IF4TM

Institutional framework for development
of the third mission of universities in Serbia

Operational manual for implementation of 3M

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IF4TM

D2.5 Operational manual for implementation of the third mission with recommendations to faculties/institutes/high schools

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Abstract	Operational manual for implementation of the third mission with recommendations to faculties/institutes/high schools. The Manual includes the set of recommendations and guidelines to Serbian HEIs (universities, faculties, institutes, high schools) on how to establish the legal framework and procedures for successful implementation of the third mission. In that sense, models of by-laws and contracts and templates for various forms will be provided. Besides these, the Manual will also include definitions of all three third mission dimensions with supporting metrics. As the third mission activities will be implemented and developed throughout the project, the Manual will be updated accordingly

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LIST OF ABBREVIATIONS

BSO	Business Support Office
CE	Continuing education
D	Deliverable
ECTS	European Credit Transfer and Accumulation System
EPO	European Patent Office
EU	European Union
HEI	Higher Education Institution
HR	Human resources
IP	Intellectual property
IPA	Instrument for Pre-Accession Assistance
IPR	Intellectual Property Rights
KTT	Knowledge and technology transfer
LLL	Lifelong Learning
NGO	Non-government organization
POC	Proof of Concept Programme
R&D	Research and Development
SME	Small and medium enterprise
TRL	Technology Readiness Level
TSNA	Training and service needs analysis
TTC	Technology Transfer Center
TTI	Technology transfer and innovations
USA	United States of America
WIPO	World Intellectual Property Organization

EXECUTIVE SUMMARY

Operational manual for implementation of the third mission with recommendations to faculties/institutes/high schools includes the set of recommendations and guidelines to Serbian HEIs (universities, faculties, institutes, high schools) on how to establish the legal framework and procedures for successful implementation of the third mission. In that sense, models of by-laws and contracts and templates for various forms will be provided.

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1. Introduction

Universities as organizations traditionally dedicated to teaching and research were recently confronted with necessity to modernize in order to keep the pace with the demands of their social and economic environment. They faced ever-growing need for "marketization" and "socialization" which ultimately led to the changes in the understanding what their role in society is.

"*The growing importance of knowledge production and innovation for economic life has created new potential roles for universities and challenged the traditional societal privileges and monopolies which they have long enjoyed*" ("Reform of Higher Education in Europe", J. Enders, H.F. de Boer, D.F. Westerheijden, 2011)

Universities are today striving to integrate and incorporate their traditional missions to create human capital (Teaching – first mission) and to generate new knowledge (research – second mission) into newly shaped social and economic context. This strategy has become known as the "third mission" of the universities.

Third mission can be understood in numerous different ways.

"*The basic understanding derived from Molas-Gallart et al.'s (2002) framework is that the third mission is based on teaching and research missions and that it utilizes the knowledge capabilities and physical facilities of universities to serve society. The framework also shows that the TM includes not only the commercialization of academic knowledge, patenting and licensing and creation of spin-off companies but also the contributions of universities to policy-making and social and cultural life (see also Adamsone-Fiskovica et al., 2009; Ca, 2009; Gregersen et al., 2009; Krücken, Meier, & Müller, 2009; Montesinos, Carot, Martinez, & Mora, 2008; Schoen et al., 2006)*". (Source: Institutionalization of the 'Third Mission' of the University, HENRY MUGABI).

In Serbia, although universities have already been engaged in a number of different activities that fall into the third mission (lifelong learning, social engagement, knowledge transfer, innovations), the third mission as a concept has not been recognized as a strategic impulse. The very first time that this concept started shaping as strategic approach to universities development and modernization is with the Erasmus+ plus project IF4TM (Institutional framework for development of the third mission of universities in Serbia), which is why it can be considered a pioneer in the third mission development in Serbia.

Starting from the basics, the IF4TM analyzed the level of development and implementation of third mission activities at EU institutions and countries, finding in their experience the examples of good practice that can be custom-tailored for application in Serbia (D1.1 Review on EU policies and legal frameworks for establishing university third mission). With mapping of current state-of-art at Serbian existing legal framework (D.1.3 Report on existing strategies and laws in the Republic of Serbia related to third mission dimensions) and existing legislative at seven higher education institutions (D1.4 Reports on existing university regulatory documents and structures supporting third mission activities), it was able to identify the gaps to be overcome and challenges to be solved in order to establish the support system for the third mission (D1.5 Benchmarking report). Based on the findings, the communication was initiated with the relevant stakeholders at national and institutional level through organization of debate and round tables at Policy seminar (D1.2 Consolidated report

with recommendations drawn from the presentations and discussions at Policy Seminar) and a set of consensus meetings.

Based on the consensus reached on topics and next steps in the development and implementation of third mission, the set of recommendations were provided for the modification and adjustment of existing legal framework. In this process, the Draft of Law on Higher Education was prepared, Strategy on Scientific and Technological Development of the Republic of Serbia for the period 2016 – 2020 was developed and a draft of Action Plan was prepared, proposal for amendments of Law on Innovation activities was developed and Smart Specialization Strategy was initiated.

Based on the changes in national legislative, seven Serbian universities has started changing and modifying their institutional policies and procedure to support the successful application of national legislative and to enable the practical implementation of third mission activities.

Apart from establishing the legal ground to build up third mission concept, the IF4TM project proposed the set of concrete actions to strengthen several aspects of all three third mission dimensions

1. Technology transfer and innovations (Innovation platforms, Workshops “Methodology guide for innovation, Competition for best student ideas, Proof-of-concept programme)
2. Continuing education (Definition of integrative university approach in continuing education, Development and delivery of IP management, market strategy and start-up trainings)
3. Social engagement (social engagement plans, Creativity Centers, student volunteering, unlocking university resources, Open-innovation campaigns).

IF4TM also foresees the development of monitoring system through definition of set of metrics to follow the realization of proposed activities.

Although this initiative undertaken by IF4TM project will be implemented to a great extent at seven Serbian universities, it tends to scale up the impact and expand it to all higher education institution in Serbia. As results of this effort, this Manual is developed with the aim to share the findings of the comprehensive work and analysis conducted and to provide the set of guidelines, instructions and supporting documents to be used by the universities outside the IF4TM Consortium that wants to engage themselves in developing the third mission concept at their institution.

2. Implementation of dimension “Technology transfer and innovations (TTI)”

Technology transfer is the process during which results of scientific research are developed into practical application and thus commercialized in the form of product, process or service at the market. Technology transfer recognizes a number of commercialization forms such as licensing (in case of patent existence), joint projects of academy and industry (to combine the technology development with production), establishment of spin-offs (in case university itself wants to launch the technology to the market), etc.

Having in mind above mentioned, through the technology transfer, universities transform its research results into a marketable product, service or process that the society at large can benefit from.

However, before the technology transfer process is even initiated, it is crucial to protect the technology by the means of intellectual property rights, regardless of the type (patent, industrial design, trade mark, copy rights, know-how, business secret, etc.).

In order to develop the sound and efficient system of support to the development of technology transfer and innovations and implementation of their activities, a higher education institution needs to undertake several steps.

2.1 Institutional policy

A common agreement needs to be reached at the management level about the direction of a university’s development. Management structure needs to recognize TTI activities as essential in the process of modernization of its institution. That means that critical mass needs to be reached at the decision-making level in order to include the technology transfer into the mission and vision of institution in question (Statute).

Once this is achieved, it is recommended to develop a separate policy/strategy with set of strategic measures and supporting activities accompanied with an action plan.

Western Balkans Regional University Innovation Platform

The University Innovation Platform is a strategic publication developed within the WBCInno Tempus Project with the aim to support the development and growth of a range of technology transfer activities including commercialization of research, collaboration between universities and enterprises, and establishing start-ups and spin-offs. It considers the issues of managing and supporting these activities to optimize success as well as considering ways in which success can be measured and reported.

The University Innovation Platform is accompanied with the Action Plan, outlined in the generic terms so that it may be used for any individual Western Balkan university, particularly having in mind the specificity of each university and different levels of development.

Methodology Guide on Innovations

This strategic document aims at providing a methodology guide for the transformation of research to innovation. It focuses on two knowledge intensive sectors: Embedded Systems and Industrial Informatics, yet it could be also read from a broader audience. Focusing on the aforementioned sectors, it identifies as its starting point the existence of a prototype system that has been developed out of a promising idea and is in the state of laboratory prototype. Thus, the main audience of this document are researchers either from academia or SMEs or larger firms that have a novel idea and have proceeded in a prototypical development of this idea. The document aspires to provide them with helpful information on what are the next steps for the evolution of this development into an innovative product or service and its successful launching to the market.

Methodology for Innovation Management

The Methodology for Innovation Management is a strategic publication dealing with the different aspects of the innovation management process. It describes and more thoroughly explains:

- innovation management techniques, by providing ten recommended techniques that are most commonly used in innovation process
- intellectual property aspects with a preview of all types of intellectual property rights and the list of steps and procedures that need to be followed in order to protect those rights.
- innovation cycle phases with financial aspects describing in details the innovation cycle with its five stages (market research, analytic design and technical feasibility, detailed design and test, redesign and production, distribution and marketing)
- software support to innovation management in terms of the special innovation management techniques used and their benefits for end-users of software platform, accompanied with definition of project management workflows, assigned roles and responsibilities, etc.

While developing the institutional policies, the universities are strongly advised to build them upon the national strategies and law, such as following:

- Draft Law on higher education
- Law on innovation activity
- Law on science and research activity
- Set of laws on intellectual property rights
- Strategy of development of education in Serbia 2020
- Strategy on scientific and technological development of the Republic of Serbia 2016-2020 – “Research for innovations”
- Strategy on development of adults education in the Republic of Serbia
- Strategy of development of SMEs, entrepreneurship and competitiveness 2015-2020

- National recommendations for IP management at universities and institutes in Serbia.

In order to identify the gaps and define the relevant strategic measures, it is necessary to conduct benchmarking analysis through comparison between the state-of-the-art in the field of technology transfer and innovations at a university and selected referent universities recognized as examples of good practice (benchmarks). Once the existing gaps are identified and prioritized, the plan for overcoming these gaps in the forthcoming period need to be determined and presented in the form of the action plan as integrative part of the policy document.

Benchmarking report

Benchmarking report is a strategic document developed within the IF4TM project with the aim to address the challenge of finding the most suitable model to regulate the third mission at Serbian HEIs.

The report is based on the findings of benchmarking analysis of state-of-the-art in this area in the EU countries and institutions. This included the mapping and analyzes of the state-of-the-art in this area on the sample of ten higher education institutions from five EU countries (Austria, Italy, Portugal, UK and Slovenia). Parallel with this, the same analysis was conducted in Serbia at seven higher education institutions.

The analyzes results showed that existing legal framework in Serbia do tackle some of the aspects of third mission but this is far from sufficient to provide solid background to support its systematic establishment and development.

This is why besides giving insight in the state-of-the-art in the field of third mission in Serbia and EU, the Benchmarking report also identifies good EU practices that could be adopted in Serbia at national and institutional level and provides the set of recommendations how to reduce the identified gaps with the current practice in Serbia.

2.2 Development of institutional legal acts

In order to be make institutional policies applicable at the operational level, it is necessary to define the set of bylaws and other legal acts, grouped into three categories:

1. The bylaw regulating the internal rules for employees and students participating in creation of any of the forms of intellectual properties, including procedures for disclosure, ownership and transfer of intellectual property to the third party;
2. The bylaw defining management of intellectual property in collaborative and contracted research;
3. Bylaws defining procedures for commercialization of research results, regardless of the fact whether it is through selling, licensing, establishment of spin-off or in any other way.

2.2.1 Bylaw on IP management

The bylaw on IP management should define the procedure regulated by the relevant IP laws and the environment for organized assistance to authors and/or inventors related to the assessment, protection, registrations and industrial exploitation of the intellectual property generated at the university, including its member faculties, institutes and departments.

