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Education research innovation

A Tool for Crisis?

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Tempus Project Opening University towards Society:
Linking Education-Research-Innovation (OPUS)

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Contents

7 Foreword

9 Introduction

11 Short overview of the Tempus OPUS Project

21 The Education-Research-Innovation Triangle in SEE countries

31 The role of Government – Ministry of Science, Education and Sports, Croatia

35 Introduction to structural changes through the exchange of good practices

93 Bibliography

97 List of TEMPUS OPUS Good Practice Recipes and Case Studies

100 Tempus OPUS Project - List of Consortium Members

Foreword

When we started our work on application for Tempus OPUS project in the beginning of 2008 the economy of European Union was stable and growing. The countries of South Eastern Europe seemed to have clear picture what is about to be done and which way to go: to follow the tracks of EU and to eventually catch up and join one day this powerful and prosperous family of nations. From that perspective the proposal of the project 'Opening University towards Society – Linking Education-Research-Innovation' (OPUS) seemed like ambitious but very clear target. The overall objective of the Project was to strengthen education-research-innovation (ERI) triangle and to improve knowledge transfer from academia to industry by building structural and legislative framework and by implementation of recognised good practices. The project focused on education-research-innovation (ERI) triangle.

The Project was approved and started in January 2009. In that time the recession touched just few EU members but concerns were growing that hard times are on the horizon.

Now, when we are reaching the completion of the Tempus OPUS project the European Union is facing many challenges never seen before. As put by Mr. Barosso in Europe 2020 document the crisis '...have left millions unemployed. It has brought a burden of debt that will last for many years. It has brought new pressure on our social cohesion.... The crisis is a wake-up call, the moment where we recognise that 'business as usual' would consign us to gradual decline, to the second rank of new global order. This is Europe's moment of truth. It is the time to be bold and ambitious...'

In that perspective the importance of Tempus OPUS project grew over the boundaries of the initial plans and ambitions. The role of creative innovation, excellent research, and high quality higher education has been recognized as main leverages that are supposed to take Europe out of the crisis. The Project became a window of opportunity and a playground for new ideas and innovative solutions in difficult times. The mere execution of the Project brought many challenges itself and was a tough and steep learning curve for us and our partners. Therefore, we are proud to announce that achievements of this Project met our expectations. The impressive number of case studies and good practice recipes that are listed in this book are offering possible solutions in establishment of the basic segments of ERI triangle in any university. At least they will help the reader to ask right questions and find some good answers in these turbulent times.

We thank all our partners on Tempus OPUS project for their invaluable efforts and contributions in bringing this Project and this book to successful conclusion.

1

Introduction 1.

The main characteristics of the project 'Opening University towards Society – Linking Education-Research-Innovation' (OPUS) is its complexity. It is a Tempus Structural Measure in the area of Higher Education and Society (HES). It involves regional Higher Education Institution (HEI) partners from Bosnia and Herzegovina, Croatia, Macedonia (FYRoM), and Montenegro. Also participating are universities from Austria, Belgium, France, and Germany. Joining the HEI partners are representatives from national and local governments, innovation support institutions and divisions, and advisory organisations and commercial enterprises.

Background of the project

All of the Partner Countries involved in this project, Bosnia and Herzegovina, Croatia, Macedonia (FYRoM), and Montenegro, have demonstrated a strong commitment to join the EU and to implement the necessary reforms. For this purpose, they need to fulfil the economic and political criteria, which include the capacity to cope with competitive pressure and market forces.

The Partner Countries are still significantly lagging behind the achievements of EU countries, including Austria, Belgium, France, and Germany, particularly in terms of the education–research–innovation triangle (ERIT). In order to develop means for the exploitation of academic research outcomes and to create harmonized and efficient relationships between universities and industry, this project is conceived to trigger the creation and implementation of adequate structural measures.

Doctoral education in particular has recently received significant attention in international communities and is undergoing a radical reform throughout Europe. The impact of globalization worldwide, combined with developments in the *Bologna Process*, has heightened awareness of the potential benefits to societies of developing highly skilled personnel who are capable of adapting to and dealing with a rapidly changing environment. In addition, EU leaders decided on a process to boost the Union's competitiveness and growth to create 'a Europe of knowledge'. To face rising challenges, the education of future graduates needs to be reconsidered, and doctoral training is certainly the major link between the Bologna Process and the Lisbon Agenda.

The general aim of the TEMPUS OPUS project is to develop and implement structural measures in the area of higher education, in particular the third cycle of education (doctoral studies); research and its application (technology transfer) in order to achieve both better quality Higher Education (HE) and research outcomes; as well as to improve communication between academia and industry.

The project unites twenty-three (23) partner organisations and one named individual for a period of three years from January 2009 to January 2012 . A full list of the partners can be found at the end of this publication. More information about the project is available at the project web-site: www.opus.unizg.hr

2.

Short overview of the Tempus OPUS Project

The overall objective of the Tempus OPUS Project was to strengthen the education-research-innovation (ERI) triangle and to improve knowledge transfer from academia to industry by building a structural and legislative framework and by the implementation of recognised good practices.

Particular project objectives have been grouped on three levels:

I) THE STRATEGIC LEVEL – identification of structural and legislative measures on the local, national and regional levels and the development of strategic documents, regulations, procedures, and good practices.

II) THE IMPLEMENTATION LEVEL – increased awareness and understanding of the role of innovation, IPR and entrepreneurship among researchers; increased participation in Framework Programmes and other EU projects; increased collaboration between universities, public authorities and industry on the national, regional and European levels; introduction to research quality assessment.

III) THE PROJECT MANAGEMENT LEVEL – dissemination, sustainability, quality control, monitoring and overall management of the project.

