



WBCInno

*Sustainability strategy
for Universities in the
Western Balkan Region*





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in the Western Balkan Region**

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LIST OF ABBREVIATIONS

BI	Business Incubator
BSO	Business Support Office
CIP	Centre for Innovation and Entrepreneurship
DS	DataStation software platform
EACEA	European Audiovisual and Culture Executive's
EC	European Commission
INT	Intranea Solutions
KTT	Knowledge and Technology Transfer
RDI	Research, Development and Innovation
STP	Science and Technology Park
UIP	University Innovation Platform
UNI	University
UNS	University of Novi Sad
UNZE	University of Zenica
WBC	Western Balkan Countries
ZDK	Zenica-Doboj Kanton

EXECUTIVE SUMMARY

Due to the rapidly changing global economy, innovation and entrepreneurship have become far more market-driven, high-speed and intense, as well as more closely linked to scientific and technological progress. In fact, the Maastricht Communiqué 2004 [1] stresses the need to improve links between education, skills, jobs and enterprise to comply with the described change. It also emphasises the important role that knowledge and technology transfer (KTT) can play in facilitating innovation in this global context. Therefore, the logical step for any country intending to improve the quality of life for its citizens is to nurture the KTT, transferring it to an inherent process of national research and development programs. Primarily higher education institutions can play an important role in reducing the gap between the supply and demand for innovation, technology and knowledge transfer services.

The WBCInno Project is a three-year project that began in 2012 funded by the EACEA programme Tempus. WBCInno aims at planting the seeds of change for KTT in West Balkan countries. The Project extends across five universities situated in Bosnia and Herzegovina, Montenegro and Serbia to achieve the following objectives:

- To establish a Regional University Innovation Platform (UIP) at five WBC universities for integration and to focusing on innovation potential and for fostering technology transfer and commercialisation,
- To reinforce existing and to establish new university structures and services in the areas of knowledge transfer, research and innovation, in line with the UIP,
- To support the development of university-based Business Incubators (BI) and Science Technology Parks (STP) in the WBC region, through mobilizing of university resources and partnerships with the business world,
- To develop a methodology for innovation management and networking of different cross-functional stakeholders from university and business, based on a collaborative software platform/tool,
- To facilitate the creativity of young people and involvement of public and private stakeholders in all modernisation processes based on the Triple Helix model of cooperation.

Briefly put, the anticipated overall result is to create and support university-industry partnerships by developing the necessary technological and other infrastructure. These new relationships will improve the transfer of knowledge and technology generated within the higher education sector, thus, moving the region closer to 'a knowledge based society'. To establish this society based on sustainable KTT, there needs to be open, connected networks, two way knowledge flow, relationships built on trust and a shared understanding between WBC universities and the relevant private sectors. Step by step the change will improve the level of innovation and entrepreneurship across WBC higher education institutions, also generating new income streams.

The Project outcomes' long term sustainability and their potential to foster the desired changes can only be assured if all WBC partner universities regularly review and reflect on the recommendations contained in this Sustainability Strategy. Accordingly, this Strategy identifies the present, as well as future opportunities and threats that

may affect the sustainability of the Project outcomes. In addition, the Strategy is designed to ensure the on-going and active role of WBC universities to drive innovation and entrepreneurship, as well as providing a firm foundation from which to create more productive and highly skilled workforces. Given the foregoing, the Sustainability Strategy is a 'living' document which should be constantly updated by each of the involved parties to take into account the ever changing political, environmental, socio-economic and cultural contexts that are inherent to globalisation.

1. INTRODUCTION

To facilitate the sustainability of any project, it is important to identify the project activities and results that are intended to last and/or be disseminated after the end of the EC funding.

This *internal* document articulates the strategy and has been developed to provide a starting point for reflection and for crucial follow up actions by the relevant WBC HEI stakeholders throughout the project lifetime and beyond. It is expected that the WBC HEI stakeholders will evaluate post project sustainability through the development and implementation of sustainability monitoring programmes as outlined in the Appendix – Sustainability Indicators, as a regular follow-up activity.

According to the EC, sustainability may not concern all the aspects of a project. In each project some activities or outputs may be maintained, while others deliberately may not be so necessary to maintain. A project can, therefore, be considered as sustainable if relevant activities are pursued and outputs are maintained or developed beyond the funded project period (i.e. new training offer, up-dating of new tools, continuation of the newly created Business Support Offices (BSO)). For more information, please consult the Tempus handbook [2] for guidance on how to plan for and ensure sustainability.

In order to ensure the sustainability of any changes and improvements undertaken in an institution, it is important to identify the key factors that may hinder or support the changes, from the very beginning of the project. Once these factors are identified, it enables project partners to identify risks and incorporate contingency measures to mitigate them, as well as to develop strategies to enhance the opportunities to achieve project objectives, which arise during the project implementation.

The aim of the Sustainability Strategy is therefore to:

- Help partners to reflect on the strengths, weaknesses, opportunities and threats in relation to the project objectives and expected outputs;
- Identify the major stakeholders and key allies and their information needs to guarantee continued project support;
- Identify key factors that support or hinder sustainability, identify risks and consider possible contingency measures; and,
- Develop an action plan with sustainability measures.

Several actions for sustainability were identified at the project proposal stage and specific deliverables aimed at reinforcing the relation to the crucial stakeholders were included (Deliverables 7.2 – 7.5).

Moreover, any project Sustainability Strategy should include topics related to **economic, environmental, social and ethical issues**, following the triple bottom line definition [3]. Accordingly, this strategy has been developed:

- To achieve sustained and improved services and structures for knowledge transfer, research and innovation;

- To facilitate exploitation of research results through commercialisation and transfer of innovations to the market for economic-social benefits in the WBC Region;
- To define a set of recommendations for responsible research to avoid any negative impacts on environmental or ethical issues; and,
- To encompass the aspects of financial sustainability for major project outcomes contributing to the abovementioned goals (sustainability of BSOs activities, online Catalogues and established Innovation Management Platform).

In particular, the aims of the WBCInno Sustainability Strategy are to:

- Ensure sustained development of WBC universities as socially responsible institutions;
- Encourage creativity among students and assist them to develop business ideas;
- Identify/ensure sources for financial sustainability; and,
- Achieve the knowledge triangle.

