

# Entrepreneurial University as Contemporary Paradigm of 21<sup>st</sup> Century

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*Abstract: This manuscript is presenting some of the activities of University in Belgrade, as the largest academic institution in Serbia, in development of the adequate conditions for technology transfer and connections between research, industry and SMEs. The activities of the Center for technology transfer are additionally described by its representatives and introduced in the manuscript. Also, some activities of Technical faculty in Bor, in developing the entrepreneurial way of thinking of young population in the region of Eastern Serbia, are also discussed.*

*Keywords: Entrepreneurial University, Knowledge Transfer, Entrepreneurial skills*

## 1 Introduction

The mutual relationship between the university and industry through the exchange of knowledge has become a global trend recently [1]. Many European countries have introduced reforms and policy initiatives to encourage and improve university technology and knowledge transfer [2]. Following these trends, a number of universities have transformed themselves from a traditional research university to an entrepreneurial university with strong relations to industry and SMEs, thereby encouraging and promoting the entrepreneurial activities of their teaching staff [3].

In accordance to different authors, the role of the entrepreneurial university is not simply producing new knowledge, but also disseminating this new knowledge to industry and society [4]. The entrepreneurial university also tries to provide a culture and suitable atmosphere for encouraging academics to disseminate their

knowledge through traditional academic activities as well as through activities that are more entrepreneurial in nature [5]. Also, the entrepreneurial university as a concept, have to be based on many changes to university routines, culture and policies.

However, In spite of all the initiatives, educational policy modifications and changes and desire to create entrepreneurial universities, even today there is a question on how the entrepreneurial orientation within a university may influence academics' willingness for engagement in different new activities [4]. Meaning that transforming from classical to entrepreneurial university requires engagement of almost all teaching staff, wiling to adopt changes in their everyday educational practice. Also, actual involvement in entrepreneurial activities is largely associated with the environment surrounding academics. Namely, research of authors [6], which was conducted 20 year ago, has emphasized that the environment in which an individual works is likely to have a great influence on an individual's behavior. As stressed by D'Este and Patel [7], the environmental factors mainly influencing an academic's behavior are university culture, policies and routines. In many cases, even at universities operating in countries with highly developed market economies, this can be an obstacle. The lack of entrepreneurial role models, the absence of an entrepreneurial culture across the institution, and the reward system are some of the main barriers in increasing the entrepreneurial patterns of the universities, even in recent year as described in [4,5]. The obstacles in introducing the entrepreneurial university concept, in contemporary academia space of EU were also investigated and presented in [8]. This is even more evident in case of Serbian academic space, considering that limited resources can be dedicated to university development under the transitional economy.

The importance of the Entrepreneurial University concept in European Union is also evidenced by development of "A Guiding Framework for Entrepreneurial Universities" [9]. The Guiding Framework is aimed at those European universities looking for advice, ideas and inspiration for the effective management of institutional and cultural change. It is designed to help interested universities assess themselves against statements which are organized under the seven areas of Entrepreneurial universities concept, presented in Figure 1.

Having all above in mind, following text is describing some of the attempts of the University of Belgrade, as the largest academic institution in Serbia, in developing strong connections between research and teaching activities, on one side, and requirements of the industry and SMEs, on another. Also, some examples of activities targeting development entrepreneurial way of thinking, among young population in Eastern Serbia, facilitated by Technical faculty in Bor, are presented. The idea of this manuscript is to explore the possibility and applicability of the concept of entrepreneurial university and accordingly to draw attention on the importance of a new approach in higher education.

## 2 Initiative at university of Belgrade for developing the base for entrepreneurial university

The University of Belgrade (UB) is the oldest and the largest university in Serbia with over 89.000 students and 5.000 teachers and associates. According to the Shanghai list, it is ranked among the top 400 universities in the world. The UB comprises 31 faculties, 11 Institutes, 7 Centers and a University library, which all work together on achieving academic excellence. Although being a large academic institution with complex organizational structure can be a limiting factor in the attempt to reposition itself from its traditional role, the University of Belgrade is making continuous efforts in order to contribute to the development of a national innovation system and the creation of an economy and society based on knowledge, transfer of knowledge and entrepreneurial activities.