The expected concrete outputs and outcomes of the project are listed below:

I) STRATEGIC LEVEL

OUTPUT/OUTCOME 1. Identification of structural and legislative measures on the local, national and regional levels

OUTPUT/OUTCOME 2. Development of strategic documents, regulations, procedures and good practices

II) IMPLEMENTATION LEVEL

OUTPUT/OUTCOME 3. Increased awareness and understanding of the role of innovation, IPR and entrepreneurship among researchers

OUTPUT/OUTCOME 4. Increased participation in the Framework Programme and other EU projects

OUTPUT/OUTCOME 5. Increased collaboration between universities, industry and public authorities on the national, regional and European levels

OUTPUT/OUTCOME 6. Research quality assessment

III) PROJECT MANAGEMENT LEVEL
OUTPUT/OUTCOME 7. Dissemination

Achievements

OUTPUT/OUTCOME 1.
Identification of structural and legislative measures on the local, national and regional levels

At the beginning of the project comprehensive data gathering was conducted in all the partner countries' (PC) institutions. All existing documents on the national and institutional levels were collected in a documents database and made public on the project website, and were thus available in a user-friendly manner to all partners. An analysis of stakeholder needs was undertaken and a SWOT analysis for each PC institution was developed. The results of these information gathering and sorting activities were summarized in the project publication 'Toward education-research-innovation triangle: Where are we starting from?' Additionally, highly inspirational good practices were presented during well-organised study visits to EU partner institutions (Uni Saarbruecken, Uni Vienna, KU Leuven, PMCU Paris). Through several round tables (held in Zagreb, Zadar, Rijeka, Podgorica, Mostar and Skopje), all issues on structural and legislative measures were thoroughly discussed.
Therefore, the project objective to understand the present status of education-research-innovation activities related to knowledge transfer and academic entrepreneurship was successfully accomplished.

OUTPUT/OUTCOME 2.
Development of strategic documents, regulations, procedures and good practices

It was planned that all gathered information would be used to define the necessary measures at the local, national and regional levels in order to initiate changes in legislation related to research, IPR and technology transfer (including the development of strategic documents, regulations, procedures and good practices) that would lead towards an education-research-innovation policy and related documents. The activities of the project certainly helped in the development of some important documents in a few PC institutions: the doctoral studies rulebooks of Zagreb and Skopje Universities, the innovation strategy of the University of Zagreb, the IP Rulebook of the University of Zadar, first drafts of the IP Guidelines and Spin-out Guidelines at the University of Zagreb, etc.

Therefore, the project definitely produced some impact on the development of strategic documents at the level of PC institutions, and good practices have been exchanged. The project also achieved moderate impact on legislation improvement on the national level in PC countries. All project partners made valuable contributions to the debate on the proposals of three new laws in Croatia (on HEIs, on science, and on universities). These three laws are now in the process of rewriting. It was concluded that there is some room for the improvement of several laws related to the ERI triangle in most of the PC countries. The final analysis and recommendations of this book will contribute significantly to define the necessary measures at the local, national, and regional levels.

A major activity was the formalised exchange of experience between project partners that resulted in 22 good practices in the areas of education, research and innovation that were identified, captured and analysed by the partners and then formatted either as Case Studies or as Good Practice Recipes. They will serve as guides for the project partners, and also through their later dissemination to any interested PRO/HEI.

OUTPUT/OUTCOME 3.
Increased awareness and understanding of the role of innovation, IPR and entrepreneurship among researchers

The project delivered a comprehensive set of workshops on different aspects of the ERI triangle, especially on innovation, IPR protection, and collaboration with industry, but also on building some basic entrepreneurship competencies.

A special event at the University of Zagreb was the workshop series 'March – The UNIZG Month of Innovation and Research,' which was organized consecutively in the years 2010 and 2011. Six workshops on IP management and knowledge exchange were presented during this single month. Such concentrated events proved to be attractive to the academic public, especially young researchers, and became very popular among them. The event also attracted the significant attention of the media.

Therefore, the project objective to improve the entrepreneurial and management skills of researchers and to raise awareness among researchers about the importance of research, innovation, IPR, and entrepreneurship was successfully accomplished and disseminated among PC institutions.

Within the project several workshops were organised with topics such as proposal writing in the Framework Programme and project management. Workshops were organised in Zadar, Podgorica, Rijeka and Osijek, and two workshops in Zagreb. Every workshop attracted between 20 and 60 interested participants. Workshops dedicated to intellectual property management and technology transfer were held in Rijeka, Zadar, Mostar and Skopje. The workshop in Mostar also included a session on the development of innovations support policies, internal regulatory frameworks and technology transfer services.

The University of Zagreb has successfully organized eight workshops on transferable skills development aimed at doctoral candidates. The goal of these workshops was to raise the competence level of doctoral candidates and offer them the possibility of acquiring additional professional and personal skills as an essential prerequisite for better employability perspectives. These workshops were conducted during the years 2010 and 2011, and they offered wide areas of skills and competencies, including writing effectively about PhD research, communication and cooperation in research and business, and the basics of entrepreneurship. They also covered the legal aspects of intellectual property, which is an essential part of doctoral research and a potential means of exploiting research results. More than two hundred doctoral candidates from different scientific fields have attended these workshops, which are clear evidence of the need for such workshops, and it shows that doctoral candidates have recognised the quality of such activities and the benefits they offer them for future career prospects.

In the autumn of 2011, the University of Zagreb organized training for new doctoral supervisors, which was a pioneer event of this kind not only in Croatia but in the region. The purpose of this kind of training was to prepare new supervisors to deal with the challenges of the supervision process. Twenty new supervisors from participating universities attended the two-day workshop, building their skills for the successful supervision of doctoral candidates.

OUTPUT/OUTCOME 4. Increased participation in the Framework Programme and other EU projects

The intense activities and workshops reported above can be linked to improvement among the partner countries in terms of their participation in EU projects, especially in their application success rates and EC contribution success rates (see table).