The subject of the bylaw is intellectual property generated as results of research, scientific and art activities at the universities, created using the university resources and should apply to:

- Employees of the university and its member faculties, institutes and departments
- Persons engaged in research and development projects at university
- Other persons dealing with research at the university and its members who provided their written consent to accept the provisions of this bylaw
- Persons under any kind of contractual obligations with the university and its members.

The bylaw should cover following forms of intellectual property:

- Patentable inventions
- Knowledge and experience that is not patentable or protectable by other forms of IPR, but are applicable in industry (*know how*)
- Industrial design
- Data bases protectable by the related rights
- Computer programs
- Plant variety
- Trademarks
- Topographies of semiconducting products

In order to apply the bylaw, it must be accompanied by the relevant forms:

- IP disclosure forms for different types of IP
- Form for reviewing of IP disclosure applications
- Form of a report on industrial applicability and exploitation of intellectual property
- Form for defining the profit share
- Technology assessment form

as well as guidelines and models of different contracts:

- Guidelines for the selection and application of the contract models
- Non-disclosures agreement model
- Technology assessment agreement
- Agreement on collaborative research and development
- Licensing contract
- Agreement on exchange of information

Universities should also establish a separate body (e.g. committee for protection of intellectual property) that will be responsible for providing the opinion on adequacy of protection, potential novelty, innovative level and industrial applicability of intellectual property generated at the university, as the ground for decision making at the management level.

2.2.2. Bylaw on reviewing procedure

In order to support the decision making process of an IP protection committee or other similar university bodies, it is necessary to review the submitted IP applications for disclosing the intellectual property generated at the university.

Reviewing procedure and procedure for selection of reviewers should be defined by a separate act or a bylaw.

Bylaw on application for reviewers and reviewing procedure should regulate the terms and conditions for review process, rights and obligations of reviewers and methodology for reviewing all applications for disclosure of intellectual property generated at university and any of its member institutions (faculties, institutes, etc.).

Examples of bylaws at Serbian HEIs

- Bylaw on IP management at University of Kragujevac
- Bylaw on application for reviewers and procedure for reviewing the IP disclosure applications
- Bylaw on legal protection, industrial exploitation of intellectual property and activities of Technology transfer center at the University of Belgrade
- Rulebook for Intellectual property rights (draft)
- Bylaw on activities of Technology Transfer Centre of the University of Nis

Guidelines and models of contracts and agreements from EU institutions:

- Recommendations for license agreement
- Recommendations and instructions for establishing of university spin-offs
- Recommendations and instructions for designing the contracts for university spin-offs
- Model of consultancy agreement
- Model of research collaboration contract

The special attention should be paid to those who are not under any kind of working contract but are actively involved in the research activities, such as students in the elaboration of their master and doctoral thesis, publishing the scientific papers.

2.2.3 Bylaw on Collaborative and Contract Research

The collaboration with the industry in the form of contract or collaborative research should be properly addressed in terms of internal legislative procedures. The regulations need to clearly define the rules, rights and obligations within the realization of this kind of research, considering at the same time the interests of both sides (academy and industry) in order not to create the additional burden but to encourage this kind of joint work.

One of the terms and conditions included in this kind of acts that need to be precisely defined is the right to use background intellectual property of partners, ownership of foreground intellectual property and share of the profit created upon the commercialized results.

Useful literature to help universities define this area can be found at following links

https://www.iprhelpdesk.eu/sites/default/files/newsdocuments/Fact-Sheet-How-to-Deal-with-IP-Issues-in-Transnational-Negotiations.pdf

https://www.gov.uk/guidance/model-agreements-for-collaborative-research

http://ec.europa.eu/invest-in-research/policy/crest_cross_en.htm

https://www.iprhelpdesk.eu/sites/default/files/newsdocuments/Fact-Sheet-IP-Joint-Ownership.pdf

https://www.iprhelpdesk.eu/node/1076

http://www.aal-europe.eu/wp-content/uploads/2012/07/AAL-Consortium-agreement-Guidelines-final-06.03.2012.pdf

2.2.4 Bylaw on establishment of spin-offs

Research conducted at higher education and research institutions combining the knowledge of highly educated researchers and high-tech equipment can result in products and processes with high commercialization potential. These research results do not necessarily need to be commercialized through licensing but idea of establishing the spin-off company should be considered as well.

Establishment of spin-offs is a form of entrepreneurial policy that need to be encouraged at all levels at higher education and research institutions (among students, researchers, professors). The researchers can be not only the innovators but also the founders, managers and consultants of the newly established spin-off companies.

This is why universities need to develop a **policy to support the entrepreneurial culture** among their professors, researchers and students indicating clearly the benefits at individual and professional, as well as the institutional and national level.

Additionally, in establishment and management of spin-off, it necessary to prevent any conflict of interest that may result from the cooperation of higher education or research institution with the spin-off. In order to avoid any risks, universities need to develop their **internal acts to define the policy for preventing the conflict of interests**, with accompanying procedures and contingency measures. By adopting such policy and with participation in appointing the spin-off management structure, universities and research organizations are in position to protect their interests. At the same time, spin-off management needs to act in the best interest of the company, not jeopardizing of course, the interests of the university/research institution.

Another important aspect is to define the **regulations and procedures for using the equipment, facilities and other resources of HEI** by spin-off company. The use of these resources need to be the subject of separate agreement/contract that will define the available resources, time and duration of their use, forms of remuneration, etc.

Even with all aspects properly defined and successful management of establishment procedure, the success of a spin-off is not secured. There are many risks for launching the innovation onto the market, including the financing of this process. At the moment of

establishment, neither the spin-off nor the university have the financial capacity to finance the spin-off innovative activities. In situation like this, universities need to provide the support in attracting the outside actors (signing the contracts with venture funds, for example).

2.3 Organization units dealing with TTI activities

2.3.1 Internal organization units

In order to exploit in the most efficient way the generated results of research, scientific and art work at the university, the entire technology transfer process needs to be managed in the most professional way.

This can be carried out by specialized center or office as the centralized university TTI unit that will be actively and professionally engaged in:

- Identification of scientific and research results with commercial potential
- Supporting faculties, institutes and its professors, researchers and students to protect the intellectual property generated
- Facilitating the transfer of research results into marketable products and services
- Promoting the technology transfer and innovations
- Establishing the cooperation with business sector
- Participating actively in establishment of spin-offs and start-ups
- Providing training for researchers (IP, innovations, technology transfer, knowledge transfer, etc.)
- Monitoring the TTI activities at the level of universities and its members
- Create the income from the commercialized research results for the unit, university as a whole and inventors of commercialized technologies and results.

The process of technology transfer, particularly the segment of protection and management of intellectual property generated at university and its faculties, should go through TTI units. By default, these units should be responsible for the realization of the processes defined by bylaws and other university legal acts and for securing their application throughout the university.

Technology Transfer Center at the University of Belgrade

Technology Transfer Center at the University of Kragujevac

Technology Transfer Center at the University of Nis

Danube Technology Center of the University of Novi Sad

2.3.2. Cooperation of university TTI unit with other organizational units and faculties within the university

If there are organizational units at the university dealing with complementary activities and some forms of TTI programs and mechanisms as explained in Section 2.5, it is recommended that TTI unit establishes sustainable forms of cooperation with clearly defined forms of cooperation and clearly defined roles and responsibilities. Innovation centers,

incubators or other units established at the member faculties dealing with technology transfer and innovations should be also included in this cooperation with TTI units at the university level.

Since in the process of intellectual property disclosure it is necessary that researcher/inventor submits information first the faculty first as their employer and TTI unit at the same time about the invention, this requires that every faculty appoints the contact points for receiving those information and cooperation with TTI unit through direct contact with their staff.

In the first, those contact points can be faculties' secretaries due to their legal background, particularly having in mind that IP disclosure can lead to some kind of legal IP protection.

Collaborative Training Centre (CTC)

Collaborative Training Centre of the University of Kragujevac develops and applies the innovative approach to product development and optimization of technological processes based on the virtual engineering technologies. Modern resources, trained staff and external experts make CTC services unique in this field and customized for domestic enterprises.

Besides services, CTC center also offers a whole set of customized trainings, and two specialized programmes (Practical Placement Programme and Industrial Fellowship Programme) that further strengthen the links of University and local and regional industry sector.

Business Support Offices (BSOKG, BSONS)

The main focus of Business Support Offices is on providing unique access to university knowledge and resources that are offered to the business environment. This concept is based on the mapping of research and innovation potential of the university and its presentation within the catalog (printed and online).

Besides this, the BSO Offices are involved in the maintenance of collaborative platform for innovation management (Student INNO Platform of University of Kragujevac and University of Novi Sad, respectively) for gathering and developing ideas and entrepreneurial ventures in the university environment, particularly through the Competition for best student ideas that is organized by the Office and Open Innovation Campaign.

2.3.3. Cooperation with external partners

Cooperation of university TTI units should not be limited only on internal units (university or faculties'), but should be intensively spread to the external partner institutions:

Incubators can provide the secure incubation environment for development of ideas, concepts and innovations coming from the professors, researchers and students into business ventures, particularly through providing of consultancy services, trainings (business plan development, validation of business model, financing, pitch presentations, etc.), networking, business infrastructure, etc.

Science and technology parks offer location and environment for university researchers for development and commercialization of technologies, and their transfer into viable commercial products. They can also

Serbian Innovation Fund contributes to the development of innovation by applying financial mechanisms that encourage establishment of new companies, investments into technology development and strengthening the link between the research and technology development and industrial sector. For cooperation with universities, the Innovation Fund has specially designed Technology Transfer Facility (TTF) that has two core objectives:

- To enable commercialization of research results
- To raise capacities of local TTI units by providing the opportunities for building practical skills and experience in technology transfer and commercialization field.

Serbian Business Angels Network is the first organization of this type in Serbia whose main goal is to connect Business Angels, individuals ready to invest in new business ideas and projects, and entrepreneurs with a developed business plan and a team of people ready to implement the idea and to develop the business project. Cooperation with this network could help providing additional financial resources and networking opportunities for the development of innovations at the university.

2.4 Building capacities and motivating university staff and students to engage in TTI activities

In order to ensure the efficient implementation of TTI activities, it is necessary to build capacities of HEI's human resources. During the mapping on continuing education activities at Serbian HEIs conducted in the beginning of 2017 within IF4TM project, one of the questions included in the questionnaire was related to the inclusion of topics such as entrepreneurship and intellectual property into the regular study programmes. Out of surveyed professors and researchers, 74% of them answered that they find it important to introduce IP topics in the regular curricula. With regards to the entrepreneurship as a topic, 22% conformed that this topic is already included in the curricula (as part of the subject or as the whole subject), while amongst the rest of them 51% that this topic should be included in the curricula in the future and 22% are against it.

These data clearly shows that there is a tendency to introduce TTI related topics in the study programmes, and HEIs are advised to take this into consideration while developing the strategy for building HR capacities in this field.

The following text describes some of the most common mechanisms to raise the level of HR competences in TTI area.

1. Capacity building za TTI units staff and other organizational units dealing with complementary activities at the university level through participation in the trainigns organized by Intellectual Property Office, European Patent Office, World Intellectual Property Organization and others.
2. Capacity building for university/faculty staff and students organized and delivered by trained TTI units staff, in the following areas:
    a. Application of IP policies and legal acts
    b. Entrepreneurship
    c. IP management
    d. Innovation management

e. And others.

3. Specialized subjects dealing with IP or even study units within the existing subjects can be incorporated into curriculum by university professors, in this way raising the capacities and skills of the students as the most promising and numerous population generating the new ideas and innovations.

It is of the crucial importance that students and professors of non-business disciplines are explained on the relevance of the entrepreneurship training, while students and lecturers of non-technical disciplines, should be introduced to basics of TTI. Usually, the link between these components seems to lack.