Figure 1

Seven factors for assessing the entrepreneurial activities of the universities as defined by EC-OECD

Considering that establishing, fostering and developing cooperation with other universities, organizations and enterprises all over the world, and strengthening the bonds between them, has been an everlasting commitment of the University of Belgrade, forming of the Center for Technology Transfer (CTT), primarily for the purpose of identification, protection and commercialization of UB's R&D results, was only the next logical step in the direction of preparing the base for evolving in to the entrepreneurial university.

Therefore, the importance of investment in intellectual potential, technology transfer and protection of scientific research results was acknowledged as one of

the foremost prerequisites for further successful development in the entrepreneurial direction.

The Center for Technology Transfer plays a supportive role through its promotional, educational and networking activities. It helps students and university employees to recognize the existence of innovation potential, to understand the relevance of its protection, possible ways of commercial exploitation and the complexity of the whole technology transfer process. Also, trainings, seminars, info days, and joint events with the industry representatives are being organized for the purpose of educating targeted groups in the area of entrepreneurship, commercialization and intellectual property rights. Considering that investments are indispensable precondition for further growth, Center endeavors to help young researchers to make an excellent pitch and present their idea in the best possible way in order to attract investors. In this respect, there is a permanent strive for creation of startup competitions and matchmaking events, as the opportunity for good ideas to find a way to the market.

The Center's Technology Transfer Managers are creating new and strengthening the existing connections with other universities, organizations and enterprises, through involvement with different associations which promote the Technology Transfer concept, as well as taking part in mentoring programmes with the aim to support future entrepreneurs during their path from the idea up to setting up business. Basically, they make maximum effort to create an ecosystem which is going to be beneficial for innovational initiative of students, researchers and teachers, simultaneously providing easy access to suitable staff, research projects, technical solutions, and portfolio of inventions needed by industry.

A part of this effort is embodied in the form of „Science2Business“ database, which was created as a response to increasing need for intensification of collaboration between academia and industry, and informing the broader audience about the scientific potential of University of Belgrade.

The process of technology transfer and the role of the Center are presented in Figure 2.

Technology transfer process

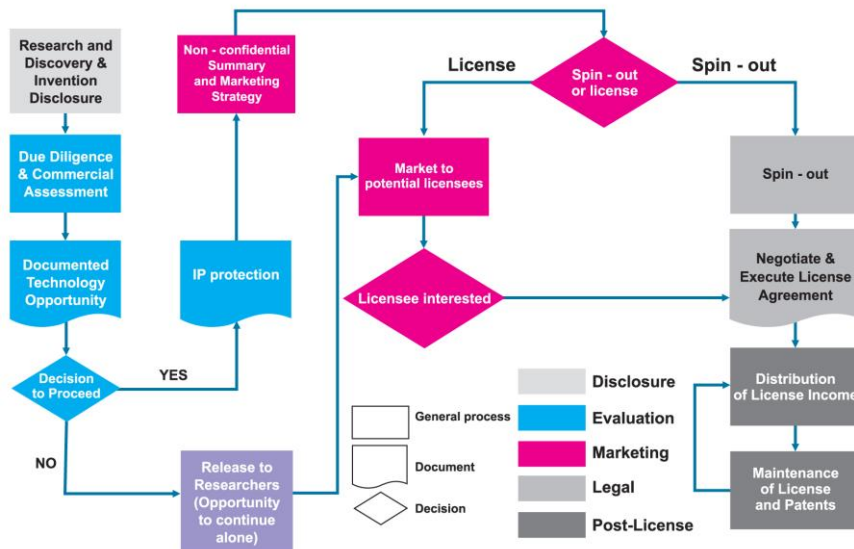


Figure 2

The process of technology transfer at the UB [10]

Database facilitates transfer and implementation of knowledge and technology in favor of prosperity of both sectors and indirectly of sustainable, knowledge based economic development of the country. It enables companies to get the information about new technologies and knowledge easy and efficiently, which is the best way to protect and enhance their competitive advantage in the era of turbulent technological progress.