The major factors that currently hinder sustainability have been identified as follows:

- WB Rectorates do not fully support WBCInno and the adoption, implementation and tuning of University Innovation Platforms;
- University staff might be inert and resistant to change;
- Financial resources for BI/STP infrastructures are not available;
- Students and young researchers are not motivated to join the innovation network/platform;
- National and local media support dissemination activities and follow up project events do not eventuate;
- A lack of readiness, availability and interest of target groups, especially the Ministries of education, science and economic development, to participate in the dissemination and awareness raising project activities;
- Enterprises do not have the necessary motivation to cooperate;
- Insufficient number of employees are sufficiently motivated to engage in training events;
- Insufficient number of students are interested in presenting innovative ideas;
- Ministries do not sufficiently support cooperation within the Triple Helix model due to the lack of financial resources;
- Students and university staff are not encouraged to establish spin offs and start-ups; and,
- BI/STP staff and their tenants are not motivated to participate in capacity building training and to use services offered by universities.

In order to mitigate these possible threats this Strategy seeks to safeguard the sustainability of the main project results:

- Establishment of Regional University Innovation Platform (UIP) at five WBC universities for integration and to focus on innovation potential and to foster technology transfer and commercialisation;
- Establishment of five BSOs at WBC universities;
- Development of a collaborative web-based software platform for innovation management;
- Elaboration of a methodology for innovation management and networking of different stakeholders from universities and businesses; and
- Facilitate the creativity of young people and involvement of public/private stakeholders in all modernisation processes based on the Triple Helix model of cooperation.

In order to support the aims, as well as to minimise the threats stated above, Section 3 below analyses the project results to be sustained for each of the WBC partner universities.

2. PROJECT RESULTS TO BE SUSTAINED AT WBC UNIVERSITIES

Project results to be sustained	Comments / Description
<p>1. Regional University Innovation Platform based on collaborative software tool for innovation management</p>	<p>The University Innovation Platform (UIP) is a strategically important document that supports the development of KTT activities such as commercialisation of research results, cooperation between enterprises and universities, establishment of start-up and spin-off companies, etc.</p> <p>WBC universities proposed an Action Plan for UIP implementation, which includes seven strategic measures, covering the period of the project implementation and one year after completion of the project. Therefore, it is imperative that the majority of the proposed activities of UIP implementation are sustainable. The sustainability of the collaborative INNO software platform at five universities is critical, for collating ideas and supporting their development towards innovations on the market.</p> <p>Having in mind that five INNO platforms were launched at WBCInno universities and that they are used to organize the Competitions for the best students ideas in 2015, they will be used in the following years. This is supported by the high level of satisfaction of INNO platforms users (organizers, idea proposers, evaluators, etc.).</p> <p><u>Institutional support needed:</u></p> <ul style="list-style-type: none"> • to provide University and faculties' management commitment • to attract more professors, researchers and students to UIP and INNO platform • to include SMEs from the region in the network • to involve PhD Candidates as key actors for RDI
<p>2. BSO activities</p>	<p>BSO represents a single-point of access to university resources, equipment, trainings and research findings and at the same time promoting university services and creating closer links between university and enterprises.</p> <p>It will be actively engaged in</p> <ul style="list-style-type: none"> • collection of data on university's research and innovation capacity • promotion of university research and services • maintaining the database in the form of on-line catalogues with tools to search and prepare special reports (administrator-level and user-level) • providing unique access to university resources, equipment, training, research results, patents and licenses offered to the business environment • the establishment of public-private partnerships and the promotion of modernized services of the university • development of partnerships with enterprises and connecting researchers and students with business partners • supporting and strengthening the ties with BIs and STPs • the organization of the competition for the best student idea • maintaining a web platform for the innovation management

	<ul style="list-style-type: none"> • improvement the university regulatory documents and procedures <p><u>Institutional support needed:</u></p> <ul style="list-style-type: none"> • Support of University management • Support of the local governmental bodies (especially those dealing with science and technological development) • Recognition and networking with other similar structures
<p>3. University structures / units dealing with KTT</p>	<p>Activities of KTT structures and units at the WBC universities need to be better integrated and reinforced during the project and designed to be sustainable after the project through joint organization of events, activities, promotion of universities services, capacity building programs, etc.</p> <p><u>Institutional support needed:</u></p> <ul style="list-style-type: none"> • Policy framework for IPR issues • Legal basis for establishment of spin-offs and spin-outs • Strengthening activities of the Centre for Intellectual property • Intensive work of BIs/STPs with universities and faculties • More detailed development of regulatory documents on public-private partnerships • Procedure for commercialisation of university research
<p>4. Collaboration and partnership with relevant stakeholders</p>	<p>Collaboration and partnership with key stakeholders is of utmost importance for providing sustainability and a solid foundation for implementation of policies and measures recommended within the WBCInno project. This is to be mainly achieved through joint initiatives, development and implementation of strategic documents and policies, provision of services and trainings for different target groups, etc.</p> <p><u>Institutional support needed:</u></p> <ul style="list-style-type: none"> • Recognition of importance of WBCInno strategic documents • Maintaining cooperation with industry, spin-off and spin-out companies • Strengthening co-operation between of all stakeholders • Developing strong relationships with alumni • Developing cooperation with the scientific diaspora

2.1. University of Kragujevac

2.1.1. *Economic / financial sustainability factors*

1. The collaborative web-based software tool for innovation management will remain and be further exploited after the project has ended. Intranca Solutions (INT) agreed to serve the involved WBC universities on a continuous basis for a symbolic fee covering only running costs for engaged on-line services (depending on the number of registered users). Fees vary for different numbers of active users of the platform. In addition, within *Act 4.4 Trainings for users of innovation suite*, INT will train an administrator at the University of Kragujevac who will be able to readily maintain the system.

- 2.** Sustainability of the BSO office at the University of Kragujevac is to be provided through staff training, regular daily activities, internal communication with university staff, researchers and students, as well as external communication with enterprises and stakeholders. The financial sustainability of the office will be maintained through fundraising activities, new projects and provision of commercial services.
- 3.** The long-term goal of the University of Kragujevac is to develop the third pillar related to knowledge and technology transfer activities, as well as the commercialisation of research results particularly within the University's initiative to develop Centres of Excellence funded in part by the European Investment Bank. These centres have a surface of 11,000m² and will act as a Science and Technology Park with the focus on the commercialisation of high-level research. Financial sustainability will only be possible through the development and implementation of suitable IPR rules, thus attracting a new source of income.
- 4.** Online catalogues, mapping of research resources, as well as the offer of marketable research and services by the University and faculties' units are a solid framework for securing additional resources. The WBCInno project will help to strengthen this output and to ensure an income stream (through fees for research and services) continues after completion of the project.