2.4.1 Trainings for TTI units

Serbian Intellectual Property Office has in its structure **Educational informative center** that organizes the set of trainings covering the topics such as intellectual property management, patents, searching the patent databases at both Serbian universities and IPO office premises. They organize basic and specialized trainings on the whole specter of IP topics for the participants of the various knowledge level (beginners and IP professionals).

Basic trainings on IP:

- IP basics
- Patents
- Trademarks
- Industrial design
- Copyright and related rights
- Indications of geographical origin
- Soft IP
- Benefits of using IP in business

Specialized Trainings on IP

- Database searches
- IP management
- IP valuation
- Enforcement of IP rights

One whole segment of the education is tailored especially for the universities, faculties and research institutions. In order to support public research and technology transfer, the Center provides support in the form of education through consultations and conducting training, seminars and workshops aimed at identification, protection, management and exploitation of the results of research as intellectual property created in institutions involved in research.

Topics that are included in this kind of seminars are as follows:

- IP policy workshop
- From idea to license part I
- IP basics for students
- IP basics for researchers
- Importance of IPR

2.4.2 Trainings for university staff

Serbian Intellectual Property Office, WIPO organizations and several projects (Erasmus+, Tempus, IPA) has already organized various trainings, seminars and workshops for **researchers and employees** at universities engaged in TTI activities to level up their knowledge in fields such as intellectual property, knowledge and technology transfer, innovations, etc. These events are provided with no participation fee.

Besides IPO and WIPO organizations, the similar trainings should be included in their regular activities and organized by TTI units (technology transfer centers, business support offices, lifelong learning centers, patent center, etc.). Some of the topics to be covered are:

- Legal framework and terms for TTI
- International cooperation in research and TTI
- Incentives system for staff engaged in TTI
- Cooperation between TTI units
- Benefits and risks of mediators in TTI process
- IP management in mobility programmes, etc.

2.4.3 Trainings for professors and students

Since students have been recognized as an important link creating IP capital in academic sector, European Patent Academy prepared the Patent Teaching Kit that was translated to Serbian and presented to Serbian universities by Serbian Intellectual Property Office. The Kit is designed to be used by universities' professors (particularly of technical universities and faculties) in order to present the patent system to students in several teaching units, application procedures and mechanism for searching the patent base.

Universities' and faculties' professors can also use the IP Teaching Kit that is currently available in English, and its Serbian version of extended package is being prepared in Serbian language. This Kit includes the teaching material for IP topics consisted of: i) IP Basics, ii) IP Advanced (package I and II), and iii) IP Search Tools. Besides these three modules, two additional are available at EPO website: IP Management and Case Studies that can be found useful.

Example of available workshops and trainings for university professors, researchers and students were organized at seven Serbian HEIs:

- Workshop "Methodology guide for innovation"
- Training on IP protection and IP Management
- Training on Market Strategy
- Start-up trainings

2.4.4. Funding opportunities for capacity building activities

In order to provide the financial support for the realization of capacity building activities, bringing experts from this area and networking with other training providers, universities are advised to encourage and raise capacity of their staff to apply for various grant schemes and

funding programmes in order to provide the financing of these activities. Programme schemes that offer this kind of opportunity are Erasmus+, Horizon2020, etc.

Please find more information at

https://eacea.ec.europa.eu/erasmus-plus_en

https://ec.europa.eu/programmes/horizon2020/

2.5 University mechanisms and programs for technology transfer and innovation

2.5.1 INNO platform

Although all Serbian HEIs have some type of TTI activities already established, mainly joint projects with business entities, provision of consulting services, organization of trainings, providing access to equipment and software, etc., it can be noticed that are no mechanisms to monitor these activities neither to collect more details on them.

This is why, it is recommended to all Serbian higher education institutions to make additional efforts to provide some kind of collaborative support tool for all existing and forthcoming activities related to the technology transfer and innovation. Introducing the collaborative software/online tool for innovation management would significantly contribute to the systematization of TTI activities and allow the monitoring of its realization.

With the introduction of such tool, it is necessary to provide the appropriate promotion on this tool to raise awareness on its necessity and benefits, as well as set of trainings for the use of such support tool.

Introducing this practice as mandatory would significantly speed up the process and overcome the problem of hesitant users.

In order to enhance innovation culture within scientific community and to facilitate development of ideas of students and researchers and match them with financial facilitators, five INNO web-based collaborative platform for innovation management were developed within WBCInno Tempus project. The Platform tends to provide the centralized and efficient innovation process from concept documenting, idea generation and management, through new product/service development, until market success.

Based on the experience from WBCInno project in using INNO platforms, for the purpose of development of sustainable solutions, within IF4TM project seven Student INNO platforms were developed and adjusted. These platforms are used for collections of ideas, their development and collaboration among the team members.

INNO student platform of the University of Kragujevac

INNO student platform of the University of Belgrade

INNO student platform of the University of Novi Sad

INNO student platform of the University of Niš

INNO student platform of the State University of Novi Pazar

INNO student platform of the University Metropolitan Belgrade

INNO student platform of the Technical College of Applied Sciences in Zrenjanin

2.5.2 Mapping and promotion of research and innovation potential

In order to identify existing intellectual property and resources and to improve the existing level of exploitation and commercialization of research results, it is necessary to systematically map and categorize universities resources.

Universities are advised to start and continuously dedicate themselves to regular mapping of existing units, services, technologies, trainings, etc. in order to have a clear picture on the innovation and TTI potential of the institution. This process should be conducted by universities' units dealing (in one form or another) with TTI (business support offices, technology transfer offices, etc.) at the level of university and its integrative members (faculties, institutes, departments, centers).

These units can use the mapping model developed within the WBCInno Tempus project and conducted by the Business Support Offices (BSO) at five HEIs in the region (two of them in Serbia, BSOKG at University of Kragujevac and BSONS at University of Novi Sad).

The mapping methodology can be found at Methodology for Collection Data, that includes the model questionnaire (Annex I), Invitation letter (Annex 2) and a table for Field of science and technology classification (Annex III). Mapping process should cover research entities (centers, laboratories, research groups), HR capacities (researchers, associates), resources (equipment, software, etc.), projects (international, national, with industry), achievements (methodology, technical solutions, services, trainings, patents, etc.).

The collected data need to be assessed and made publically available, either as the online or printed catalogue (e.g. http://www.bsokg.kg.ac.rs/, http://www.bsons.uns.ac.rs/, Catalogue on research and innovation potential of the University of Kragujevac, Catalogue on research and innovation potential of the University of Novi Sad). These should be published (printed or online) in both Serbian and English version to ensure the data are available not only in Serbia but also abroad so that foreign partners can establish the contact and cooperation with some research groups and units.

Online Catalogues of the research and innovation potential of the university collect the information on valuable research results, developed technologies, software, patents, licenses, specific methodologies trainings, commercial services, laboratory tests that can be commercialized and offered to users outside the university, primarily from enterprises.

Catalogue on Research and Innovation Potential of University of Kragujevac

Catalogue on Research and Innovation Potential of University in Novi Sad

WBCInno Tempus Project

2.5.3. Competition for best student ideas

Competition for best student ideas is one of the most efficient way to promote innovativeness and entrepreneurial spirit attracting and creating at the same critical mass necessary for change to take place.

In order to successfully organize the Competition and achieve the foreseen impact, it is necessary to develop the methodology that will define:

- Competition objectives
- Info package
- Competition rules
- Competition flow
- Platform for realization of competition
- Rewards
- Promotional activities
- Contact details of organization board
- Guidelines for participant.

Competition for best student ideas 2015

Competition for best student ideas started in 2015, within WBCInno project, at six WBC universities (University of Kragujevac, University of Novi Sad, University of Banja Luka, University of Zenica and University of Montenegro) from three WBC countries (Serbia, Montenegro, Bosnia and Herzegovina). After organization of seven local finals, and selection of two most promising ideas at each, the Regional Final Competition was organized in November 2015, in Belgrade. Upon the evaluation of the expert jury based on the predefined set of criteria, three best teams were selected and rewarded.

Competition for best student ideas 2017

Another round of competition was organized in in 2017, based on the previously used methodology adapted based on previous experience and new technical requirements of the collaborative platform. Students from seven Serbian HEIs participated (University of Kragujevac, University of Belgrade, University of Novi Sad, University of Nis, Belgrade Metropolitan University, Technical College of Applied Sciences in Zrenjanin). After seven local finals, two finalist were selected from each HEI who participated in the National final competition for best student idea in December 2017.

Competition for best student ideas 2018

In 2018, the local competitions gathered 155 students from 7 higher education institutions (University of Kragujevac, University of Belgrade, University of Novi Sad, University of Nis, Belgrade Metropolitan University, Technical College of Applied Sciences in Zrenjanin) who applied with 54 different ideas. Two best teams from each local competition participated in the National Final Competition that was held in Belgrade in November 2018.

Competition for best student ideas 2019

The Competition for best student ideas 2019 was organized with the same methodology as previous years. Sixty ideas were submitted by teams gathering the total of 185 students from 5 public and 1 private universities, and one college. The best teams competed for valuable awards on the National Finals in May 2019.

As an example of good practice, Serbian HEIs can rely on the Methodology for Competition that was developed for the first time within WBCInno Tempus project, and modified and updated with new elements within Erasmus+ project IF4TM.

Within the above-mentioned Competition, students apply in teams with their ideas and go through the set of start-up trainings to learn how to realize their ideas into business ventures. For that purpose, following trainings were developed:

- Business model development

- Business model validation
- Finance for start-ups
- Elevator pitch

Competition should be organized at least annually.

2.5.4. Student-industry innovation projects: Creative path to knowledge

Creative path to knowledge is a programme that targets students who in addition to their studies, wish to participate in “small research projects”. The focus is for these students to find creative and innovative solutions to practical challenges in the corporate sector. These students are guided by mentors offering expert support. The programme was created that students could gain competence and experience that are needed for transitioning from school into working life. The programme is supported by Ministry of education, science and sport and the European social fund and carried out by The Public Scholarship, Development, Disability and Maintenence Fund of the Republic of Slovenia.

The projects include many different fields and variations depending on the field of study. The environments can be very different as well, projects range from medical to chemical laboratories to forests and faculty gardens. Projects that the students participate in are extremely useful since they usually help society as a whole. Previous projects include musical lessons for infants, research and development of paraplegic clothing, online application for gene data analysis and for conducting bio information procedures and many more.

There are numerous benefits for this programme, it connects students, companies and education faculties. Students gain practical knowledge, experience as well as make connections that can further advance their future careers. Companies gain help with problem solving and find employment candidates. Faculties can connect theory with practice and can practically update their study programmes.

Competence gained from the programme include:

- Interdisciplinary and team work;
- Analytical and creative thinking and problem solving;
- Corporate and organizational competence;
- Communication skills.

Effects from this programme include:

- Increasing employability of students thanks to experience and competence;
- Actually employed students;
- Updating study syllabus. A new approach to employing young people in companies;
- Connections students create with companies.

This programme is a great way to learn how to work as team and find new ways to deal and solve challenges which can happen in working life. Students learn useful knowledge and skills. It’s a great way for students to network and make new connections in their own professional field and find employment.

2.5.5 Open Innovation Campaigns

Open innovation campaigns are strong motivational and promotional tools.

These should be organized in close cooperation with companies and innovation centers, technology parks, incubators, etc.

The concept of Open Innovation campaign relies on top-down mini projects that include the company that defines the challenge, i.e. the problem that needs to be solved and the open call for researchers/students to apply with their ideas in order to solve the defined problem.

Open Innovation Campaigns

Open Innovation is a concept that implies that companies can improve competitiveness on the market and reduce costs of research and development by opening up the challenges they face in their business environment in all phases of business process, from product development to the positioning on the market.