COUNTRIES	APPLICANTS IN RETAINED PROPOSALS				SUCCESS RATES OF APPLICANTS			
	2007	2008	2009	2010	2007	2008	2009	2010
BOSNIA-HERZEGOVINA	7	5	6	8	6,8%	15,2%	13,0%	16,7%
CROATIA	68	39	40	69	17,4%	14,1%	11,8%	29,9%
MONTENEGRO	8	10	3	7	15,7%	33,3%	9,,7%	38,9%
FYROM	20	17	13	13	15,5%	20,2%	11,8%	19,7%

COUNTRIES	EC CONTRIBUTION TO RETAINED PROPOSALS (IN € MILLION)				SUCCESS RATES IN EC CONTRIBUTION			
	2007	2008	2009	2010	2007	2008	2009	2010
BOSNIA-HERZEGOVINA	0,6	0,2	0,3	0,6	6,5%%	7,7%	2,5%	10,2%
CROATIA	9,1	8,3	7,1	8,7	14,5%	12,7%	5,0%	21,4%
MONTENEGRO	0,4	0,5	1,3	0,2	9,1%	12,1%	12,8%	20,2%
FYROM	2,4	3,4	1,4	0,6	14,1%	18,1%	3,6%	6,3%

OUTPUT/OUTCOME 5.
Increased collaboration between universities, industry and public authorities on the national, regional and European levels

The project enabled the creation and further development of essential infrastructure at the University of Zagreb through the Centre for Research, Development and Technology Transfer (CRDTT) in order to enhance the skills and competencies of researchers to produce innovations and to increase the university's capacity to support the commercialisation of innovative research results. This new organisational infrastructure, when put into full function, will significantly increase the exploitation of the huge potential of scientific excellence, knowledge and high quality of human resources at the University of Zagreb that have not been utilised efficiently until now. It will bridge the gap between the pre-commercial and commercial phases of R&D in Croatia, creating thus a productive environment for collaboration with industry, but also for innovation and the growth of knowledge-based companies, improving thus the industry competitiveness of the whole country. The CRDTT was created by the functional merger of the previously established Research Office and Technology Transfer Office. Besides Tempus OPUS, other sources of project-related funding were also used to complete the function of the Centre (World Bank Loan - Science and Technology Project, IPA grant schemes).

The result of these coordinated activities was that the University of Zagreb initiated activities to support research excellence and productivity, intellectual property rights management, knowledge exchange and spin-out formation.

IPR activity has focused on identifying promising research results, protecting them with an appropriate patenting strategy and seeking to transfer them to the commercial sector

for commercialisation through the sale or licensing of the rights with associated economic return to the university and the researchers.

Knowledge exchange activity has focused on promoting collaborations and academic interactions with the commercial sector that result in the transfer of specialised knowledge between both parties and the development of the knowledge economy.

Spin-out formation has focused on encouraging academic entrepreneurship by supporting the academic community to start a new knowledge-based enterprise with associated benefit to employment and the economy.

The centre also developed a fundraising function through successful applications for other sources of financing.

A strong procedural framework has been established for IPR; a framework for knowledge exchange and spin-out is still under development and making strong progress. The fundraising and support to the university management function has been successfully developed.
The University of Rijeka was also very active in capacity building in technology transfer, and Ruđer Bošković Institute proved to be successful in spin-out creation. Other institutions in partner countries were more focused on capacity building in the domain of research and doctoral studies, but many of them also expressed interest in the implementation of good practices in technology transfer and innovation.

Partners that were representatives of industry - especially Erickson Nikola Tesla and the Croatian Chamber of Economy - made significant contributions to the overall success of the project.

In that respect the project succeeded in achieving the objective of producing a strong, robust and sustainable network among universities, industry, and public authorities.

OUTPUT/OUTCOME 6.
Research quality assessment

The University of Zagreb developed a tool for the enhancement of financial management of FP7 projects. This tool was provided to all project partners from partner countries. The University of Rijeka also introduced the OPUS developed timesheets programme to track staff time in all projects implemented by the University's Centre for EU projects.

Development of a pilot database tool is one of the major activities of this project. Until this stage of the project, information was collected on the specific needs of developing a pilot database. During consultations with project partners, it was suggested that for the purpose of developing the pilot database tool, the company @mire should be contacted.

This company is a spin-off company of K.U. Leuven that developed the repository for K.U. Leuven. @mire is a well-known company within the industry for academic content management software and services. After explaining university specific needs, @ mire offered to develop the pilot database, which was constructed according to concepts and principles that could be used at the national and regional levels by several project partners.

OUTPUT/OUTCOME 7.
Dissemination

The workshops and lectures were the main dissemination tools throughout this project. More than 1000 PhD students and researchers attended these dissemination events, which covered many topics of interest, such as innovation, academic entrepreneurship, IP management, proposal writing and project management (see list below).

WORKSHOPS FOR PROPOSAL WRITING AND PROJECT MANAGEMENT:
- University of Zadar, 31 March 2009
- University of Montenegro, 2 October 2009
- University of Osijek, 09 November 2011

WORKSHOPS ON INNOVATION, IPR AND ENTREPRENEURSHIP:
- University of Rijeka, 30 June 2009
- University of Zadar, 25 November 2009
- University of Mostar, 07 July 2010
- University of Skopje, 7 April 2011

WORKSHOP FOR DOCTORAL STUDENTS:
- Communication in Science – Writing and Speaking About Your Research, University of Zagreb, 3-14 May 2010
- Intercultural Know-How: Communication and Cooperation in Research and Business, University of Zagreb, 7 October 2010
- Writing Effectively About Your Research, University of Zagreb, 18-22 October 2010
- Speaking Effectively About Your Research, University of Zagreb, 22-26 September 2010
- Introduction to Innovation, University of Zagreb, 27-28 October 2011
- Intellectual Property: Legal Aspects, University of Zagreb, 17-18 November 2011
- Introduction to Entrepreneurship, University of Zagreb, 1-2 December 2011
- Workshop for supervisors in doctoral education: Professionalisation of PhD Supervision,
- University of Zagreb, 6-7 December 2011