As a modern communication channel, designed to be useful service for all involved parties, “Science2Business” contributes to generation of their economic benefits through joint research activities, development of new and improvement of the existing products, joint participation in national and international projects and business idea creation.

Although still in developing phase, establishing of Center for technology transfer in the scope of the University is clear indicator of its decisiveness to initiate and encourage entrepreneurial spirit within itself. Taking all the above into consideration, Center has made remarkable results creating entrepreneurial and innovation friendly environment through its numerous activities in that field and it is eager to continue in the same direction in the future.

## **2.1 Initiatives of Technical faculty in Bor in increasing the entrepreneurial spirit of youth in frame of the HE**

Technical Faculty (TF) in Bor was established in the year 1961 as a part of the University of Belgrade as a scientific-research organization in the area of technical-technological science. Main activities on TF Bor could be divided into two groups. The first is focused on providing a highest level of academic studies possible, in order to provide the students with the applicable knowledge, technical and managerial skills, which are required by business organizations. Academic studies are organized for approximately 1,400 students at BSc, MSc and PhD level. Second group of activities are projects in which our scientific staff is engaged.

Also, Technical faculty in Bor is active in publishing, being the publisher of two International Scientific Journals: Journal of Mining and Metallurgy, Section B: Metallurgy (indexed on Thompson Reuters List) [www.jmmab.com](http://www.jmmab.com) and Serbian Journal of Management (indexed by EBSCO Publishing and SCOPUS) [www.sjm06.com](http://www.sjm06.com).

There are four divisions at the Faculty, e.g.: The Division for management; The Division for Inorganic chemical technology; The Division for metallurgy and the division for mining. Technical faculty in Bor is a member of University of Belgrade (UB), together with 30 other faculties. However, TF Bor has one particularity. It is the only one of 31 UB faculties, which is located outside Belgrade, being located in Eastern Serbia, in city of Bor, which is 250 km away from Serbian capitol. There is a strong reason for this. The city of Bor is one of the largest copper producing centers in the Europe. For more than one century copper ore is mined and extracted there in the mining and metallurgical company RTB – Bor. Being as such, the TF Bor, is developed to sustain this industry and to educate engineers which will be employed in this large company.

Such situation has many positive, but also some negative, consequences. The positive consequences are in the fact that TF Bor is strangely connected with the industry since the beginning. There are lots of places for experimental work and practice of our students, which have direct links to industry of the RTB Bor Company. Also, development of the study programs at TF Bor was largely influenced by the requirement of the company. On the other hand, the negative consequences of this situation reflect the low development of entrepreneurial initiative in the region of the city of Bor. The reason for this should be found in the fact, that in the past, most of the high school and university graduates from this region were automatically employed in the RTB Bor Company. Sometimes, students were employed on their final years, because of expansions of the company. Accordingly, nobody even thought about possibility to start their own business in those days. However, during nineties, the economic situation in Serbia largely changed, leading to decrease of the RTB Bor Company capacities and resulting with downsizing. Instantly, the region faced large number of laid off employees and decrease of employability of newly graduated students. This was a

wakeup call to start thinking about entrepreneurial activities as the alternative to large industry of this region. Accordingly, TF Bor gain its primarily role again in responding to the needs of the region, and 13 years ago developed the Management department, with one of the goals to offer the entrepreneurial skills and knowledge to its management students. Entrepreneurial disciplines are among main courses included in the Engineering Management Department (EMD) curriculum (<http://menadzment.tf.bor.ac.rs/english/curriculum/>).

However, at TFB it was realized that it was not enough. It was realized that the most important issue is in development of “entrepreneurial spirit” among younger population (high school and elementary school students) of the region of Eastern Serbia, where TFB is located, which will lead to change toward entrepreneurial DNA [11]. Development of the entrepreneurial spirit, in the young population of the region, will at the same time lead to crating the new jobs by self-employment. Accordingly, Engineering Management Department (EMD) of TF Bor, UB, started its campaign and engagement in the projects dedicated to increase entrepreneurial potential among young people of the region.