2.2. University of Novi Sad

2.2.1. Economic / financial sustainability factors

- 1.** The University Innovation Platform of the WBCInno Project will contribute to the modernisation of the Western Balkan Universities. The idea is to include a large number of professors, researchers and students to be active in the UIP. The collaborative web-based software tool for innovation management will remain after the end of the Project. INT has agreed to support the involved WBC universities on a continuous basis for a fee covering only running costs for used online services (depending on the number of registered users). Fees vary according to the number of active users of the platform. In addition, INT will train an administrator at the University of Novi Sad who will be responsible for the future maintenance of the system.
- 2.** The sustainability of the BSO at the University of Novi Sad will be assured through staff training, internal communication channels with university staff, professors, researchers and students, as well as externally with representatives of enterprises and stakeholders. The financial sustainability of the office will be achieved through international projects, co-funding by the Provincial Secretariat for Science and Technological Development, and donations from regional companies, etc.
- 3.** UNS has a unique advantage of tightly integrated industrial development with pure scientific research and education. During the last 25 years, 101 spin-out companies were generated at the University of Novi Sad, the majority of these over the past few years. Those companies constitute a naturally born Science and Technology Park at the University of Novi Sad, which generated income of more than 100 million euros in 2013 and with average yearly growth of 25 %, and a 2,500+ workforce selected from the best alumni of Faculty of Technical Sciences and other faculties of UNS. This

STP contributes significantly to the economic perspective of the city of Novi Sad and the wider region. Some of the aforementioned companies like Schneider Electric DMS Novi Sad are already known worldwide. The spin-out companies usually start in UNS laboratories through an informal incubation process, and engage the best students in the final period of their education at all levels (Bachelor, Master and Doctoral).

4. Two online Catalogues on Research and Innovation Potential of the University of Novi Sad (in Serbian and English) will attract attention and interests within the scientific community, as well as other stakeholders. These catalogues will be updated regularly and all important events at the University of Novi Sad will be used to further disseminate them.

2.3. University of Banja Luka

2.3.1. Economic / financial sustainability factors

1. The University Innovation Platform developed during the WBCInno project will also be used after the completion of the project and will be maintained on a continuous basis for a small maintenance fee (depending on the number of registered users). Fees will vary for different numbers of active users of the platform. One administrator (for UIP) at the University of Banja Luka will be trained by INT.

2. Sustainability of the BSO at the University of Banja Luka will be provided by staff training, as well as internal and external communication channels. Financial sustainability of the office will be achieved through fundraising activities, national, as well as international projects and co-funding from the Chamber of Commerce of the Republic of Srpska, etc.

3. One of the long-term UNIBL goals is the development of a University centre for the transfer of knowledge and technology. The BSO located in the Faculty of Electrical Engineering will be one of few such offices/areas of the University KTT centre. Amongst others, the primary tasks of this centre should be: identification of research results with commercial potential, protection of University IP, management of University IP portfolio, commercialisation of research results, facilitation of research collaboration agreements related to University IP and future development of innovative activities, etc.

4. An on-line Research and Innovation Potential catalogue was developed during the WBCInno project. This catalogue will be updated on a regular basis. An electronic (CD) and printed version of the catalogue will be distributed at all important events at the University of Banja Luka, as well as the participation of BSO staff at other important business events.

2.4. University of Zenica

2.4.1. *Economic / financial sustainability factors*

1. The online Catalogue and BSO web-site of the University of Zenica are the strongest tools with which to present all laboratories, institutes, centres and departments of the University of Zenica. In that sense, the online catalogue has already gained considerable interest from the staff that are likely to use it. Also, the printed version of the Catalogue aroused a great deal of interest from teachers and it has become a mandatory document providing an identity card. It is used for all business presentations of the University of Zenica, offering a new comprehensive RDI potential review for the faculties/institutes/centres. The software developer, INT promises to continue maintaining the web platform for a modest fee (dependent upon the number of registered users). Fees are varying for different numbers of active users of the platform. In addition, within the activity Act.4.4 INT will provide training for administrators of the partner universities to guarantee the sustainability of this deliverable. On the other hand, CIP UNZE will try to transfer all of the benefits of the web based software to other organisations in Bosnia and Herzegovina, which, in a wider ambit of networking, might also be interested in this software (e.g. Technology Park Intera in Mostar, Innovation and Entrepreneurial Centre of the University of East Sarajevo, etc.).

2. The sustainability of the BSO within CIP UNZE is supported through staff and other kinds of training made possible by this project, as well as daily communication between the staff of the BSO and other university staff, as well as a wide circle of stakeholders. At the time of writing, BSO CIP UNZE has set itself up as a link for project networking and co-operation between the member units of the University of Zenica with an extensive network of business partners, both at the domestic and regional level. This proactive approach should provide the basis for sponsorships, international projects, personal projects and volunteer work for first job seekers (as well as senior students and master students) to ensure the future financial viability of the BSO.

3. The establishment of a Scientific and Technology Park (STP) as a future project has been identified in strategic documents one of which is the Development Strategy for the period 2015-2020 of the University of Zenica. Since 2009 the organisational structure of the University of Zenica has made provision for this STP and the Law on public-private partnership of ZDK from 2014 opens the possibility to initiate the activities for implementation of this immense project. In 2012, through credit funds from the Austrian government, UNZE received RDI equipment worth more than 6 million EUR, and today, the Campus of University of Zenica is more than 40,000 m², of which more than 50% of the space is intended for laboratories. In that regard, CIP UNZE and its BSO represent an embryo of future STP Zenica as a private-public partnership company of UNZE and stakeholders. This kind of structure requires approximately 10 employees in managerial positions for the STP.