WORKSHOPS HELD BY EURICE

- Workshop for research managers, administrators, financial officers, legal staff.
- Title: ' FP7 Project Management including financial and legal issues', University of Zagreb, 23 March 2010
- Workshop for researchers (including young researchers, PhD-students) or companies interested in applying for FP7, Title: 'From the idea to the (successful) proposal', University of Zagreb, 24 March 2010
- Workshop for researchers (including young researchers, PhD-students) or companies interested in applying for FP7, Title: 'From the idea to the (successful) proposal',
- University of Zagreb, 25 March 2010
- 'From the idea to the (successful) proposal', University of Zagreb, 27 – 28 June 2011
- 'From the idea to the (successful) proposal', University of Rijeka, 24 November 2011
- 'Intellectual Property Rights Management', University of Rijeka, 25 November 2011

INFORMATION AND DISSEMINATION WORKSHOPS

- Tempus OPUS workshops and meetings
- Tempus FoSentHE: 1st year project closure & 2nd year project launch coordination meeting (Zagreb)
- Coordination of activities in research and development projects at universities and between universities and industry (Omiš, Croatia)
- Tempus Info day organized by National Tempus Office (Zagreb)
- Month of Innovation and Research (University of Zagreb, March 2010, 2011)
- Tempus Info day Models of cooperation between academic and business communities in the region (Rijeka, Zagreb – June 2010)
- Project Meeting & Workshop in course of 'Creating R&D Capacities and Instruments for boosting HE-Economy Cooperations', Montenegro, 15-17 September 2010

OTHER

- Workshop Method of European dialogue – Basis of lobbying in the EU

University of Zagreb, 19 February 2010

- Info day 'Model of cooperation between academic and business communities in the region' University of Zagreb, 30 June 2010
- Organization of 'Month of innovation and research' University of Zagreb, March 2010
- Organization of 'Month of innovation and research' University of Zagreb, March 2011

3. The Education-Research-Innovation Triangle in SEE countries

The goal of the Tempus OPUS project on which this paper is based is to strengthen the education-research-innovation triangle (ERIT) at the institutions taking part in the project and other institutions in the countries involved in it. More specifically, 'The general aim of the TEMPUS OPUS project is to develop and implement structural measures in the area of higher education, in particular in the third cycle of education (doctoral studies); research and its application (technology transfer) in order to achieve both better quality Higher Education (HE) and research outcomes; as well as to improve communication between academia and industry.'[18] This is a complex task involving not just universities, but also other actors that are – or should be – connected with it.

It has been widely recognised that socio-economic systems have undergone profound changes in recent decades and have had an impact on both research institutes and higher education institutions (HEIs). Instead of only teaching and conducting research, they need to forge links with other sectors in order to make a larger contribution to societal welfare. This extends to their contribution to the economy as well. The collaboration of universities should concern government, industry partners (both SMEs and larger companies) as well as civil society organisations. This model is called the Quadruple Helix, as it encompasses all four partners which are crucial for the development of innovations[1,4]. Universities' new role and their motors are not only limited to the formal, physical and life sciences, but should also extend to the social and behavioural sciences.

In order to understand these changes and be able to contribute to the reorganisation of HEIs, one needs to be aware of the following:

- A National System of Innovation (NSI) ought to be considered – the trajectory of university development has been dependent on technological revolutions within the economy[4]; SMEs that are more R&D intensive are more likely to cooperate with the university.[25,26]

- Not only patents are important - they are complementary to other intellectual property (IP) forms - both proprietary and non-proprietary.[2]

- In terms of linkages with industry, universities should pay attention to, [promoting] broader development by bringing together relevant stakeholders, thereby acting as a country innovation organizer, especially in advanced services, creative industries and innovative manufacturing sectors'[28]; cooperation with industry can be fostered in many different ways, including changes in curricula, improved knowledge transfer, two-way mobility between university and industry, etc.; linkages with SMEs should be carefully[3]

- All types of sciences are important for socio-economic development – especially in the wake of the global crisis, as market-based products and services as well as social service provisioning by the state have largely failed to maintain the standard of living of the majority of the population. Social innovations are, new ideas (products, services and models) that simultaneously meet social needs and create new social relationships or collaborations. In other words, they are innovations that are both good for society *and* enhance society's capacity to act.[21]

- Contributing to local development is an important goal of the universities, whose fulfilment can provide significant benefits for the local economy as well as for universities.

The Universities in South Eastern Europe (SEE) taking part in the project have significantly developed their ERIT capacities, benefiting from the transfer of experiences from the EU as well as from their own efforts. Since further development of the National System of Innovation in SEE countries is as much a prerequisite as it is a long-term goal, the universities, in partnership with other NSI actors, intend to make it stronger and more sustainable. This role of the universities would incorporate, but also transcend, teaching and research and would extend to changing society through more direct contributions to both industry and society (the local and broader community). Hence stronger ties as well as innovative technology transfer and best practices in key ERIT segments in the quadruple helix of university-industry-government-civil society are the key to development.

3.1. The State of National Systems of Innovation

No post-socialist country out of those that are included on the Innovation Union Scoreboard has a better innovation performance than the EU average.[17] On a scale including modest innovators, moderate innovators, innovation followers and innovation leaders, Macedonia is a modest innovator and Croatia a moderate innovator – see figures 1 and 2. However, Bosnia and Herzegovina, Montenegro, and Macedonia are, according to the WEF,[32] on a lower level of development (efficiency-driven) than Croatia (in transition from efficiency-driven to innovation-driven stage) – see figure 3.