First call for Open Innovation Campaigns was announced in December 2017 at seven Serbian Universities:

- University of Kragujevac
- University of Belgrade
- University of Novi Sad
- University of Nis
- State University of Novi Pazar
- Belgrade Metropolitan University
- Technical College of Applied Sciences Zrenjanin

The Call was open for 15 challenges and during the first call 11 solutions was proposed by students and young researchers. The challenges were defined in close cooperation with successful innovative companies such as Intranea, Proenergy, Extent, Elplant, ICT Cluster of Central Serbia, Gorenje, NALED, SmartTarget, CAM Engineering, IGB Automotive d.o.o, Tourist organisation of Novi Pazar, ITU Plenipotentiary Resolution, Global Game Jam, Inc, etc (http://www.if4tm.kg.ac.rs/article/openinnovation-campaigns-on-inno-platforms-in-collaboration-with-enterprises.html).

The participants in OI campaign had the opportunity to present their solutions to the companies, and best solutions were selected. The winners at each campaign received rewards from the company that proposed the challenges:

- Money prize
- Internship opportunities
- Support in finding customers and business partners
- Further development of proposed solutions
- Shared sales
- Temporary work engagement
- Established partnerships
- Promotion of teams and developed solutions
- Realization of the idea
- Potential founding start-up company
- Opportunity to work on new joint challenges

For companies this is of great significance since it improves their competitive position and innovative capacities by including researchers and students in their innovative cycle and enabling the access to the fresh pool of ideas and high quality and highly motivated employees.

For students and researchers, on the other hand, the campaign boost development of creativity and entrepreneurial spirit, creating the possibility of later employment of most promising candidates.

Methodology for Open Innovation Campaigns

2.5.6. Proof-of-Concept Programme

In order to improve the capacity of HEIs to generate commercially exploitable research results, it is necessary to raise the Technology Readiness Level (TRL) of their research. TRL concept is based on the nine-stages of technology validation based on the level of development and "maturity" of technology in question, defined by USA Department of Defense and NASA:

1. Basic principles observed and reported
2. Technology concept and/or application formulated
3. Analytical and experimental critical function and/or characteristic proof of concept
4. Component and/or breadboard validation in laboratory environment
5. Component and/or breadboard validation in relevant environment
6. System/sub-system model or prototype demonstration in an operational environment
7. System prototype demonstration in an operational environment
8. Actual system completed and "flight qualified" through test and demonstration
9. Actual system flight proven through successful mission operations.

Since TTI units established at university level should deal with the identification of commercially exploitable technologies, their aim is define the TRL level of technology in question and apply the best mechanism to raise this level.

Very efficient way to raise technology readiness level (TRL) is to implement Proof-of-Concept (PoC) Programme developed within the IF4TM project and included in the Strategy of Scientific and Technological Development of the Republic of Serbia 2016-2020 – "Research for Innovation. The concept of PoC Programme is based on support to research teams with promising technologies in developing their research, valuating IP and developing the commercialization strategy.

Since PoC Programme should be implemented by TTI offices established at Serbian HEIs, their staff are advised to use the Operational manual for the implementation of PoC Programme. The Manual includes the criteria for selection of research teams to be supported by PoC Programme, application procedure, type of support to be provided, expected outcomes, financial and technical implementation of the Programme, reporting, etc.

Proof of Concept Program

The Program for raising Technology Readiness Level and its validation (PoC Program) supports the researchers from Serbian HEIs who develop technologies with the potential for commercialization and who need additional support for validation of their research results, technologies and laboratory prototypes, with the aim to raise their Technology Readiness Level and get closer to the market.

This kind of Program is realized for the first time in Serbia and during 2018, it was piloted at seven higher education institutions:

- University of Kragujevac
- University of Belgrade
- University of Novi Sad
- University of Nis
- State University of Novi Pazar
- Belgrade Metropolitan University
- Technical College of Applied Sciences Zrenjanin

Research teams from these institutions applied with their PoC projects for some of the support activities that were realized in the following period, in cooperation with Serbian and EU experts, such as:

- Mentoring and consultancy services in development of business model using Canvas method
- Support for evaluation of intellectual property
- Development of commercialization strategy
- Development of prototypes
- Access to modern equipment for development and validation of technologies
- Information on opportunities for funding through national and European funds
- Support for development of project proposals and applications
- Study visits to EU partner institutions in IF4TM project
- Assistance in preparation of pitch presentation for investors

The first call for PoC program was announced in in December 2017 at seven Serbian HEIs (University of Kragujevac, University of Belgrade, University of Novi Sad, University of Nis, Belgrade Metropolitan University, and Technical College of Applied Sciences in Zrenjanin).

For this call, fourteen applications were received, the majority of them from the fields of engineering (medical engineering, electrical engineering, electronic engineering, etc.).

In line with the pre-defined set of criteria, reviewers selected best 10 teams who presented their project at the event held in the Ministry of Education, Science and Technological Development in May 2018. During the meeting, the models of support were discussed.

In the following period, PoC teams received the support in terms of:

- Consultancy services
- Study visits
- Support in development of proposed projects, etc.

2.5.7 Support to establishment of start-up and spin-off companies

Encouraging the entrepreneurial spirit among the professors, teachers and students is essential for creation of innovative ecosystem at HEIs institutions. The start-up and spin-off landscape has just begun evolving in Serbia especially in the light of new law provisions that regulate this area.

Creation of start-ups and spin-offs are one of the most efficient mechanisms of commercialization of research that contributes to technology development and economic growth of the region gravitating around university centers.

This is why the support mechanisms for professors, researchers and students who want to engage in entrepreneurial needs to be developed. Some of recommended mechanisms can be:

- Professional development of researchers and students in the area of entrepreneurship (LLL courses, workshops, conferences, trainings)
- Promotion of entrepreneurial culture (public lectures, debates, promotion of examples of good practices)
- Development of services for professional orientation of students
- Organization of competitions and campaigns for best ideas or technology solutions (Competition for best student idea, Best technological innovations, Open innovation campaigns, etc.)
- And many others.

Faculty of Technical Sciences in Novi Sad – Serbian example of best practice

Recently the universities worldwide show the growing trend to transfer technologies through establishment of start-up and spin-off companies, rather than through technology transfer offices (licensing, selling patent, etc.). Those companies are able to commercialize the technology developed at the university through development of their own innovative products and services and their launch on the market.

In Serbia, according to the official information of the Serbian Business Registers Agency from 2014, the Faculty of Technical Sciences in Novi Sad generated 126 companies in previous 25 years with created income of 72 million EUR and provided jobs for 2525 employees (as presented in the table below).

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Income in mill EUR	21.4	25.45	29.13	36.62	42.19	49.37	64.78	72.52	71.70
Number of employees	490	676	849	971	1213	1435	1710	2037	2525
Income growth rate	129.5	18.9	14.5	25.7	15.2	17	31.2	11.9	-1.1
Employee growth rate		38	25.6	14.4	24.9	18.3	19.2	19.1	24

Today, Faculty of Technical Sciences in Novi Sad has 143 start-up and spin-off companies from the various fields, but most of them are from ICT sector.

http://www.uns.ac.rs/index.php/start-up-spin-off

2.5.8. Program for cooperation with enterprises

The efficiency of commercialization of research results to a great extent depends on the cooperation with external actors, particularly the private sector as potential investor and user of research results.

Some recommendations for the development of this kind of cooperation can be found in two strategy documents

- WBC Regional model of University-enterprise cooperation
- Knowledge and technology transfer between science and businesses: Academic KTT Offices` Experience and Good Practice

WBC Regional model of University-enterprise cooperation developed within WBCVMnet project is based on comprehensive analysis of collected EU models of university-enterprise cooperation, intensive communication and interviews in the WBC region, project partners and individual experts. This strategic publication offers comparative analysis of the state-of-the-art in the area of cooperation with enterprises between EU and WBC region, identified good practices and **seven recommended models** of cooperation that universities should develop taking into account the level of their development and other specificities:

- Establishment of Science and Technology Parks
- Organization of WBC Industrial Clusters
- Joint participation in FP7 and EUREKA projects
- Establishment of regional Collaborative-training and/or Life-long Learning centres
- Setting up of the Open Innovation Networks with SMEs
- Practical placements for students in industry
- Industrial fellowship programme (IFP) for graduates and/or employees from enterprise

Analysis of best practices was also conducted within IF4TM project on management of knowledge and technology process between academy and private sector. The findings are presented in the report Knowledge and technology transfer between science and businesses: Academic KTT Offices` Experience and Good Practice.

The report recommends eight most important modes of technology transfer between two sectors:

- R&D collaboration, contract research projects, scientific or technological services;
- Commercialization of R&D results by patenting, licensing
- Entrepreneurship (spin-outs from university, start-ups)
- Student mobility, career services
- Student projects with businesses
- Mobility of academics between science and businesses
- Involvement of businesses in curricula development
- Lifelong learning, training courses

The practice shows that the most effective results are achieved through collaborative and contracted research projects and services, which consequently requires the highest engagement of TTI units' staff.

On the other side, second highest engagement of TTI units' staff is required for providing support to researchers in patenting and licensing process, which has the weakest commercial impact for the university.

Student projects with enterprises and involvement of employers in the development of curricula have excellent long-term effects with minimum of university's and TTI units' staff engagement.

It is recommended that each university/HEIs choose the modes that suits best the specific nature of its scientific and research work, and will be the most beneficial for the institution.

2.6 Participation of university in establishment of innovative ecosystem at municipal and regional level

Innovation system needs to be supported by local economies and strong cooperation between industrial sector, universities/research institutes and public bodies in accordance with the concept of Triple Helix.

One of EU initiative to promote this concept and efficient use of public investments into research in order to achieve economic growth and social prosperity is the Smart Specialization Strategy. The objective of this strategy is to encourage regional innovativeness by focusing on comparative advantages of the regions, through:

- **Definition of region profile** and comparative advantages of the region, using several recommended methods such as analysis of scientific and technology indicators, export data, SWOT analysis, information on available human resources and their distribution through industrial sectors , investments in research and education, etc.
- Based on the defined profile of the region and with the active involvement of industry, universities/research institutes and local community, **research and innovation strategy** needs to be developed. The strategy should define plan for public and private investments, information on structural funds, and support measures for non-technological innovations.
- In accordance with the smart specialization strategy, it is recommended to establish **regional development agencies** that would be responsible for the coordination of research in priority areas defined by the smart specialization.
- Establishing new and modernizing the existing **innovation hubs** (accelerators, incubators, entrepreneurial networks) will lead to the creation of environment suitable for collaborative development of innovations and more rapid launching of innovative products and services on the market.
- **Directing the foreign technology transfer towards specialized regions** that already have companies and clusters dealing with similar technologies.

2.7 Monitoring

The progress of implementation of any activities related to the TTI, regardless whether they are legislative or operational, need to be properly monitored. For this purpose, a set of metrics or key performance indicators need to be developed and applied. As the source for development of metrics, HEIs can use the set of metrics developed within IF4TM project, presented in the table below and available at the following link (D6.2 Metrics for the third mission activities).

Besides the definition of monitoring procedure itself, each HEIs should appoint the body that will be responsible for collecting the data and monitoring the metrics.

Based on the information collected, regular reports should be submitted to HEI management.