4. The mapping undertaken to identify research and innovation potential, based on the model developed for the WBC, provides an excellent basis for on-going and comprehensive co-operation with all stakeholders. The WBC Development Strategy

for RDI recommends regional co-operation on various project activities. This approach provides an excellent basis for uniform comparison and presentation of project partners for all future applications from universities and RDI institutions (Horizon 2020, Erasmus+ etc.), thus the visibility of members of UNZE, and especially of CIP UNZE, will be even higher.

2.5. University of Montenegro

2.5.1. *Economic / financial sustainability factors*

1. The tool for innovation management will also be active after the project completion as already agreed with INT. The service will be provided at a special low fee, i.e. only the costs for an on-line service running will need to be covered (depending on the number of registered users). The fees vary for different numbers of active users of the platform. Moreover, INT will provide the necessary training for a University administrator for the maintenance the system.
2. It is necessary to train the existing and prospective new staff of the Office so as to continue with the BSO activities at the University of Montenegro. These BSO activities will be grouped into the internal and external activities, which will define the share of responsibilities among the staff. The *Internal activities* will be based on the communication within the University, namely with the researchers and research centres, units of University (faculties and institutes) and University central services (International Relations Office, Career Development Centre, R&D Service Centre etc.). The *External activities* will be based on communication and mutual activities with the government stakeholders, Bls, enterprises, and other similar organisations, industrial unions, and also with other research and development institutions in the country.
3. The development of University structures, which deal with the KTT, represents a logical continuation of the R&D Service Centre function. Beside this, there are further activities for the organising unit of KTT structures in several faculties. Therefore, networking among these units and development of the mutual activity plans may be considered as one of the future mutual activities.
4. The activities aimed not only at commercial aspect of research and innovative activities, but also activities related to the building of staff capacity for the issues such as IPR and related rights, commercially related issues, etc. are some of the urgent factors that need to be dealt with.

3. SWOT ANALYSIS RELATED TO SUSTAINABILITY

3.1. University of Kragujevac

<p>STRENGTHS</p> <ul style="list-style-type: none"> • High level research in a number of areas of Fields of Science (FOS), proven through SCI publications • Experience in applying and managing EU projects • Eleven units and mechanisms established as support to KTT, advanced research and innovation • Established cooperation with enterprises and external organisation through two mobility programmes (Practical Placement Programme, Industry Fellowship Programme) coordinated by the Centre for Student Counselling and Career Development and Collaborative Training Centre (CTC) • Socially responsible behaviour of University of Kragujevac through development of study programs and Lifelong Learning programs at the request of large companies (FIAT) and the Municipality of Kragujevac. • Contract research and services for SMEs offered by CTC and other research centres • Regular TSNA analysis since 2009 • One of the strengths of the University in Kragujevac is in the fact that it has strong research base 	<p>WEAKNESSES</p> <ul style="list-style-type: none"> • Poorly defined IPR framework • Lack of information system for monitoring of KTT activities, their efficiency and impact • Fragmentation of research potential; the lack of defined priorities • Partial integration of university, since all faculties are still separate legal entities • Existing KTT support mechanisms are not coordinated or integrated • Low visibility of KTT units to researchers, students, etc. • Good practices are not shared among relevant actors • Lack of systematic approach towards seeking and establishing collaborative work in the KTT field • The third pillar has not been set as a top strategic priority by the University management (education and research are still in the main focus) • Lack of funds for pre-financing and co-financing of EU funded projects
<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> • Modernisation of management processes in the Rectorate is in progress, leading to the strong integration of faculties' activities on the university level • The University of Kragujevac covers the territory of 2.5 million citizens and faculties in six Serbian towns • The University has been recognised as an important stakeholder in the region • External organisations that the University has collaboration with (business incubators, chamber of commerce, development agency) • Support of the World Bank for establishment of the centres of excellence in the amount of 10 million EUR • Innovation is becoming increasingly important at regional and EU level • Implementation of Western Balkans Regional R&D Strategy for Innovation (WBRIS) supported financially by different funds (EU, IPA, etc.) • Kragujevac has become a leader in the automobile industry in Serbia 	<p>THREATS</p> <ul style="list-style-type: none"> • Political instability • Economic crises • Low success rate of University of Kragujevac for Horizon 2020 projects due to increased competitiveness at EU level • Reduction of both public and private funding for research in Serbia • Enterprises show little interest in cooperation with the University

3.2. University of Novi Sad

<p>STRENGTHS</p> <ul style="list-style-type: none"> • Motivation, ambition and skilled employees • Young and qualified staff • Students motivated to learn and improve and exchange their skills and knowledge with foreign students and foreign institutions • Centre for Career Development and advice for students • Uniqueness of campus of Novi Sad in comparison to other universities in the country • 460 different on-going science and research projects, knowledge transfer projects, international research and student mobility projects at UNS • About 114 science and other conferences and symposia organized by the UNS faculties and R&D institutes annually • Three units of knowledge transfer were established at the university level: an Innovation Centre, a Technology Transfer Centre, and a Novi Sad Incubation Centre as the first phase of the Science Technology Park • 101 spin-off companies established on UNS 	<p>WEAKNESSES</p> <ul style="list-style-type: none"> • Frequently changing legal acts • The amount of international co-operation is not equal across the Faculties • Slow purchase of modern technologies for education process • Recognition procedures are not equally regulated at faculties across the University • Absence of necessary level of integration • Low level of awareness of the Centre for Career Development
<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> • Development of the Science and Technology Park (new building) • The University of Novi Sad (UNS) is the second largest university in Serbia • University of Novi Sad is recognised as a reform-oriented university in the region • Increased usage of modern technologies and equipment • Attractiveness of the region of Vojvodina as a multi-cultural environment 	<p>THREATS</p> <ul style="list-style-type: none"> • The economic recession in Serbia and a high unemployment rate • Political instability in Serbia and the region • Companies are reluctant to invest in innovation • Reduction of both public and private funding for research in Serbia