FIGURE 1: Countries with innovation performance below EU27

Legend: LV – Latvia, BG – Bulgaria, LT – Lithuania, MK – Macedonia, RO – Romania, RS – Serbia, SK – Slovakia, PL – Poland, HR – Croatia, HU – Hungary, MT – Malta, GR – Greece, ES – Spain, CZ – Czech Republic, IT – Italy, PT – Portugal, EE – Estonia, SI – Slovenia, CY – Cyprus, EU27 – 27 member states of the European Union

Note: Summary Innovation Indeks (SII) is a composite indeks calculated by InnoMetrics (2011)

Source: InnoMetrics (2011: 71)

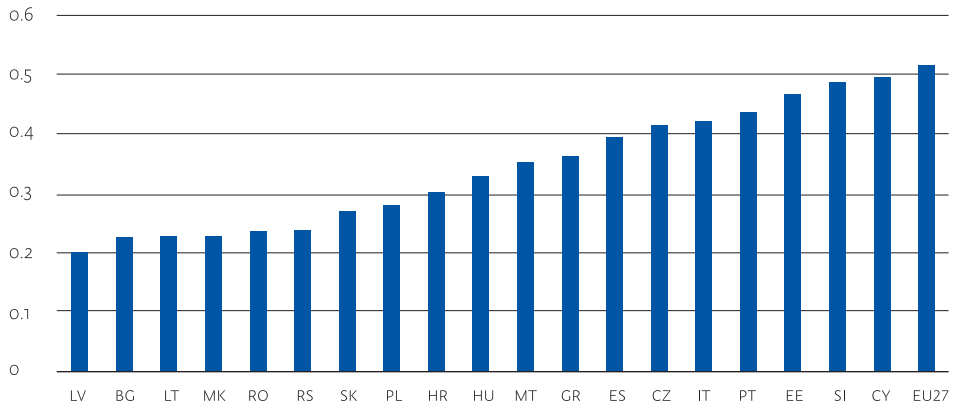


FIGURE 2: Countries with innovation performance above EU27

Legend: EU27 – 27 member states of the European Union, FR – France, LU – Luxembourg, IE – Ireland, NL – Netherlands, AT – Austria, BE – Belgium, UK – United Kingdom, DE – Germany, FI – Finland, DK – Denmark, SE – Sweden.

Note: Summary Innovation Indeks (SII) is a composite indeks calculated by InnoMetrics (2011)

Source: InnoMetrics (2011: 71)

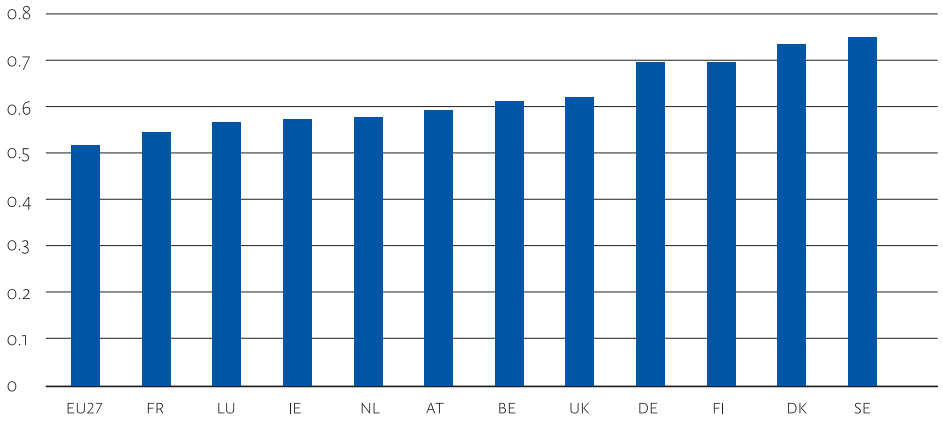
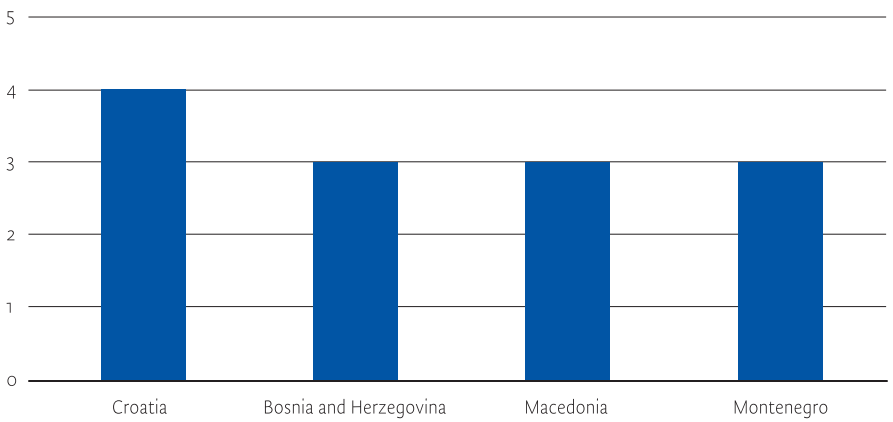


FIGURE 3: SEE countries according to their development level

Note: WEF (2011) measures development on a three-stage scale ranging from 'factor-driven' to 'efficiency¬-driven' to 'innovation-driven'. Furthermore, some countries are currently classified as being in transition from either the factor-driven stage to the efficiency-driven stage or from the latter to the innovation-driven stage. To each of these stages we have assigned a number on an ordinal scale ranging from 1 (factor-driven stage) to 5 (innovation-driven stage).