Table 1: The list of possible indicators for measuring of progress or success in technology transfer and innovation dimension

No.	Indicator	Specific indicators
TT 1	Income from licenses per researcher (full-time equivalent)	The total amount of income gained through licensing university knowledge, measured in RSD, divided by the number of researchers of an institution measured in full-time equivalent
TT 2	Number of patents per researcher (full-time equivalent)	The total number of patents, national and international, held by the university/faculty divided by the number of researchers of an institution measured in full-time equivalent.
TT 3	Number of technical solutions applied on national or international level, per researcher (full-time equivalent)	The total number of technical solutions applied at national or international level divided by the number of researchers of an institution measured in full-time equivalent.
TT 4	Number of joint publications with at least one coauthor from economy sector outside of HEI, per researcher (full-time equivalent)	The total number of joint publications with at least one coauthor from economy sector (employed in company, business institution, NGO, government institution, business associations and similar nonacademic legal entity) divided by the number of researchers of an institution measured in full-time equivalent.
TT 5	Number of hours taught by external lecturers as a percentage of teaching hours in regular study programs	For this indicator, "external lecturer" corresponds "*predavač van radnog odnosa*" defined in article 80 of the Law on higher education of the Republic of Serbia. It could be a person who is self-employed or employed by an organization (including companies, NGOs and government bodies, excluding public and private higher-education institutions or research institutes). The number of hours includes in-class contact hours and excludes one-on-one counselling. Teaching hours in regular study programs counts contact hours in bachelor and master programs excluding CE programs.
TT 6	Final works, master works and doctoral thesis developed in cooperation with economy sector, per total number of students	The number of student final works, master and doctoral thesis that were realized in cooperation with economy sector (company, business institution, NGO, government institution, business associations and similar nonacademic legal entity) divided by the total number of students.
TT 7	Number of spin-offs established per researcher (full-time equivalent)	In this context, a spin-off is defined as a company that uses research results, and therefore either the university or a faculty owns a stake in this company, or the university has given official allowance to a researcher to start this company. Indicator should be divided in three categories. • I category: HEI is co-owner of company • II category: HEI decided not to accept co-ownership, 60 days after invention disclosure. • III category: Student start-up company, incubated or supported by expertise from the university/faculty. Institution could have part in start-up company profit.

TT 8	Earnings from contract research per researcher (full-time equivalent)	This amount in RSD, earned by the university and its faculties/departments/institutes within the reporting year through contract research, is divided by the number of researchers of an institution measured in full-time equivalent.
TT 9	Number collaborative research agreements with companies where technology transfer is included per researcher (full-time equivalent)	Total number of contracts between the university and profit-seeking companies where both partners jointly do research, and the research result should be commercialized by the company. The number includes all valid contracts, also those signed in earlier years, classified in following three categories: • EU financed research projects (Like H2020, must include TTI) • Cooperation of HEIs and companies (e.g. IF Collaborative grant scheme, etc.). • Collaborative projects of HEI and company with joint research and joint financing. Intellectual property issues must be defined by legal binding contract.
TT 10	Number of contracts for access to university space, facilities, equipment and services per researcher (full-time equivalent)	Total number of contracts between the university and non-academic partners (as defined above) that regulate the use of university facilities by the externals; these facilities include machinery and instruments, laboratories, class-rooms etc. Services include various aspects of university administration (like IT services, library use, facility management, payroll, financial management, etc.) but excluded contract research or teaching.
TT 11	Revenue from TTI activities realized on the market, provided from non-academic partners per researcher (full-time equivalent)	This amount in RSD, earned by the university and its faculties/departments/institutes within the reporting year through TTI activities realized on the market, charged from non-academic partners (as defined above) is divided by the number of researchers of an institution measured in full-time equivalent.
TT 12	Number of TTI events and competitions (not including knowledge competitions)	Head count of TTI events intended to innovation and entrepreneurship development, organized by university and its members, such as: • Competition for best student idea • Open innovation campaigns • Start-up weekends • Summer schools on TTI topics • Etc.

2.8. Financing of TTI activities

Universities need to be more actively engaged in attracting the necessary financial resources required for the development of innovations and commercialization of research results. Some of the mechanisms for securing the financially favorable environment for development of TTI that can be implemented at Serbian HEIs are:

- Promotion of available funding resources should be one of the activities of established university TTI units, with focus on following and regular dissemination of latest information on availability of various programs and funding schemes
- Encouraging research teams to participate at various events such as venture forums (Belgrade Venture Forum BgVF, Balkan venture forum) where they can present their innovative solutions to the investors from all over the world in order to attract necessary financial resources for further commercialization
- Crowdfunding model is internet-based principle for securing the financial resources for a project or business venture through collection of smaller funds from greater number of individuals willing to invest (Kickstarter, Indiegogo, Gofundme, etc.)
- Application for and participation in the Horizon 2020 program, biggest EU Research and Innovation programme ever with nearly €80 billion available over 7 years (2014 to 2020) for funding the research and innovation activities, commercialization, research capacity building, etc.
- Innovation Fund offers various funding programs such as
    - Mini grants for stimulating the creation of start-ups and/or spin-offs in the private sector by providing financing for development of innovative market-oriented technologies, products and services with significant commercial potential.
    - Matching grants which supports cooperation between SMEs and strategic partners (for instance: the private sector, research and development organizations, investment funds and venture capital funds), with the intention to increase private sector investment into projects of technology development and commercialization for new and improved products, services and technologies.
    - Innovation vouchers that enable SMEs to use the services of public research institutions (universities, faculties, institutes) in order to raise the innovative level of their products and become more competitive on the market.
- Linking with enterprises that have potential for expanding an existing business or improving the quality of the goods/services through licensing of research results and technologies generated at universities through mediation of TTI unit.

3. Implementation of dimension “Continuing education”

3.1 Institutional policy

As with any other dimension within the third mission, continuing education needs to be recognized as one of the priorities and included in the institution’s strategies and policies. Some institutions prefer to develop the separate strategies, such as Strategy for LifeLong Learning (University of Kragujevac, University of Belgrade), but it is important to integrate the strategic approach to continuing educations into statutory documents as well, i.e. to make continuing education a component of university’s mission and vision.

Apart from “umbrella” policy at institutional level, it is recommended to develop the set of accompanying procedures and documents to regulate this area, such as:

- strategy and accompanying procedures for introduction and approval of new CE courses in order to avoid the risk of duplicating the services and unnecessary expenditures
- establishment of the centralized unit at the level of HEI that will deal with records keeping, collecting data, monitoring the process of development and delivery of courses, report to HEIs management
- mandatory procedures for CE organizers to provide necessary information to centralized CE unit (statistic data, reports, revenue, level of expenditure, learning outcomes, etc.).

3.2 Legal framework

Introduction of an integrative approach is a way to deal with the complex system of continuous education in such a way that otherwise different and fragmented activities fulfil the main objective and mission of the organization resulting in an optimum performance in a cost effective and sustainable manner for the benefit of all involved actors.

Having this said, it is strongly recommended that HEIs management have in mind integrative function of CE approach while defining the institution’s policy and strategy for its development.

In practical terms, integrative approach can be achieved through regulating the area in the form of the **Bylaw on the CE activities** that will define the following **procedures**:

- registration and evaluation of courses at the university level in the integrative approach
- approval of courses, including the relevant university bodies/units
- publication of information on available courses
- reporting after the course realization
- issuing the certificates
- other relevant elements

Universities and faculties in Serbia conduct wide range of CE activities with different accreditation and recognition requirements.

There is a range of CE activities that are conducted by faculties and that due to their characteristics need to be **accredited externally** in accordance with the national legislative. These CE activities belong to following areas:

- education (short-cycle study programs, adult CE courses and programs of specialized professional training of pre-school and school teachers and associates) accredited by the Ministry of Education, Science and Technological Development,
- health care (specialization and continuing education) accredited by the Ministry of Health, and
- public management (professional education of employees in public administration) accredited by the National Academy within the Ministry of public administration and local self-government.

Detailed description of CE activities that require external accreditation is provided in the strategic document *D4.1 Guidelines for establishment of integrative approach in continuing education at the university level* .

On the other hand, the **internal accreditation** at the level of universities is recommended for those CE activities that belong to integrative approach and that are conducted by the faculties, faculties' and universities' organizational units.

This *Manual for implementation of third mission* focuses exactly on those CE activities that belong to integrative approach and the related procedures for their registration, evaluation, approval and issuing certificates. These CE activities are by definition conducted by the faculties and organizational units of the universities in duration of more than 12 hours and have ECTS credit system applied (as described in more details in Section 3.2 of this Manual).

3.2 Evaluation and approval of CE programs at university level

Integrative approach to continuing education activities should encompass the wide specter of courses that are realized at faculties and university units outside of formal education system, (i.e. the study programs) in order to promote existing or gain new skills. These courses within the integrative approach do not have external accreditation, but ECTS credits system can be applied and certificates issued by the university.

ECTS credits should be awarded if the following conditions are fulfilled:

- the course has been approved in accordance with the integrative approach procedure
- the course is designed for those with four-year secondary education or any level of higher education, regardless of employment status
- the course is realized in a manner defined by the integrative approach procedure, quality wise
- the participant attended more than 80% of the classes
- after the course has been realized, the participants passed the exam positive grades

The grading system for CE courses, ECTS credit system and the procedure of their approval within study programs need to be defined by the relevant bylaw at the higher education institution in question.

It is recommended that 1 ECTS credit is awarded for every 12 hours of active program. The courses with less than 12 hours, as well as all other forms of educational activities (workshops, debates, round tables, seminars, conferences, etc.) are not the part of integrative CE approach and can be realized at faculties and other organization units outside the defined procedures for CE integrative approach.

3.2.1 Procedure for the development and approval of the continuing education programs at university level

For all continuing education programs that belong to the integrative approach, a procedure for their development and approval needs to be defined at the level of university. This procedure is to be the integrated part of the Bylaw on Continuing Education Activities.

The recommended procedure for development and approval of CE programs is given in details in the strategic document D4.1 Guidelines for establishing the integrative approach in Continuing Education at the university level.

According to the procedure recommended in D4.1, after developing the continuing education program at faculty or department, the authors need to submit the Application for new continuing education program to the Dean or Vice-Dean for Teaching. In case that continuing education program is developed by the university organizational unit, the Application for approval is submitted first to the Rector or relevant Vice-Rector.

Application for the approval of the continuing education program includes the following:

- Filled in Application Form for approval of continuing education programs by the university's Committee (Annex 2.1 of the D4.1).
- Elaborate (Annex 2.2 of the D4.1) on introduction of new continuing education program that encompasses:
    - Reasons for introduction of new program
    - Description of participants profile
    - Assessment of the participants number in the following three years
    - Structure of continuing education program in case it is of modular type and includes more subjects connected with the joint aim to gain new competences of participants
    - Table with the program description (subject title, number of ECTS, place of realization, lecturers names, requirements for participation, duration, purpose and objectives, topics, expected learning outcomes, knowledge assessment and evaluation, etc.)
- Table of lecturers (Annex 2.3 of D4.1)
- CVs of all lecturers
- Description of space, equipment and other teaching materials to be used in realization of continuing education programs (Annex 2.4 of D4.1)

After signing the Application by the Dean or Rector as their consent to the proposal for introduction of new continuing education program and its realization, and Application need to be sent to the university's Committee for quality assurance and assessment for approval, whose working body will review the proposal for new continuing education program.

After a review, this working body can forward the proposal of continuing education program to the Committee to:

- Approve the program
- Return for adjustment with the recommendations what should be improved in the Application
- Reject the program with the explanation

Relevant information on the approved program or course are then entered into the university IT system and published at the university internet website on the page allocated for the purpose of promotion and publishing information for potential participants.