3.3. University of Banja Luka

<p>STRENGTHS</p> <ul style="list-style-type: none"> • Motivated, ambitious and skilled employees • Various on-going science and research projects, knowledge transfer projects, international research and student mobility projects at UNIBL • Three units of knowledge transfer were established at the UNIBL or in cooperation with UNIBL: UNIBL Entrepreneurship Centre, Innovation Centre Banja Luka and Technological Business Park Banja Luka • Experience in applying and managing of EU projects • Contract research and services for SMEs offered by UNIBL • Students motivated to learn and improve and exchange their skills and knowledge with foreign students and foreign institutions 	<p>WEAKNESSES</p> <ul style="list-style-type: none"> • Poorly defined IPR framework • Lack of information system for monitoring of KTT activities, their efficiency and impact • Fragmentation of research potential; the lack of defined priorities • Existing KTT support mechanisms are not coordinated or integrated • Low visibility of KTT units to researchers, students, etc. • Good practices are not shared among relevant actors • Lack of funds for pre-financing and co-financing of EU funded projects • The amount of international cooperation is not equal across the UNIBL faculties • Absence of necessary level of integration
<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> • UNIBL covers a territory of about 1 million citizens • UNIBL has been recognised as an important stakeholder in the region • Various organisations that the University has collaboration with (business incubators, Chamber of Commerce of the Republic of Srpska, privately owned companies, etc.) • Growing number of SME's, especially in ICT sector • UNIBL is the largest university in Republic of Srpska • Increased usage of modern technologies and equipment 	<p>THREATS</p> <ul style="list-style-type: none"> • Political instability • Economic crises • Reduction of research funds • Companies show little interest in co-operation with the UNIBL

3.4. University of Zenica

<p>STRENGTHS</p> <ul style="list-style-type: none"> • The first university in the Federation of Bosnia and Herzegovina accredited by the state • Extensive academic legacy of higher education in Zenica (for over 50 years) • A modern organisational structure that relies on a small number of administrative staff, and a highly efficient system • The university is integrated in accordance with the organisation of universities in the countries with a long university tradition. • The University was developed from the triple-helix model of cooperation • Conditions are created for horizontal and vertical mobility of students and teachers • Internal evaluations are regularly conducted by way of special analyses and programs on improvement measures • Continuous external evaluations by international organisations as the best form of objective assessment of the state. • Good cooperation with the stakeholders • Understanding the importance of the transformation of teaching toward entrepreneurial university • Modern educational and research equipment adapted to the acquisition of modern competence • Openness to teachers and staff in the country and abroad in all study levels and projects • Intensive cooperation with international academic community expressed through a number of programs and protocols of cooperation and specific projects • Proactive work on the development of quality systems, development of QMS, established teams for QA on each organisational unit and managers of quality have been appointed. • A complete formal-regulatory structure of the university library was set up • Formally established a complete quality system relating to the library activities • Development of an integrated library information system of the University has commenced 	<p>WEAKNESSES</p> <ul style="list-style-type: none"> • Complexity of structure of human resources has increased • Out-dated laboratory equipment at some organisational units • Underdeveloped function of public relations • Underdeveloped work of integrated chairs • Problems of space in the faculties • Work in oversized groups of students at some faculties • Lack of a unified register of teachers and teaching assistants • Lack of involvement of students in research and professional work (projects) • Lack of involvement of certain faculties, institutes and centres in national, regional and international projects • Stimulation for extraordinary efforts of teachers and associates is still not enough • Unfavourable ratio between the number of students and the number of full-time teachers and associates • Due to the treasury system of operation, there is inertia in the reaction and lack of interest by a part of staff to work on projects • Lack of professional library staff with the adequate faculty degree • Uncoordinated and unplanned purchase of new library materials • Inadequate technical conditions for the operation of most libraries, without adequate space to store the materials and without reading rooms • A number of publications, issued by the University, are not sent to the university library • Most faculty libraries do not conduct audits of library materials, so it is impossible to determine the exact library statistics and the state of library fund • Treasury system of operating prevents the full development of the University Library and purchase of new journals
<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> • There is public awareness about the necessity of involvement of the University in the European Higher Education Area (EHEA) and the European Research Area (ERA) • Increased co-operation in teaching and research with academic and scientific institutions at the local, regional and global level • Good rating of UNZE in the eyes of employers in the region, especially in the SME sector and 	<p>THREATS</p> <ul style="list-style-type: none"> • Local authority's understanding of higher education as consumption factor rather than investment in human resources • Many of the existing legal provisions are not in a full compliance with the European norms • The unfavourable economic situation in the country and the lack of material resources necessary for changes • The state rejects to accept that universities

<p>private entrepreneurs</p> <ul style="list-style-type: none"> • A good base for further expansion of international co-operation • Work in COBISS system has enabled the direct involvement of the University of Zenica in the regional bibliographic databases, which has increased the "bibliographic visibility" of researchers and scholars of the University • Indexing of university journals increased citation and bibliographic reference of scientific workers of the University. • Strengthening cooperation with alumni as a basis for strengthening the model of triple-helix. • Strengthening cooperation with B&H scientific diaspora as an element for attracting the international projects. • Good rating should be used for stronger networking in the region as a base for RDI projects (Horizon 2020, COST, FP and others). 	<p>need autonomy as in the European sense</p> <ul style="list-style-type: none"> • Work of the University within the treasury system of operating, which is not suited to higher education, entrepreneurial organisation of the university and which, objectively, inhibits many activities of the University of Zenica • Poor quality of previous education in most high schools • Uncontrolled opening of private universities • The labour market, and especially the state services, accept the graduates, who have diplomas but without valid knowledge, skills and competencies required for the execution of tasks • Inequality regarding employment opportunities
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3.5. University of Montenegro

<p>STRENGTHS</p> <ul style="list-style-type: none"> • Biggest and only comprehensive research/HE institution in the country • Great critical mass of academic staff at UoM in almost all disciplines; • Excellent researchers/research groups • UoM is integrated to a large extent, which brings comparative advantages • UoM has defined its mission to develop and improve knowledge, learning and skills and to provide services to the wider social community along with full openness for co-operation. In the area of higher education, research and arts UoM covers all the development areas of the state of Montenegro; • There is a significant positive trend in the development and implementation of regional and multilateral projects • Increase in publishing in high impact journals • Increase in awareness on importance of KTT and related issues • Structures and framework for LLL as means of cooperation with the industry are well set 	<p>WEAKNESSES</p> <ul style="list-style-type: none"> • Existing critical mass of scientific staff is not used sufficiently for performing interdisciplinary studies, multidisciplinary research and exchange; • There is still little relevance in teaching mission of the UoM; • Established research priorities in development and scientific-research activity are not sufficiently defined and systematically coordinated • IPR framework is in initial stages • KTT activities are still not monitored and measured against other strategic priorities of the UoM • Lack of coordinated efforts between the central level and the level of units, and existing structures • Lack of institutional and national funds necessary for the implementation of EU funded projects
<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> • Increase in the number of internationally funded projects • Establishment of the first Centre of Excellence in Montenegro has commenced at the University (World Bank support in the amount of 3 mill EUR) • Good cooperation network within the country and abroad • Significance of Innovation, RTDI evaluation and development of capacities is gaining more and more prominent place • Exploiting possibilities within EU, Regional and national programmes for research and innovation for additional funding • Announced financial reform from the state level, introducing block funding for research at the UoM 	<p>THREATS</p> <ul style="list-style-type: none"> • Low level of research funding at the national level • Lack of institutional funds for science • Economic crises • Possible brain drain • Insufficient interest from the enterprises to cooperate with the University

