledge, related to knowledge triangle in the existing modules. It is recommended to organize summer schools, student and teacher mobility, and industrial projects and internships, to complement this.

Concerning research, technological development committee of the Ministry of Education and Science should, in the selection of future projects, more valorise innovative oriented projects which are oriented to development and experimental research. Also, it should be more encouraged the exchange of ideas and results, preparing joint initiatives, research networking and mobility.

Business should be focused on providing end-to-end tools for quick turning research results to successful innovation in an accessible, flexible, and agile manner. This set of measures will foster innovation on both the entrepreneurial and the industrial path. A key goal is to create an open market for problems and solutions by matching research results with potential entrepreneurs or industry partners.

All this involves the coordination of activities in education, technology and innovation and entrepreneurship. These activities should be designed, developed, and implemented by a very reasonable balance of top rank industries, research centres, universities and business schools, and actors of the knowledge triangle.

5. Innovation Culture at University

Advances in learning sciences, including cognitive science, neuroscience, education, and social sciences, give us greater understanding of the three connected types of human learning:

- factual knowledge („*that"* or *facts*),
- procedural knowledge („*how"* or *skills*), and
- motivational engagement („*why"* or *urgency*), corresponding to each of the three main areas of the human brain.

They should take advantage of research into brain activity and apply the appropriate behavioural science and technology to optimise individual learning, but also teaching methods.

Creativity and innovation on an individual basis occur all the time in everyday life when people adapt to their surroundings. Creativity and innovations that change society on a larger scale, in terms of new products or processes, can only occur in a system where different actors with diverse backgrounds and competencies are able to act together.

At universities should be introduced new features, which include basic knowledge of the vertices of the knowledge triangle with an emphasis on innovation.

6. Concluding Remarks

As a result of the project KNOWTS, at three universities in Serbia are established technology transfer offices, and at Belgrade University, it has contributed to the rapid development of already founded current office.

In this way, the at universities will foster a new generation of young specialists with an integrated view of research, education, innovation and business, combined with a spirit to transform ideas into business and to make a societal difference.

This involves close cooperation between researchers, students, innovators and entrepreneurs. This can be achieved if the company closely involved in education in order to participate in it and defining its need for highly trained and skilled labour force. It is also necessary to achieve a spatial and organizational mobility of students, researchers and entrepreneurs by promoting openness and creativity, to develop better methods of selection of outstanding researchers, students and entrepreneurs who promote scientific and creatively behaviour.

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