Source: WEF (2011)



The problems stem from underdeveloped NSIs that have been undergoing transition from the previous NSIs in the former Yugoslavia. Not only have enterprises underperformed in terms of innovation, but NSIs continue to suffer from weak connections among their constituents.[23] The private sector remains weak, and there is low demand for R&D performed at home, as well as for skilled employees. The R&D systems of Bosnia and Herzegovina, Macedonia and Montenegro are less developed than the Croatian R&D system and are not yet fully functional.[24]

There is insufficient communication (linkages) between all four elements of the quadruple helix. University-industry collaboration in R&D is rather low. The links between universities and industry have deteriorated mostly as a consequence of the privatisation of industry without sensible industrial policies that could have contributed to development. The links between universities and government are best articulated through funding.[24]

The main carriers of R&D are normally high-technology industries like pharmaceuticals and medium-high technology industries like motor vehicle production.[22] However, there is consequently a lack of such industries in some SEE countries. This can also be seen from the very low share of high-technology exports as a percentage of manufacturing exports,[30] in particular for Bosnia and Herzegovina (3%) and Macedonia (1%); Croatia fares much better with 9%.[8]

Gross expenditures on R&D (GERD) are much lower than the EU[27] average, although Croatia has much higher GERD than the other three countries. However, the public sector dominates in R&D funding, which is a clear indicator of the weakness of the private sector. 8,17

Industrial policy and EU programmes

Since high-technology sectors are also expected to have higher value added there is hence a need for industrial policies that will favour them through tax incentives and other horizontal subsidies. Furthermore eligible countries should participate in the Instrument for Pre-Accession Assistance (IPA) of the EU (that partially encompasses subsidies). IPA is funding several programme areas which indirectly affect industry: transition assistance and institution building; cross-border cooperation; regional development; human resources development; rural development. Other programmes of the EU which (in)directly affect industry should be utilised as well – if and when countries become eligible.

In terms of intellectual property rights (IPR), the legal framework is partially in place, but enforcement is deficient.[9-12] Among 142 countries, Montenegro ranks (57th), Croatia (69th), while both Macedonia (89th) and Bosnia and Herzegovina (121st) are in the lower half of the table regarding intellectual property protection.[32] Furthermore, it is not surprising that these countries have a small number of USPTO patents grants per million population, which is indicative of their competitiveness on foreign markets: Croatia leads the group with 2 (rank 45 out of 142 countries), while the other three countries have no U.S. patents.[32] Since the private sector is mostly underdeveloped, based on SMEs, and is predominantly involved in low value-added activities, it cannot be expected that the system of IPR *per se* has any greater influence on patenting and innovation activities. The development of the private sector requires active involvement of the state, but also of the universities.

External financing of innovations in firms is mostly dependent on bank loans, besides government financing. This is a general characteristic of bank-based financial systems such as those in SEE. This goes hand in hand with the fact that capital markets in these countries are underdeveloped, and that firms only marginally rely on financing sources like venture capital (VC), which have a financial and governance potential to fund growth-oriented small and medium-sized enterprises (SMEs). Since bank-based financial systems favour incremental innovations (and vice-versa), and capital market-based financial systems prefer radical innovations (and vice-versa), there is a tendency of NSIs to lock in on a certain technological level.[6]

The state should have a crucial role in building economies based on strong NSIs. (Re) building infrastructural institutions supporting an NSI is primarily in the hands of the state, since one cannot expect the other private organisations to have the same horizon or goals.

The role of the state and policy measures

Although the role of the state is indispensable it has been neglected in SEE. This goes especially for innovation policy. The state can stimulate demand for companies' products – as it has historically done.[16] That way it can substitute for low demand for R&D. Furthermore, it should contribute to development of a smart system of financing of innovations that can circumvent limitations resulting from potential lock-ins due to positive feedback between banking credits and incremental innovations. This could be done e.g. via tax credits for innovative enterprises, venture capital funds that are not primarily profit oriented and other instruments. A system of incentives through intellectual property rights, and other institutions (e.g. technology transfer offices, business incubators, technology centres) should create a more stimulative environment for innovations. That is all the more important as conditions have changed rather unfavourably as a consequence of a prolonged global socio-economic crisis.

3.2. Education–Research–Innovation Triangle in context

Universities in SEE are below the potential development level which can be seen in the EU, their research and innovation capacity being particularly deficient.[5] So the state of the ERI triangle has a lot of room for improvement. Further problems are caused by the lack of quality data at the HEIs, which creates barriers when it comes to evaluating institutions. Changes that are being introduced are encountering resistance from university employees, which is especially the case with non-integrated universities, i.e. those that have an organisational structure comprising faculties (as legal persons), each of which has its own management and administrative structure. Problems with funding, which is either poor or poorly distributed, only worsen these circumstances.[24]

As education is nowadays crucial for development and economic growth (cf. Lebert and Vercellone, 2007), its financing is of the utmost importance.[19] The state should have a major role in financing education (not just in SEE), as relying primarily on private sector financing cannot suffice nor be intended to promote the universities' mission, especially because of the aforementioned problems arising from private sector underdevelopment. That higher education should primarily be government-financed is in line with the World Declaration on Higher Education for the Twenty-First Century.[31] In the words of Nobel laureate Joseph Stiglitz, Government plays a central role in financing the services that people want, like education and health care. And government-financed education and training, in particular, will be critical in restoring competitiveness in Europe and the US.[27]

In terms of research and innovation, universities in the region are still at a very early stage. They are based on teaching, and not research. Research is generally not internationally competitive and awareness of the importance of IP protection is weak. The first step towards alleviating the situation has already been taken by some universities, in that they have set up either Research and Technology Transfer Centres, or Incubators and Science Parks and similar professional services that can propel research and innovation. The fragmented university structure that exists at some universities makes it additionally hard for them to build appropriate infrastructure that facilitates innovation. Furthermore, it represents an obstacle to transdisciplinary intra-university cooperation, slows down decision-making and increases costs due to the multiplication of administrative staff and procedures.