4. RECOMMENDATIONS FOR SUSTAINABLE DEVELOPMENT OF UNIVERSITIES

Transformation of WBC universities from educational to entrepreneurial socially responsible institutions which contribute to sustainable regional economic development

One of the key issues underlying any change programme is ensuring that the journey is continued after the initial catalyst has been removed. It is insufficient to set up a number of partnerships within the early growth stage (e.g. during the WBCInno project) and then expect these to flourish and grow on an ongoing basis without first ensuring that a suitable infrastructure is in place to support ongoing development and improvement.

There has been a history in the Western Balkans and elsewhere of initiatives to establish support mechanisms which have been perceived to be a panacea for supporting the growth of knowledge transfer between universities and industry. It is not unusual to find that these have often been established without the full input of key stakeholders and in a number of cases these have subsequently been underutilised and eventually closed down.

The work to date has enabled the identification of the currently perceived parameters, which are important to enable growth in fruitful collaboration between academic institutions, commercial enterprises, ministries, and other regional stakeholders at the R&D policy level.

Regarding collaboration on the policy level, WBCInno partners were participants of the “Regional Workshop on Technology Transfer” held in September 2014 in Budva, Montenegro. This is one in the series of the events being organized by the Regional Cooperation Council (RCC) in the process of developing a set of regional programs corresponding to the targets of the South East Europe 2020 Strategy.

The involvement of partners which are at varying stages of development is useful in so far that it has enabled identification of needs for those who are just starting out on the partnership building journey, through to those who are well established but who need to maintain and extend their portfolio.

It is important to note that the environment within universities and commercial enterprises is constantly changing and as such, any infrastructure that is established to support and maintain growth in knowledge and technology transfer needs to accommodate this fact. The establishment of a knowledge based society needs to be kept under review so that it remains fit for purpose and is perceived as providing a useful support mechanism rather than a bureaucratic burden.

It is noted that the universities engaged in the WBCInno project are themselves at different stages of development (in terms of KT and supporting a knowledge based society), and indeed different faculties within each university are also at different stages of the journey. Similarly, while there are some excellent examples of partnership working and knowledge transfer, none are so good that they could not be improved or could not learn from others in the region and elsewhere.

There are a number of measures which can be taken to facilitate the ongoing sustainability towards being fully entrepreneurial and socially responsible institutions

which contribute in an optimal way to sustainable regional economic development. A number of these suggested below are aimed at ensuring that the growth in the profile of this arena is maintained, while others are intended to ensure that the universities and their staff are appropriately supported in their endeavours to deliver this agenda:

1. Ensure that activity and outcomes that are aimed primarily at contributing to Knowledge and Technology Transfer and sustainable regional economic development are reported at the highest level within the university, at relevant inter-university forums, and also to the appropriate bodies within the region.
2. Ensure that information on funding opportunities (European and regional) related to knowledge transfer is collected at the level of university and staff /researchers and students are well informed about possibilities to apply for the funds.
3. Ensure that key performance indicators (KPIs) for institutions, faculties, research groups and individuals include relevant parameters, are owned by those who have to deliver against them, are supported by the management at all levels and are considered as of equal importance to those related to teaching and research.
4. Ensure that the collection, collation and review of KPI data is not burdensome (particularly to those delivering against them) and is part of normal operation. Also ensure that their consideration is routine and forms part of regular review of performance both of management units (e.g. faculty, research groups) and individuals.
5. Ensure to include in the university and faculty calendar of events a reasonable share of those related to knowledge transfer, entrepreneurial and knowledge development activity. These should include events such as annual research days, open events for commercial enterprises held at a time suitable for their attendance (e.g. early evening, breakfast time), training for staff at all stages of development, events for inter-faculty networking and for inter-university networking.
6. Ensure that units developed to support relevant activities (eg KT Offices) remain appropriate to the needs of faculty staff and partner organisations. This will necessitate feedback from stakeholders being gleaned on an ongoing basis and being documented and analysed so that any necessary changes can be implemented in a timely and managed manner, noting that this will need to be consensual and that not all demands will be able to be met. Do not be afraid to restructure and redefine if this is deemed in the best interests of supporting this area of work.
7. Ensure to include in the annual institutional/faculty review process a reflective exercise of:
 - a. Growth in knowledge transfer activities on a faculty and subject group basis
 - b. An updating of the research catalogues

- c. Changes in the portfolio of activity with respect to the potential for knowledge transfer activity, be this through partnership working, start-ups or spinouts.
 - d. The results of ongoing 'horizon scanning' aimed at identifying short and medium term opportunities for knowledge transfer activity and contributing to the regional economy.
 - e. Updating the priority plan including agreeing where strategic support is to be made available to enable the pump priming of selected areas.
 - f. Defining an action plan for the next period.
8. Ensure that the motivators for staff engagement in such activities are maintained and that these remain relevant to those already involved as well as those who ought to partake in the future. Include in this the development of plans to assure the future by including mechanisms for attracting those staff who are not already engaged into the arena of knowledge exchange and wealth creation, as well as supporting existing activists.