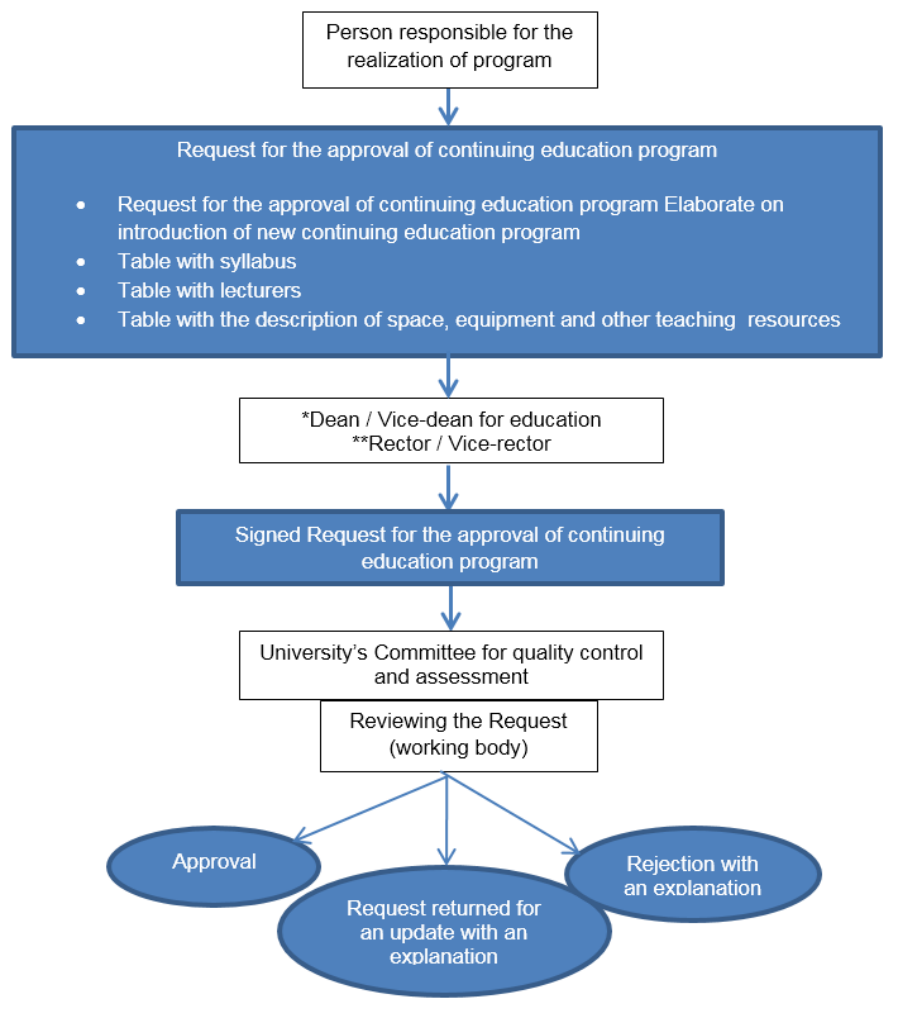
In the strategic publication *D4.1 Guidelines for establishment of integrative approach in continuing education at the university level*, some recommendations of the procedures for development and approval of continuing education programs are given. The flow of development and approval process are shown here.

Forms for development and approval of continuing education programs

Number	Form	Submits	Receives / forwards	Approves
Form 2.1	Request for the approval of continuing education program	Person responsible for realization of program	*Dean / Vice-dean for education **Rector / Vice-rector	University's Committee for quality control and assessment (working body)
Form 2.2	Elaborate on introduction of new continuing education program			
Form 2.3	Table with syllabus			
Form 2.4	Table with lecturers			
Form 2.5	Table with the description of space, equipment and other teaching resources			

*if the continuing education program is realized by the faculty within the integrative approach
**if the program of continuing education is realized by the organizational unit of the university

Schematic preview of procedures for development and approval of continuing education programs



3.3 Quality assurance and control for CE programs

Quality assurance and control of CE activities need to be included in the existing regulations defined by the institutional legal acts (bylaw) either related to the lifelong activities or other similar activities in order to reflect the strong commitment of an institution to continuously and systematically improve the quality in all segments of CE programs realization.

Since every university has established the Committee for Quality Assurance and Control whose activities are defined by the university Statute, it is recommended to make amendments of the Statute by adding one more activity to the Committee:

***„approving and monitoring of the continuing education realization in the integrative approach at the level of university"*.**

As the Committee has authority to establish its own working bodies, it is recommended that a separate Committee's working body is formed to deal exclusively with the approval and monitoring of continuing education activities in the integrative approach.

Quality control of CE programs should be conducted at three levels:

- The approval of proposed CE programs
- Realization of CE programs
- Reporting and certification

The procedures for quality control and monitoring of proposed CE programs within the integrative approach is described in the previous chapter, and in more details in the D4.1 Guidelines for the establishment of the integrative approach in continuing education at university level.

At the level of implementation, the quality control includes the realization of continuing education programs by applying clear procedures for realization that are defined by the Bylaw and by using defined forms such as Form for attendance, Form for Questionnaire of participants' satisfaction, etc.

D4.1 Guidelines also defines the clear procedures for quality control of CE programs after their realization. The CE program provider delivers to the dean/rector the Request for issuing the certificate for those participants who successfully completed the program accompanied by the Report on realized program that contains the basic data such as the program title, number of hours, realization period, approved ECTS credits, achieved learning outcomes, results of knowledge assessment, etc.

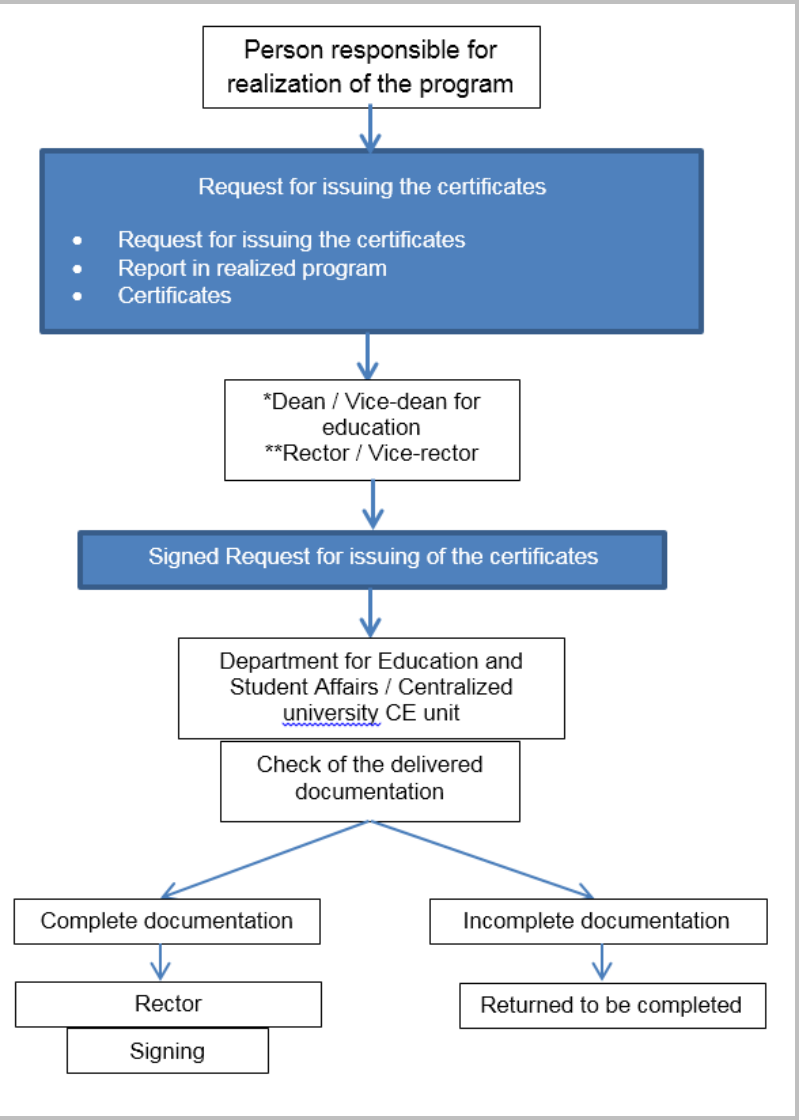
In order to monitor and improve the quality of continuing education, university needs to assess the process of realization of integrative approach at a yearly basis. For this purpose, the providers of CE programs are obliged to produce the Annual report on realization of approved CE programs and to include here the statistical data and the proposal of further development and improvement of CE programs. The Annual reports are reviewed by the Working body of the Committee that summarized all gathered reports and prepares the Summary Report to the Committee. Based on these, the Committee brings the decision on assessment of the programs and recommends the corrective measures if necessary.

The recommended procedure for reporting and issuing of certificates

Forms for reporting and issuing certificates					
Number	**Form**	**Submits**	**Receives / forwards**	**Approves**	**Signs**
Form 4.1	Report on realized continuing education program	Person responsible for realization of program	*Dean / Vice-dean for education **Rector / Vice-rector	University Department for Education and Student Affairs / Centralized university CE unit	-
Form 4.2	Request for issuing certificates				-
Form 4.3	Model of certificate				Rector

**if the continuing education program is realized by the faculty within the integrative approach*
***if the program of continuing education is realized by the organizational unit of the university*

Schematic preview of procedures for reporting and issuing certificates



Recommended procedure for annual reporting and monitoring of continuing education programs at the level of university

Forms for annual reporting and monitoring at the level of university				
Number	**Form**	**Submits**	**Receives / forwards**	**Approves**
Form 4.4	Annual report on realization of approved CE programs	Program provider*	Working body of the university's Committee for quality control and assessment	University's Co for quality contr assessment

*Faculty or organizational units of the university

3.4. Organizational units dealing with CE

3.4.1 Centralized university unit dealing with CE activities

In order to apply the integrative approach of CE activities, universities should have centralized unit whose responsibility should be to approve, organizes, develop and promotes the system of continuing education and to provide the support for all who are interested in further professional development outside the formal system of education.

This unit should act as centralized spot that coordinates CE activities within the integrative approach, including:

- Adoption of CE plan
- Organization and realization of CE activities from inter- and multi-disciplinary programs
- Coordination of other CE units
- Keeping records and provides information on CE programs and courses
- Keeping records on CE activities providers
- Consultancy for both providers and users of CE courses
- Promotion of CE activities for wider community
- Following the progress in the international CE system and cooperation in international projects of relevance.

Organization and activities of the centralized university CE unit should be defined and regulated by corresponding act or bylaw at the level of university.

3.4.2. Other units dealing with CE

There are various types of units dealing with CE, such as lifelong learning centers, collaborative training centers, center for career development and student cancelling, business support offices, etc. already established at the Serbian universities and faculties.

They need to define their roles and responsibilities in the integrative approach, with special focus on definition of joint activities and realization of inter- and multi- disciplinary joint programs.

Activities realized in these units need to be coordinated by the centralized CE unit in accordance with the university regulative.

Following the learning trends in the world and efforts to make the trainings and courses available everywhere and all the time, Serbian universities may also consider established centralized **E-learning** center.

If decided to direct its CE activities in this direction, universities are advised to undertake following steps in the process of preparation and establishment:

- to choose specific objectives and goals in advance and conduct the analysis on potential users in order to set up the proper e-learning activities and tools
- to provide a detailed description of e-learning unit (key topics, ideas, concepts) in order to avoid any duplication with other courses and units
- to develop the learning programme which is comprehensive but concise in order to avoid any risk from cognitive overload
- to assess learners every step of the way (recap, tests, etc.)
- to provide necessary feedback on the quality of learning

- choose those learning activities that serve the end goal

Sustainability of CE units are mainly hindered by the lack of financial resources which is why universities are advised to outline the sustainable financial construction and plan well in advance the exploitation of available funding opportunities (national, international projects, local and municipal support, etc.).

Centre for Lifelong Learning of the University of Belgrade, established in 2011, improves and promotes the system of lifelong learning, and provides the support to individuals interested in further education and expert training. The key activities of the Centre are:

- development of the system of lifelong learning at the University of Belgrade
- coordination of the work of centers for lifelong learning at member faculties
- providing information about programs and courses in the field of lifelong learning
- counseling for individuals interested in lifelong learning programs
- promotion of lifelong learning courses
- research in the field of lifelong learning services (the needs of potential clients, etc.)
- establishment of academic, scientific and expert cooperation with other institutions in the country and abroad engaged in lifelong learning.

Centre for lifelong learning at the University of Nis is the University organizational unit that deals with the development, definition and realization of trainings, courses and modules in the area of lifelong learning for both academic and business sector.

It organizes workshops, courses and trainings for students and staff of the faculties of the University of Nis, as well as specially tailored training programs for small and medium sized enterprises and entrepreneurs.