Universities may initiate a business forum in order to facilitate contacts between scientists and businesses. Furthermore, a business incubator can help develop entrepreneurial culture, providing information and expert advice to potential entrepreneurs. A good example of this is found at Saarland University:

> The *Start up Centre* is a business incubation centre established and wholly owned by the university with the aim of accelerating the growth and success of new companies. It is mainly open to the university's staff, students and graduates while a small number of the centre's programs are also open to the general public. The entity provides a wide range of support ranging from training programs in the form of short courses to workshops on all aspects of business. It assists entrepreneurs in all the developmental stages of their companies. In addition, the centre provides business space, administrative support in the form of a secretary.[29]

A technology transfer office (TTO) needs to be set up in order to facilitate transfer of knowledge from HEIs and other organisations pursuing publicly funded research to the private sector.[13] Best practice from University of Zagreb suggests one way in which a TTO can be built, which is beneficial even in the case of non-integrated universities. The TTOs activities are complementary to those of a business incubator:

> The University of Zagreb has established a functioning centralised TTO, using funds from the S&T project, and addresses the issue of Faculty ownership by imposing Rules on how the Office may function that must be adhered to by researchers who wish to use the service. The level of research activity at the University of Zagreb makes the presence of a centralised Office viable even with the added complication of full assignment of IP rights from the faculties. Other non-integrated universities have set up centralised TTOs, but the absence of any formally adopted structure (procedures and processes for its method of operation with regard to IPR) raises questions about their present effectiveness.[5]

Doctoral studies represent the third cycle of the Bologna higher education model. Furthermore, they are an important element in the ERIT triangle, since they contribute to research, and eventually to the transfer of knowledge (technology) as well. Therefore, the challenge of organising doctoral studies lies not only within the spectrum of teaching/education but should be also strongly based on research.[13] It has already happened in some countries during and after the implementation of the Bologna process that this has been disregarded. However, doctoral students should have appropriate funding, which has not been easy to secure in SEE.[5]

Challenge of organising doctoral studies
Universities should attract the best possible doctoral students/candidates who will have an important role in both research and teaching. Quality of research should be maintained, and qualified supervisors assured. EU experience shows that the quality of the doctoral research and efficient use of resources (not only research facilities but all other resources which support the whole process, ranging from workshops for transferable skills to accommodation for the candidates and their families) are best achieved through some organization on university level, such as doctoral schools or centres for doctoral studies[20]

Management of doctoral studies has become an important part of these efforts. An example from the Centre for Doctoral Studies, such as the one at the University of Vienna, can serve to highlight important goals and means of such an office:

> Before setting up of Center for Doctoral Studies a number of disadvantages for conducting doctoral studies (and their success) had been identified: students unprepared for a serious researcher role; a number of doctoral students studying only part-time; unsatisfactory supervision of doctoral students; deficient progress monitoring; deficient selection, in particular quality-based; unclear expectations of the dissertation. Center for Doctoral Studies has clearly defined goals: 1. Enhance the quality of the doctoral student experience. 2. Provide training in transferable skills. 3. Support the personal and intellectual growth of doctoral students. 4. Establish visible partnerships within and outside the University. 5. Facilitate improvements in co-operations and exchanges. 6. Engage in national efforts to illustrate the added value of the doctorate. 7. Serve as trusted resource concerning data and analysis. 8. Ensure administrative and policy flexibility without compromising quality. 9. Create process and policy enhancements to ensure top quality service to students and academics. 10. Be a clearly recognized voice in the decision-making process in the university. In order to fulfil these goals 16 initiatives have been established that will help achieve them, e.g. establishing a doctoral student lounge, training supervisors, writing strategic plan 2015. [33]

3.3. Looking forward

Development of the ERI triangle is an enormous task that takes a lot of effort to achieve. This task cannot be seen in isolation, but rather in the context of the NSI, which we have done here. Building the NSI is in itself a demanding undertaking that is never fully completed. Universities themselves can contribute to its development if they assume the active position of the main organiser of the ERI triangle. This requires quality management on their part, which spans not just new norms, but also facilitation of contacts between universities, firms and other relevant institutions (such as CSOs); it also requires the supervision of research and transfer of knowledge (technology). This document has drawn on both established findings and best practices of countries from the EU and SEE and can therefore serve as a guideline for strengthening ERIT.

4

The role of Government – Ministry of Science, Education and Sports, Croatia

This paper will focus on one part of the overall education-research-inovation triangle (ERIT): science-industry collaboration. The introduction will provide a brief overview of former efforts in the field.
The Government of the Republic of Croatia has recognised investments in the enhancement of science-industry collaboration as the driving force of the country's economic development. This recognition has taken the form of several initiatives, which in the first place include the following: the Science and Technology Project financed from a World Bank loan and projects financed from European Union pre-accession funds[34]. Their overall aim is to promote synergy between research and industry.

4.1. Analysis

According to a World Bank Report[35], improvement in innovation (measured as the number of new patents issued per million workers) and inbound technology transfer increases the potential output of Croatia's economy. The report analyses the current situation and comes to the following conclusions:

- Croatia is exporting below its potential; it lags behind particularly in exports of high and medium technology goods, which suggests difficulties in commercialising innovative activity;
- Croatia's overall innovation performance lags behind the EU average;
- Croatia lags behind in terms of investment in R&D;
- However, low R&D expenditures are not the only bottleneck to increased innovation in Croatia: the country is inefficient at turning R&D investments into patentable results, meaning that it is spending more on R&D per capita than other countries at similar income levels but still displays lower levels of patenting activity.

Building on the efforts made so far, as shown above, further efforts have to be directed towards the strengthening of the system.

The Ministry of Science, Education and Sports provides support to the Tempus OPUS project, not only through co-financing of the project, but also through active participation in its activities. The project foresees structural measures aiming at enhancing ERIT at partner institutions. In this respect, the White Paper is seen as a useful tool for shaping the direction of strengthening ERIT.

The purpose of the White Paper should be to provide an expert opinion on the ERIT issue that could help shape further policies in the field, rather than seeing it as a magic cure that will solve all standing issues related to ERIT.
However, introducing any kind of change requires effort and promotes greater accountability and responsibility of all partners involved: universities, research institutes, partners from industry and policy makers, both at the national and international levels.