One of the first action in this direction was connecting with Hewlett Packard (HP) LIFE program for promotion of entrepreneurial way of thinking among high school students and potential entrepreneurs, using the everyday ICT technology with which this target group is familiar. The goal of this program is achieved through development of entrepreneurial spirit, working on entrepreneurial ideas and sustaining the ideas with adequate knowledge from the field of business, as well as the field of informational communicational technologies (ICT). Education according the HP LIFE program is organized in 49 countries around the world. Technical faculty in Bor is the only accredited partner of this program in Serbia. The program was originally developed as the GET IT project, managed by Micro Enterprise Acceleration Institute - MEA I (Switzerland). Since the early beginning of this program was in 2008, when MEA-I and HP developed GET-IT project, Technical faculty in Bor was actively involved. As a participating organization, Technical faculty in Bor, received grant of HP equipment, the T-Tools Guidance course for their trainers and the T-Tools training materials.

The LIFE Program trainings are based on integration of Business Skills Courses and Technology Courses, this way resulting in Business Challenges and Technology Solutions, as presented in Figure 3 (<http://www.life-global.org/>). There is a reason for this attempt in development of entrepreneurial spirit among young population based on ICT. Today almost all high school and university students do have access to PCs, mobile phones and other ICT devices. Unfortunately in most cases, they use this equipment in personal entertainment. The Purpose of this education is to teach them to use the same technology in business and entrepreneurial activities [12].



Figure 3

Finding the solutions to business challenges based on technology

This means that none of the technology covered in the LIFE Curriculum is taught just for technology's sake. Rather, the technology covered here is applied to business to show how common, widely available ICT tools can help solve common, widely encountered business challenges – all with the goal of helping businesses run more smoothly and grow more quickly.

The training is organized in the concept of workshops with interactive approach to presented subjects and using contemporary methodological concept. Four modules which are included in the training, according to HP LIFE program are: Marketing, Operations, Communication and Finance (Figure 4). Each of the modules is further developed in five segments: Imagine Plan, Start, Grow and Innovation. This way, curriculum includes  $4 \times 5 = 20$  subjects. Each subject is worked out separately through adequate methodological approach. Also, adequate modules levels are chosen for the level of prior knowledge of the high school or the faculty students. The training is organized for groups with 10 to 20 attendants in computer rooms equipped with at list 10 Personal computers (PCs). Software required for the trainings are provided by the HP LIFE program, however most of the applications are based on the open source and publicly available. Each modules subject is based on different ICT application. Trainings for one group of students are 5 days long (15 to 20 hours in total).