5. RECOMMENDATIONS FOR SUSTAINABLE AND RESPONSIBLE RESEARCH

“Ethics” in general is a principle of right and good conduct, the philosophical study of moral values and rules. Ethics can be defined as the field of study to determine which behaviours are seen as reasonable and which rules and standards are governing the conduct of the members of a profession (Blair 1998; Kuß 2007). There are two main theories in order to determine what precisely gives an action its ethical force. The deontological approach judges actions based on their underlying considerations and their moral background, independently of their consequences (ibid.). To act on the basis on this ethical interpretation, a person should always comply with the following two rules (BBC 2014a):

- Do the right thing. Do it because it's the right thing to do.
- Don't do wrong things. Avoid them because they are wrong.

Deontological ethics teach that an action cannot be justified by showing that it produces good outcomes, but by doing a morally right action. This means that people have a duty to do the right thing, even if it produces a bad result (ibid.). The main scale in order to measure the morality of an action is the protection of the individual's rights (Blair 1998; Kuß 2007). An example of the deontology interpretation of ethics is the belief that killing someone is wrong, even if it was for the purpose of self-defence. Since killing someone is morally not justifiable, one should rather die instead of protecting himself (BBC 2014a).

The second approach is the teleological interpretation of ethical behaviour. The teleological approach is based on the following two principles (BBC 2014b):

- Whether an action is right or wrong depends only on the results of that action.
- The more good consequences an action produces, the better or the more right is that action.

In contrast to the deontological approach, the teleological approach judges actions based on their results and consequences. Of all possible actions a person might do at a particular moment, the morally right action is the one with the best overall outcome (ibid.). In practice, this is the approach most of a person's decisions are based on. As someone does not have the time to assess the moral backgrounds of all actions, ethical rules are usually derived from considering the general consequences of an action (ibid.). That is why this ethical interpretation is also called the consequentialism. Based on the teleological interpretation of ethical behaviour, killing someone is right, as long as it was for the purpose of self-defence. The outcome of that action (the innocent survives, the attacker dies) is more right compared to the case one would not do anything (the innocent dies, the attacker survives).

Research ethics deal with the compliance of moral principles, values and behaviours in order to avoid any possible damage that may arise during the performance of the research process (Blair 1998; Kuß 2007). It involves the application of the fundamental ethical principles to the scientific research and the scientific actions.

Booth, Colomb and Williams (2008) define the following reasons, why is it important to adhere to scientific research norms and rules:

- They promote the aims of research, such as knowledge, truth and the avoidance of errors.
- They insure that researchers can be held accountable to the public.
- They promote the values that are essential to collaborative work, such as trust, accountability, mutual respect and fairness.
- They help to build public support for research.
- They promote a variety of other important moral and social values, such as social responsibility, human rights, compliance with laws, health and safety and animal welfare.

In order to highlight the role of ethics in research and to demonstrate some ethical issues from practice, a few ethically questionable research topics are presented in the following. One research field, which is frequently associated with ethically questionable research projects, is the information technology (IT). IT projects are regularly confronted with widely discussed data security issues. A famous example is the research project INDECT funded by the European Union (<http://www.indect-project.eu/>). The main objective of this project is to develop a centralized interface to monitor the entire public space with the help of surveillance cameras and drones in order to automatically detect potential dangers and abnormal behaviour. The project has been criticized internationally due to the invasion of privacy resulting from the video surveillance (Johnston 2006).

Another frequently discussed research topic is the testing of new medications. Pharmaceutical companies are regularly performing their drug tests on poor people in developing countries like India (Buncombe / Lakhani 2011). In the majority of cases, the drug trials are for those people the only chance for cure and for that reason they volunteer to take part in them. Experts estimate that companies can save up to between 30 to 50 percent if they are testing their drugs in developing countries (ibid.). As a consequence of those drug trials, 1,725 Indians died between 2007 and 2010 (ibid.).

Other examples for critical research fields with projects that frequently face ethical issues are bio-genetics (e. g. the development of biological systems, including entire organisms that have never been found in nature) and military science (e. g. development of weapons).

According to Kuß (2007) there are a variety of different ethical rules in order to overcome ethical issues and to ensure a sustainable and responsible research. Those rules can be structured as follows:

1. Ethical Rules concerning the research subject(s):
 - a. To preserve the anonymity of a subject.
 - b. To deal confidentially with the given information.
 - c. To avoid or minimize strain and stress.
 - d. To debrief subjects, in order to reduce uncertainty and tension.

- e. To preserve the voluntariness and knowledge ability of the subject.
2. Ethical Rules concerning the client(s):
 - a. To deal confidentially with the research results.
 - b. To comply with the methodological standards.
 - c. To avoid a distorted portrayal of the research results.
 - d. Not to study results for unethical purposes (e. g. fraudulent sales practices).
 3. Moreover, there are three serious types of misconduct that must be avoided by researchers:
 - a. To fabricate data and results. Example from practice: In 2006, the Norwegian physician and researcher Jon Sudbø had fabricated data of 900 oral cancer patients and processed them into a study (Odling-Smee et al. 2007).
 - b. To manipulate study systems or results. Example from practice: In the 1990s, the physician and researcher Werner Bezwoda used people for his study, who did not fulfil the suitability requirements and even used a different therapy as in the title of the study indicated (Grady 2000).
 - c. To steal and misuse intellectual property, as well as to adopt foreign work results without adequate referencing. Example from practice: In 2011, a committee of the University of Bayreuth came to the conclusion that the German politician Karl-Theodor zu Guttenberg has copied passages from other authors in his thesis on a large scale without adequate referencing (Prantl et al. 2011).

At EU level the concept of 'Responsible Research and Innovation (RRI) [4] guides dialogue regarding the integrity of research and development activities. More specifically within the EU, the German Research Foundation (DFG) published [a guideline for safeguarding good scientific practice](#) (English version starting on p. 61). The guideline contains a number of recommendations, which were designed by the DFG in order to provide standardized principles for scientific research. Moreover, those recommendations have to be implemented by universities and other research institutions before requesting funding from the DFG. The eight main recommendations are presented in the following (DFG 2013):

1. The first recommendation addresses the good scientific practice itself. It says that the rules of good scientific practice of universities or research institute shall basically include
 - a. The fundamentals of scientific work (e. g. observing professional standards),
 - b. Instructions concerning the cooperation and leadership responsibility in working groups,
 - c. Instructions concerning the mentorship for young scientists and scholars,
 - d. Instructions for securing and storing primary data,

- e. And instructions for writing scientific publications.
2. In addition to that, universities and research institutes shall explicitly formulate those rules, involving their academic members in the discussion and decision process, and shall make them public.
 3. The head of the university or research institute is responsible for an adequate organisational structure to ensure that the responsibilities for direction, supervision, quality assurance and conflict resolution are clearly allocated.
 4. Universities and research institutions shall develop standards for the mentorship and supervision of young scientists and make them binding for all scientific working units.
 5. Universities and research institutes shall name independent mediators to whom scientists can turn if they have questions concerning good scientific practice. The mediators shall be known throughout the whole institution.
 6. Universities and research institutes shall give quality priority before quantity in their criteria for performance evaluation.
 7. Universities and research institutes shall store primary data as the basis for publications for ten years.
 8. Universities and research institutes shall introduce standardized practices for dealing with scientific misconduct.