The Center also coordinates and cooperates with foreign universities within the international projects in the area of lifelong learning in organization of capacity building activities in areas defined by EU (mathematics, sciences, technology, ICT, social interaction, development of initiatives and entrepreneurial spirit, etc.).

Within its activities, it has established the cooperation with the network of local partner institutions (Municipality of Nis, regional Chamber of Commerce, Employers Union, National Employment Agency, etc.) in order to provide the most adequate structure of labor force that the local labor market requires.

3.5 Promotion of continuing education at universities and incentives system for participants (organizers)

3.5.1. Promotion of continuing education at universities

Motivation, variety and availability of CE programs are the basic precondition for successful implementation of concept of continuing education.

As largest educational institutions in Serbia, universities need to promote the culture of continuing education and to facilitate access to available courses in a way acceptable and

adequate for various social groups and categories: employers, entrepreneurs, employees, unemployed, and other categories of individuals who have the strong need for personal and professional improvement.

For highest visibility, it is recommended to conduct a survey of existing courses at universities and their members and gather information such as:

- title of the course
- topic and description
- modules
- course provider
- participation fee
- course material (if applicable).

Once gathered and structured in a systematic way, these data should than be made publically available and visible to potential users (preferably as a separate page of HEIs website) and regularly updated.

For gathering this kind of information, it is recommended to develop and use IT centralized system that is structured in such a way that easy and efficient retrieval of data and generation on various reports within the system are supported.

Recent mapping of continuing education and lifelong learning was conducted in 2017. The mapping included seven Serbian HEIs (University of Kragujevac, University of Belgrade, University of Novi Sad, University of Nis, State University of Novi Pazar, Belgrade Metropolitan University and Technical College of Applied Sciences Zrenjanin.
For the purpose of mapping, two online questionnaires developed by specially designed working group for realization of CE dimension led by University of Kragujevac were used.

Questionnaire for mapping of CE activities at Serbian HEIs (for management)

Questionnaire for mapping of CE activities at Serbian HEIs (for professors, researchers, assistants)

The total of 35 questionnaires from HEIs management and 705 questionnaires from professors and researchers were gathered. Based on their answers, the analysis of state-of-the-art was conducted on CE activities and the set of recommendations were provided for promotion of CE activities both at institutional level and the level of course providers (lecturers, authors, professors, etc.) within the individual Reports on mapping of CE activities for each HEIs.

Activities of mapping, updating the data to the system and their consequent analysis for the promotion and visibility purposes need to be the included in the activities of the centralized CE unit at the level of university.

Faculty of Economics in Belgrade

The Scientific and Research center of Faculty of Economics was established in 1974 and up to now it has realized more than 1000 different trainings in various domains of economic, business and statistic sciences. The courses are aimed at: managers, students, company staff, public officers, government representatives, etc. Starting from 2016, the Center obtained accreditation from the Ministry of Education of Serbia to conduct 19 various courses for improving of competences and preserving of licences of teachers in elementary and secondary schools. In addition, specialized conference is established annually at Faculty for addressing needs of the secondary school teachers in Economic high schools.

3.5.2 Incentives system for course providers

When defining the incentives system, universities need to take into account that they should contribute to both larger engagement of university staff in CE activities, as well as to better and more adequate recognition of their work.

Having this in mind, the incentives can be:

- non-material, such as
    - professional advancement opportunity (CE activities as one of criteria for professional advancement)
    - recognition of CE activities as the reference for participation in projects
    - expressing creativity and freedom in design of new courses and teaching methods
    - access to university and faculty resources necessary for realization of courses
    - establishing contacts with labor market, business sectors, etc.
    - work in multidisciplinary teams
    - work with highly motivated attendees
- material, such as:
    - adequate financial compensation for invested efforts
    - opportunity to use the part of income for further processional development of CE activities providers

Universities also need to consider the motivation mechanisms for partner institutions engaged in development and delivery of CE activities, such as National Employment Agency, schools, health institutions, Institute for Promotion of Education, Ministry of Education, Ministry of Health, industrial partners, etc.

Joint interest of these partners would be the existence of unique date base of offered program and courses at HEIs in Serbia, highly competent and experienced teaching staff, adequate space and equipment for programs and courses realization.

Another advantage to be used for promotion is the inclusion of partner institutions in creation of CE activities. National Employment Agency, based on the labor market demand, can recommend types and forms of CE activities. On the other hand, schools, health institutions and industrial partners can establish a reliable partnership with universities that could offer

not only their existing courses, but also develop new ones that would suit short- and long-term needs of industrial partners.

3.6 Monitoring

The progress of CE activities needs to be monitored at regular basis (preferably in intervals of three years). This process should be conducted by the centralized CE unit and/or Committee for quality assurance and control based on clearly defined set of key performance indicators.

The recommended list of metrics, developed within IF4TM project as D6.2 Metrics for the third mission activities is presented in the following table.

Table 2: The list of possible indicators for measuring of continuing education progress or success

No.	Indicator	Specific indicators
CE 1	Existence of Continuing Education in the university strategy and action plan	• Is continuing education mentioned in the university strategy? • Does the university have an action plan how to implement strategic goals in continuing education? • If the university has an action plan, is this plan updated regularly?
CE 2	Number of CE programs as a percentage of the total number of study programs	Does only list programs that have taken place, hence excludes programs that were developed but have not started or that have been offered but did not reach the minimum number of participants. Answers should be provided in the categories • Not ECTS awarding CE programs, • CE programs awarding 1 – 29 ECTS, • Short-cycle programs (30 – 60 ECTS). • CE programs with external accreditation (through appropriate ministries, defined in D4.1 Guidelines for the establishment of integrative approach in continuing education at university level) Under total number of study programs (in indicator definition), each realized regular bachelor or master program count as one.
CE 3	Number of CE participants as a percentage of the total number of students	Head count of participants in continuing education as defined by Serbian legislation, as a percentage of the total number of students as defined by the Ministry (the latter number excludes CE participants).
CE 4	Quality Assurance for Continuing Education	Does the university have dedicated rules on quality assurance for continuing education? Are QA rules for CE defined in line with procedures developed during IF4TM project and defined in D4.1 Guidelines for the establishment of integrative approach in continuing education at university level)?
CE 5	Earnings from continuing education per total number teaching staff in FTE	Total amount of money earned through all continuing education programs of the university in the reporting year, measured in RSD, divided by the total number of teaching staff (FTE - full-time equivalent).

CE 6	Number of CE programs with external approval as a percentage of the total number of CE programs	Number of CE programs that have received external approval, defined in D4.1 Guidelines for the establishment of integrative approach in continuing education at university level. It counts approvals after an external quality procedure, e.g. a CE program accreditation from a national or international agency, a quality label from trade organizations, approval by a Ministry (e.g. of Education or of Health etc.). External approvals that are transferred automatically without any quality procedure are excluded. This is divided by the number of total CE programs as given in indicator CE2.

Based on the gathered information, the CE unit/Committee needs to elaborate the report on the realization of CE activities that is to be presented to the university management and publically available on institution internet page.

4. Implementation of dimension “Social engagement”

4.1 Institutional policy

Each Serbian institution should develop its strategy for social engagement as policy document or at least social engagement plan. Whether this strategy is a part of the overall mission and vision of the university (as defined by the Statute) or a separate policy documents, it should clearly describe the universities efforts to become more socially involved and responsible institution. Short-term and long-term priorities and objectives need to be established and set of actions need to be defined in order to achieve these objectives.

Some of the recommended directions for transforming universities into socially responsible institutions are provided below.

4.2 Legal framework

Social engagement includes the large variety of activities and due its nature, it is not always possible to regulate them strictly by a legal acts. However, each institutions need to define its priority areas that bring the most impact on society and that will lead most directly to transformation of university from purely educational and research to socially responsible institution.

Two core activities that universities should include in their regular practice and hence legally regulate are volunteering and cooperation with industry.

Act on volunteering defines and regulates the procedures for volunteering, volunteering results monitoring system, the cooperation between university and organizations seeking for volunteers, etc. These procedures aim to set or improve the volunteering practice at universities so that all actors can have access to the volunteering opportunities and understand its impact, but also to systematically regulates and achieve consistency in volunteering projects and areas:

- Application procedure
- Selection procedure
- Procedure of realization of volunteering activities
- Reporting procedure

To follow these procedures, adequate forms and guidelines need to be developed that will accompany the relevant bylaw:

- Application form
- Information on organization that provides volunteering
- Volunteering certificate

Act on support to students from sensitive groups can be used to define the principles for supporting the students from sensitive groups, support system, methods for its realization, measures and monitoring the process, as well as other relevant issues relevant for the promotion of this area.

The Act should regulate and ensure the equal rights to education and prohibit any kind of discrimination towards the students with disability, students from minorities and other types of difficulties (economic, social, learning, etc.).

The support to the sensitive group of students can include the following actions:

- Improving the student standard
- Assistance in initial orientation
- Services related to the providing of information
- Protecting the students' rights and interests
- Communication with teaching staff related to the student issues
- Assistance in learning
- Career guidance
- Assistance in applying to scholarships, grants, donations, etc.

Besides definition of the list of measures to be applied to support students from sensitive groups, the Act should also define the institutional bodies/committees/units that will realize those measures, coordinate its activities and monitor the progress.

4.3 Organizational units dealing with social engagement

Having in mind that social engagement is not an area whose boundaries are clearly defined and that it intertwines with all other aspects and activities of university (research, education), it is not necessary to have centralized SE unit, but activities could also be successfully organized within existing organizational units, of course, taking into consideration not to overlap or duplicate their activities.

Centers for career development and student counseling is focused on student population and provision of services for this target group. They can be involved very actively in socially beneficial activities, such as

- Contribution to the employability of the region by providing services and support for students in acquiring necessary skills for employment and through establishing and maintaining of contacts with potential employers
- Realization of volunteering activities and procedures, from seeking for volunteering opportunities, through application and selection process, to monitoring and volunteering follow-up.
- By acting as mediator for various activities of students with the community (charity actions, blood donations, sports events, joint initiatives, etc.)

Creativity centers can also widely contribute to the development of universities, especially students, into socially responsible community. By capacitating students for creative thinking and with skills for entrepreneurial ventures, the centers raises employability rate in the region gravitating around university.

Also, the students engaged in Creativity Centers are responsible for outreach activities, such as promotion of science among secondary and primary school pupils, encouraging creativity and entrepreneurship, organization of workshops.

One of the most effective activities within the social engagement of universities is opening its resources and expertise towards the industrial sectors and local community, which is the main focus of **Business Support Offices** in Serbia. They link university (university's centers, research groups, researchers, professors) to the community gravitating around the university (SMEs, large companies, local community, hospitals, culture institutions, etc.) by providing the open access for business/industrial sector to the resources available at universities in terms of equipment, technologies, expertize, trainings, projects, laboratory tests, etc.

Center for cooperation with industry at the University of Belgrade has the aim to establish links with local industry through proactive approach to promotion of university and faculty to the industry, provision of the opportunities for practical placements for students, mentoring programs, employment programs, etc.

4.4 Programs for development of social engagement dimension at universities

4.4.1 Committee of Employers

The Law on High Education adopted in September 2017, includes in its provisions the recommendations to establish the Committee of Employers at all higher education institutions as the mechanism for creating sustainable links with industry. Entrepreneurial education and entrepreneurial components are extremely important and the Committee will help faculties and universities to decide which study programs are relevant to the industrial sector.

The role of the Committee of Employers is to provide recommendations what the requirements of the labor market are and what are the best study programs to invest in. in this way, the problem of multiplying the number of unnecessary professions on the labor market will be avoided.

Prior to establishment of the Committee of Employers, it is necessary to include in the universities' Statutes the necessary provisions related to the Committee, such as the roles and responsibilities, composition and establishment models.

More detailed information on the objectives, activities, decision making process and reporting need to be included in the separate act, most preferably the Bylaw on activities of Committee of Employers.