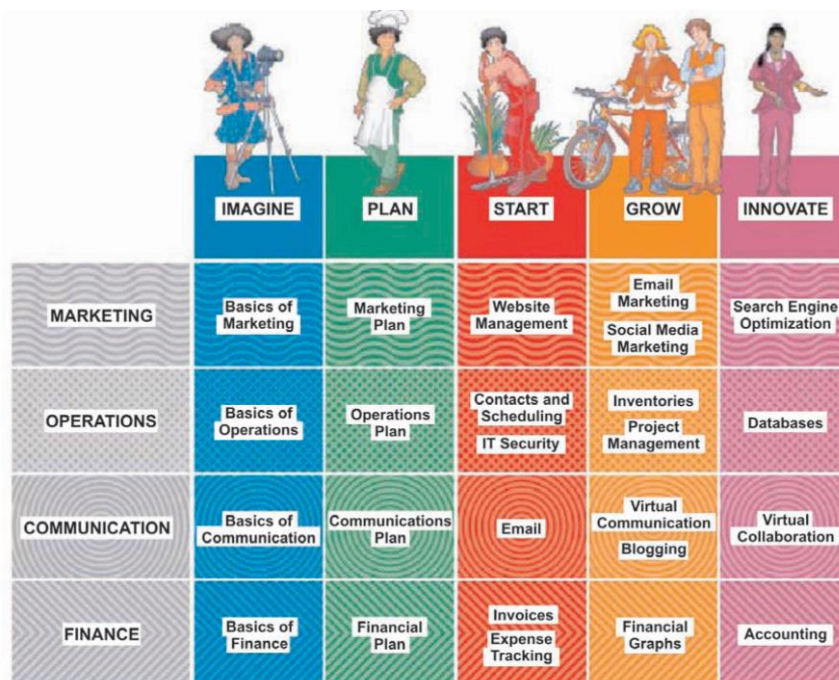


Figure 4

Modules of the HP LIFE program which are included in TFB curriculum

**IMAGINE** is the first level of the LIFE Curriculum. IMAGINE addresses people who have no background in business and who are still only dreaming of setting up their own enterprise. IMAGINE offers them training on business concepts, helping them build the foundations of their entrepreneurial thinking. IMAGINE teaches them different types of business analysis while at the same time introducing them to basic technologies that can be used to build these analyses in a professional manner.

**PLAN** is the second level of the LIFE Curriculum. PLAN addresses people who do not have their own company yet, but who have a good grasp on fundamental business concepts and an idea of the business they would like to start. It teaches them how to translate their idea into a well-researched and structured Business Plan. PLAN introduces further features of the same technological tools covered in the IMAGINE level, giving students the skills necessary to build a flexible and presentable Business Plan.

**START** is the third level of the LIFE Curriculum. START addresses potential beginners in business to help them develop their basic ICT skills so they can run their company as effectively as possible from the very beginning. The START level of the Curriculum is equally applicable to more established micro-enterprise owners who have considerable business experience but who are not in the habit of

using information and communication technologies to manage and run their company.

**GROW** is the fourth level of the LIFE Curriculum. GROW focuses on more advanced technology for business skills and gives the advanced students the chance to learn about more complex technologies. The content of the GROW level of the Curriculum builds on the skills acquired in the START level, introducing more advanced features of certain technologies as well as entirely new solutions, many of which include Web 2.0 components.

**INOVATE** is the fifth level of the LIFE Curriculum. INNOVATE addresses future entrepreneurs who are looking to optimize their operational tasks by undergoing training on more sophisticated technologies for business. INNOVATE builds on the technologies covered in the previous levels of the Curriculum to give potential entrepreneurs who are knowledgeable in business and skilled in technology the opportunity to learn how complex applications can be integrated to help them take their business one step further.

The LIFE Curriculum teaching methodology, was designed for business oriented young and adult learners. There are two key pedagogical concepts that underpin this methodology: the Experiential Learning Cycle (ELC) and the Business-Technology-Business (BTB) framework. Research has shown that adults learn best in a hands-on activity way. The ELC works as follows: Every topic in the LIFE Curriculum begins with students acquiring some new theoretical information. Then, students process that information through a practical exercise – in other words, a hands-on experience. After that, students reflect on what they learned and discuss how they might apply and consolidate their newly acquired knowledge. Then, they go into the real world and apply what they have learned. BTB means that every LIFE Curriculum topic begins with a common business challenge faced by a typical entrepreneur, anywhere in the world. By working on a business-related case study, students identify and discuss a particular business challenge. Then, the trainer introduces a technological solution to that challenge. The class is shown some of the benefits of the technological solution and taught how to use it through a hands-on exercise. Finally, the trainer guides the class back into the domain of business and encourages the students to discuss how to use the technological tool in the real business world.

Starting for the year 2009, the HP LIFE program was included in the curriculum of the Engineering Management Department, as the regular third year subject at the BSc level. Also, from 2012 this program is also offered to the high school students in the Bor region. Now, in 2016 there is additional attempt to further expand this program in the neighboring region of Vidin (Bulgaria), through IPA cross border cooperation projects.

## Conclusions

This manuscript is written in form of report, presenting some of the activities of University of Belgrade (UB) in creating the bases for enabling larger entrepreneurial activities of the academic institutions in Serbia, which are the part of UB. As presented in this manuscript, the final concept of Entrepreneurial University in Serbia is not established yet, however, there are concrete actions which are leading to development of basic conditions for introducing this concept in our academic environment in the future.

Also, second part of the manuscript is presenting the activities of Technical faculty in Bor (TF Bor), as part of UB located in Eastern Serbia, in developing the entrepreneurial spirit among young population of this region. Besides presenting activities facilitated in the past and present, some ideas for further action in this field are also elaborated.

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