6. RECOMMENDATIONS FOR FINANCIAL SUSTAINABILITY

Traditional modes of funding in research and higher education sector are in the process of change across Europe, including the higher education institutions in South East Europe/Western Balkan region. Public resources are being reduced in many countries while becoming more demanding and competitive at the same time, thus funding efficiency and financial sustainability are high on the agenda of the national, regional and EU policy-makers.

Even if universities should focus particularly on their academic teaching, learning and research, they must also be business-like in the way that they use their financial, physical and human resources. It is their responsibility to ensure that they can achieve the right level of research funding and the right balance between core and external funding appropriate to their circumstances. In other words financial sustainability is essential but it cannot be achieved unless universities have the necessary autonomy and appropriate management practices and systems, to make those decisions and act in a business-like way.

Furthermore, research management excellence is needed both at a strategic level – doing the right things – and at an operational level – doing things right – research management is about far more than just financial reporting. Excellence is needed at all stages of the research process, from basic to applied research as well as in collaboration and partnership with the business community as part of research and innovation ecosystems within non-linear complex innovation processes [5].

As clearly addressed in several studies so far, financial sustainability will be one of the key challenges for universities in decades to come: *“only those institutions that have sound financial structures and stable income flows will be able to fulfil their multiple missions and respond to the current challenges in an increasingly complex and global environment”* [6].

EUA’s recent work has identified three basic pillars, both complementary and interdependent, that are essential to ensure financial sustainability and fulfil the missions of the universities [7]:

- Universities should be able to identify and understand better the costs of all their activities and projects
- Universities should maintain a reasonably diversified income structure to mitigate risks and enhance autonomy
- Universities need sufficient, reliable and sustainable public funding with appropriate accountability mechanisms.

In this context, Estermann and Bennetot Provot (2011) proposed the following recommendations for the European universities, which also can be considered in Western Balkan Region:

Integrate income diversification in your institutional strategy

- Apply a proactive approach in diversification and identify opportunities
- Incorporate partnerships with broader implications across the whole institution
- Engage the academic community in the diversification strategy and its actions

Invest in people

- Invest in the development of institutional human capital to improve further capacities and competences to engage in income diversification
- Establish and nourish strong leadership and management

Incentives for faculties & staff to take an active part in income diversification

- Increase the use of untapped potential within the universities
- Design resource allocation models that provide incentives for income diversification at faculty/departmental level (performance agreements, development plans)
- Provide incentives that foster the commitment of the academic staff to the strategy

Interact smartly: set up professional stakeholder management

- Create a professional stakeholder management (create a “brand” around the university)
- Enhance the awareness that the university is creating value for external stakeholders and identify areas of mutual benefit with local and regional partners.

7. APPENDIX – SUSTAINABILITY INDICATORS

7.1. Monitoring Sustainability

Monitoring of a project's sustainability should be one of the core issues of project management. There are a whole variety of factors that can affect sustainability over time. Therefore, it is imperative that well planned monitoring mechanisms are put in place to assess the status of sustainability, at regular intervals during the life of the Project. This will help to quickly identify issues that affect sustainability and provide the necessary feedback for adjustments to be made. It is useful to base such monitoring on pre-determined indicators.

7.2. Sustainability Monitoring Indicators

Sustainability Monitoring Indicators are sign posts which reveal the 'status' of sustainability of a Project at a certain stage or point in time. Since the issue of sustainability concerns a variety of factors that are considered to be multi-dimensional (*i.e. economic, community, equity, institutional, logistics and environment*), the monitoring indicators representing each of these dimensions needs to be identified and measured separately.

For example, to monitor the *economic dimension*, of a project's sustainability, the indicator that is generally used is Economic Rate of Return (ERR). For example, after monitoring if the current economic value is significantly lower than the original appraisal value, then the project is likely to encounter sustainability problems.

Similarly, to assess the elements of community or stakeholder participation, a comparison between the proportion of beneficiaries expected to participate in the project activity and the level currently achieved (*i.e.*, the proportion of beneficiaries who are actively participating) will reveal the status of this vital indicator. Likewise, with application of a variety of indicators, the status of achievements of '*equity*', '*institutional*', '*logistics*' and '*environmental*' dimensions can also be ascertained. It is important to recognise that monitoring for sustainability is a multi-dimensional task.

A scoring system ranging from 1 (poor) to 3 (strong) is probably the simplest way to measure indicators. The 'mean value' of individual scores is expected to give the overall measure of the sustainability of a project. At any given time if the mean value is estimated to be less than 2 for a project it is likely that the project is facing serious sustainability problems. Anything above 2 is considered to be positive.

7.3. Sustainability Monitoring

Not all dimensions of sustainability are expected to be evident during the early stages of a project. For example, the '*economic*'; and '*environmental*' dimensions of sustainability are expected to emerge at a later stage which could be between six months to a year after implementation. However, if project managers pay attention to '*institutional*', '*logistics*' and '*community*' indicators any deviations will be detected at an early stage and corrective measures can immediately be taken.

Sustainability monitoring should be undertaken on at least a bi-annual basis. Nevertheless, experience suggests that it is preferable for some aspects of sustainability monitoring such as 'institutional', 'logistics' and 'community' indicators to be assessed on a routine basis.

7.4. Sustainability Monitoring Indicators

Economic:	Economic Rate of return of the project induced products
Community:	Proportion of community participating
Local support	
Equity:	Pattern of distribution of project target benefits, by income and gender groupings of target population
Institutional:	Manpower/resources for project management
Logistics:	Planning, organisation, management, co-ordination activities, administration

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