4.4.2 Cooperation with other institutions

The social engagement of universities should outreach various target groups:

Enterprises. Support to realization of joint and collaborative projects with enterprises is one of the most effective ways of establishing and maintaining the tight links between academy and industry. These links can be further fortified by establishing and introducing the programmes such as practical placements and industrial fellowships, industrial master and doctoral thesis etc.

As entities that support in great measure development of innovations, entrepreneurship and creativity, organizations such as **innovation centers, startup centers and business incubators** by its core activities need to be in close cooperation with universities. This cooperation although existing, need to be formalized which is why universities are advised to sign the Memorandum on Cooperation, Letter of Support or some other formal agreement to raise this cooperation at institutional level.

Problems of local community that could be addressed by universities are best channeled through the **local authorities**. Cooperation within these two sectors can contribute to the better understanding of societal need by universities

4.4.3 Regular realization of TSNA analysis

In the process of developing and implementing the CE activities, universities and faculties management need to be more oriented to the needs and demands of the labor market. Regular (at least annual) surveys are required to provide the valid current information on the topics and trends of the employment policy as well as on the profile and competences required by the potential employers.

A model of labor market analysis was developed within the WBC-VMnet Tempus project as TSNA analysis (training and services needs analysis) as a tool necessary for both sides: managers in enterprises and trainings providers (universities, faculties, centers, offices, etc.). This was a system developed to continuously monitor the changes in the enterprises' needs for human resources, analyze the results and provide a feedback to flexible and rapidly changing environment of training and service providers.

The results of such analysis is to provide to enterprises and labor market efficient and high quality trainings and services in order to improve the employability, innovation potential of enterprises, knowledge and skills of both employees and unemployed.

Useful documents

- TSNA
- ANNEX I - Questionnaire for enterprises
- ANNEX II - Analysis of the current conditions in the enterprise and the environment
- ANNEX III - Need assessment for the training of the employed
- ANNEX IV - Need assessment for the training of the unemployed

These continuing education activities need to be more promoted to the above-mentioned external users (both employed and unemployed).

Apart from the informal courses and trainings developed for the special target groups, universities are advised to put more efforts to include business and social partners in the development formal study programmes as well.

4.4.4 Promoting and recognition of volunteering activities

University staff and students can contribute to a large extent to the quality of the university and community life through the time spent volunteering with groups and organizations (formal volunteering) and providing help and support to individuals (informal volunteering).

Their motivation is mainly based on helping others and improving of life in their community, developing their individual skills and gaining work experience, networking, etc. However, apart from their personal satisfactions, these actions need to be also encouraged and motivated by recognizing the volunteering activities at institutional level. This particularly refers to appointing ECTS points for students and inclusion of volunteering activities as one of the criteria for professional advancement of university staff.

On the other side, by providing their students and staff with volunteering opportunities universities establish positive and respectful relationship with the local community.

It is presumed that all Serbian higher education institutions are to a certain extent already engaged in various forms of volunteering activities, which is why it is essential to map those activities and regulate the flow of related information between university and faculties, university centers, units, etc.

This needs to be followed by development of internal university **Act on Volunteering** as defined in the Section 4.2.

Apart from this, universities need to formalize the cooperation with institutions providing volunteering activities, such as Red Cross, charity organizations, NGOs and others in order to provide the ground for long-term and continuous engagement of students and staff in volunteering activities.

4.4.5 Support program for disadvantaged students and students with disability

Some types of support programs for students with disabilities or disadvantaged students already exist at Serbian HEIs, thus it is strongly recommended to apply and improve those throughout whole HEI system.

Affirmative program offers the opportunity for students with disability and students from Roma minority to enroll the university under special conditions and within the separate rank list.

Within **affirmative enrollment program** for persons with disability is applied to those who wants to enroll the first year of basic or integrated studies at institutions founded by the Republic of Serbia:

- Persons using the wheelchairs or persons with limited ability to move
- With partial or complete visual defect
- With partial or complete hearing impairment
- With learning difficulties (dyslexia dysgraphia, dyscalculia)
- With speech limitations
- With chronic diseases (hemophilia, epilepsy, diabetes type 1, etc.)
- With psychological or mental disabilities.

It is extremely important that for those individuals, HEIs provide all necessary conditions to participate at equal basis with other students during the enrollment test or further during the studies:

- To adjust the space and conditions for physically disabled students (specialized entrance for users of wheelchairs, for example)
- To adjust the examination methods and teaching materials (e.g. in Braille alphabet for those with vision defects, sign language interpreters for those with hearing impairment, etc.)
- To adjust other types of tasks (practical laboratory exercise, etc.).

Within **affirmative enrollment program** for persons from Roma minority, individuals can enroll the first year of basic or integrated studies at institutions founded by the Republic of Serbia based on the documentation provided during the enrollment on their nationality status.

All students enrolled within these programs, can exercise their rights to accommodations and food in accordance with the conditions of the Call for enrollment of students in the Republic of Serbia.

Besides these national measures, individual faculties can realize similar support mechanisms, such as **scholarships for disadvantaged students**. Some of the Serbian faculties already realize this program, offering a certain numbers of scholarships for students with unfavorable material status, in order to provide them with the same opportunities with other students.

4.4.6 Programs for promotion of science and education

Promoting science content and process with individuals not traditionally considered part of the scientific community is especially important for every country. These activities should target groups such as children, college students, or adults within the general public. Some of the programs available in Serbia for promotion of science and education are:

- **Researchers' night** is great opportunity to present the research work to young people through inventive workshops, games, interactions with researchers, interesting experiments, etc.
- **Open door days** should be organized at universities on a yearly basis where the students and pupils would have an opportunity to learn more about the faculties within the university. The representatives of all faculties should assist pupils in choosing their future careers and students in continuing their professional development and research career in any of the research groups or centers.
- **Start-up weekend** is an excellent promotional event where young entrepreneurs, researchers and students can present their business idea, plan or concept to experienced business people.
- **Scholarship fair** raises the level of information among the students on the opportunities of studying abroad and in the country, prerequisites, necessary skills, the significance of lifelong learning and mobilities.
- Various **workshops** can be organized by Creativity Centers for primary and secondary pupils in order to introduce the science to them in a friendly and relaxed manner.

4.4.7 Social events

Social engagement of the universities should spread outside the research and teaching activities. This component of social responsibility is related to the inclusion of staff, students

and student associations in the organization of events of local and regional character and taking part in the community actions such as:

- **Culture events** (exhibitions, concerts, literary events, lectures, etc.).
- **Charity events** (floods, donations, blood donations, etc.)
- **Volunteering** (organization of sport events, assistance in NGOs, participation in Red Cross activities, etc.)

Although Serbian universities are already involved in various kinds of events, this has mainly been based on the individual engagement of its students and staff. Participation in this kind of events need to be formalized, especially when it comes to volunteering of students.

4.4.8 Promotion and visibility of SE activities

Universities' efforts to establish the closest link to the community and society at large need to be constantly promoted and disseminated. Some of the recommended promotional tools are:

- Participation in **outreach activities** should be one of the priorities in communication with the society Examples of our outreach activities include summer schools, science week, Entrepreneurship Fairs, Researchers night, etc.)
- Organization of **promotional events** with the participation of the various target groups such as pupils, children, unemployed, employees, graduates, students, etc. (open door days, info days, open debates, etc.)
- **Catalogue of the innovation and research potential** of the University should be updated regularly at least once a year

4.5 Monitoring

In terms of social engagement performance, it is necessary that University adopts a set of measurable indicators in order to monitor its success in this context. They need to respect specificity of the university and wider ecosystem in which the university works.

Some indicators which can be implemented at Serbian HEIs are shown in Table below, developed and presented in D6.2 Metrics for the third mission activities within IF4TM project.

Table 3: The list of possible indicators for measuring of social engagement progress or success

No.	Indicator	Specific indicators
SE 1	Mention of social engagement in the mission of university	Does the university mission mention the institutional role in developing the society? Does the university have SE action plan? Does the university update SE action plan regularly? Does the university have monitoring mechanism for SE action plan realization?
SE 2	Number of student volunteers in SE activities as a percentage of total number of students	Relative measure for recognizing the involvement of students in non-discipline volunteering activities towards the community/society (fully applicable if volunteering is defined as activity within the studies or by the rules on volunteering expressed in the ECTS).

SE 3	Number of academic / administrative staff volunteers in SE activities as a percentage of total number of academic/administrative staff (full-time equivalent)	Relative measures for recognizing the involvement of academic/administrative staff in non-discipline volunteering activities towards the community/society.
SE 4	Impaired students as a percentage of the total number of students	Total number of impaired students includes: • students with disabilities, • students from minority groups, • students of poor material status, • students who are experiencing learning difficulties that are caused by one of the following factors: ○ lower socio-economic status; ○ come from other backgrounds, or do not have a place of residence in a university center; ○ have difficulties in adapting to the new environment and learning; ○ come from families in which none of the parents has a university degree or similar. ○ students migrants
SE 5	Number of students who received some kind of institutional financial support as a percentage of total number of students	Institutional financial support provided by higher education institution (university/faculty/department) could include following: • scholarships • partial or total exemption from tuition fees • prizes (goods or money) • etc.
SE 6	Number of an active Council of employers per number of faculties	Relative measure for recognizing of the involvement of Councils of employers in creating and harmonizing study programs with the economy and the real needs of the labor market (fully applicable only if Councils of employers have already been established at faculties). Integrated universities should provide binary answer Yes/No with qualitative description.
SE 7	Number of events open to community/public	Number of events (sports, culture, trainings, health, exibition…) organized by community using HEI facilities (free of charge or reduced charged)
SE 8	Number of events (sports, culture, trainings, health, exhibition…) organized by community using HEI facilities (free of charge or reduced charged)	Availability university/faculties facilities for different community activities free of charge or with reduced-cost charge.
SE 9	Number of events in HE Institutions involving primary and secondary students	The measure of the effort of university/faculties in organization of events with different purposes for primary and secondary students

Besides these quantitative indicators, qualitative indicators are very much important as well. These could include: satisfaction of the target groups (business community, journalists, NGOs, etc., investigated in polls); tradition of certain good practices (e.g. whether some events are organized in constant time periods); tone of the media articles on certain matter (positive, negative, taking into account experts' opinion or not, etc.), etc.

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Institutionalization of the 'Third Mission' of the University, HENRY MUGABI

D1.1 Review on EU policies and legal frameworks for establishing university third mission

D.1.3 Report on existing strategies and laws in the Republic of Serbia related to third mission dimensions

D1.4 Reports on existing university regulatory documents and structures supporting third mission activities

D1.5 Benchmarking report

D1.2 Consolidated report with recommendations drawn from the presentations and discussions at Policy Seminar

(http://www.uclb.com/what-we-do/are-you-a-ucl-researcher/what-is-tech-transfer).

Draft Law on higher education

Law on innovation activity

Law on science and research activity

Set of laws on intellectual property rights

Strategy of development of education in Serbia 2020

Strategy on scientific and technological development of the Republic of Serbia 2016-2020 – "Research for innovations"

Strategy on development of adults education in the Republic of Serbia

Strategy of development of SMEs, entrepreneurship and competitiveness 2015-2020

National recommendations for IP management at universities and institutes in Serbia.

Knowledge and technology transfer between science and businesses: Academic KTT Offices` Experience and Good Practice

D4.1.1 Definition of basic principles for integrative approach in CE dimension

https://elearningindustry.com/7-tips-to-create-the-perfect-learning-unit-for-an-elearning-course

D5.1 Individual social engagement plans

http://www.if4tm.kg.ac.rs/

http://www.wbc-inno.kg.ac.rs/

http://www.wbc-vmnet.kg.ac.rs/

D4.1 Guidelines for the establishment of integrative approach in continuing education at the university level
http://www.sklad-kadri.si/en/human-resources-development/creative-path-to-knowledge/

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