4.2. Recommendations

With regard to the variety of institutions involved, responsibility over the implementation of results should be clearly defined.

The Ministry of Science, Education and Sports, as a policy making body, supports the delivery of structural measures that would enhance ERIT. Based on the results of conducted analyses, recommendations by the World Bank[35] and experience gained so far in the implementation of previously stated projects, the Ministry gives the following recommendations for the strengthening of science-industry collaboration:

(1) improving the investment climate, i.e. putting in place all the necessary elements of the national innovation system, to stimulate innovative activities;
(2) undertaking further efforts that will lead to the overall recognition of technology transfer offices (TTOs) as central points of science-industry collaboration;
(3) improving conditions for collaboration (by, for example, simplifying legal requirements for cooperation, encouraging market oriented activities of public research institutes and technology parks, etc);
(4) strengthening the networking of TTOs;
(5) introducing measures that would improve the quality and quantity of human resources for innovation;
(6) strengthening the role of offices for international cooperation at universities, including the role of science managers at these institutions;
(7) creating more effective science and technology policy frameworks, i.e. defining research and innovation policy priorities at the national, but also at the institutional, level;
(8) improving the overall governance structure of Croatia's National Innovation System.

The recommendations given above are based on the following principles:

- *inclusiveness,* i.e. inclusion of all stakeholders involved, according to their institutional responsibility;
- *transparency* of actions;
- *responsibility* for actions – from development of measures to their implementation – at all levels. Responsibility means, doing the job together, but each within their area of responsibility.
- *dialogue,* i.e. the White Paper looks beyond the borders of Croatia and aims at developing good practice networks through improved regional and European dialogues;
- *effectiveness* of achievements.

4.3. Conclusion

Links between industry and the research sector are among the most important components of the innovation system. Croatia's research base is thus a potential bearer of economic growth. Having this in mind, this paper briefly discusses some measures that could help foster the innovation and technology transfer process in the country.

5.

Introduction to structural changes through the exchange of good practice

Innovation is commonly defined as the introduction of a new product or service. Innovation is recognised at the organisational level and at the process level. Innovations can be new to the world, new to a country or new to an organisation.

Countries and organisations that are seeking rapid transition from an existing to a desired state can often benefit from adopting practices that have been established by others. When such practices can be shown to have had measurable positive impact, they are frequently referred to as 'Good' or 'Best Practices'. Good Practice takes place at structural and content levels. When they were originally developed and implemented, such practices were probably regarded as innovations by more traditional organisations. In particular, the development of the knowledge triangle (education, research and innovation) and the introduction of many knowledge exchange mechanisms is still 'new to country' and 'new to organisation' for many Higher Education Institutes (HEIs) in the transition countries of Europe.

The European Commission's TEMPUS Structural Measures programme seeks to develop and reform higher education institutions and systems in partner countries, to enhance their quality and relevance, and to increase convergence with EU developments. Learning from partners through study visits and by systematically identifying and transferring Good Practice helps the project partners to attain these goals. However, the successful transfer of Good Practice requires a certain degree of analysis, particularly the identification of those elements that sustain a specific Good Practice (GP) in the present location. Transfer paths can require the adopting organisation to make changes in the home environment in order to ensure that the GP will be able to function successfully in the new location.

In this section of the report, we present the results of the identification, capture and analysis of GPs by nearly all the partners of the project. Both the HEIs and their economic partners participated directly in this exercise. As a result, 22 examples have been

captured and analysed. This output represents a valuable resource for similar organisations seeking to make changes that are beneficial to their own knowledge triangles.

The GPs have been grouped to match the three apexes of the knowledge triangle: education, research and innovation. They are further sub-divided into Good Practice recipes and illustrative Case Studies, which indicate structure or content. The topics were selected based on the interest of one or more organisation in attempting to adopt an activity that they had observed at a partner organisation.

The regional contributions, which are from Croatia, Macedonia, Montenegro, and Bosnia and Herzegovina, illustrate that development of the knowledge triangle is in its early phases here and that there is a strong focus on initiating modern doctoral education programmes, establishing research databases, and drafting and adopting frameworks and activities to support innovation activities among the researchers, local enterprises and national support organisations. However, the examples clearly demonstrate that significant progress has been made by all the partners in all three areas of the triangle.

The European contributions offered here come from Belgium, Austria and Germany. They indicate the direction in which the SEE partners are now starting to move. It is notable that the core topics are more specialised, with a focus on educating entrepreneurs, developing research strategies with the input of multiple stakeholders, and developing ICT-facilitated research databases and information systems.

The approach to capturing and analysing GPs draws on the methodology developed by the UK Higher Education Knowledge Exchange Good Practice network (KTgoodpractice.org). This approach is outlined below.

Introduction and definitions

Good Practice (GP) is a way of doing something that can be shown to have measurable positive results.

CRITERIA
Good Practices should be:

1. **transferable** – with descriptions that are neutral, objective and user-friendly, and enable others to consider the feasibility of implementation in different environments
2. **repeatable** – they do not lose value or viability by repeated application in different HEIs
3. **clear and concise** – they are lucid and brief, with a clearly articulated purpose
4. **freely accessible** – their core elements are currently in operation without restrictions on wider dissemination
5. **evidence based** – they are objectively verifiable and have proven effectiveness

sustainable – their value/relevance is not time-limited nor inherently dependent on dedicated resources

A Good Practice recipe is a way of capturing and analysing a Good Practice. This enables it to be transferred to other groups who will have a clear understanding of the regulatory and support structures that need to be in place in their own organisation in order to make the GP both transferable and sustainable.

Good Practice Case Studies are a way of illustrating a Good Practice with specific details about how the GP was developed and implemented within an organisation or region.

Using the Good Practice Recipe Template

A Good Practice template is designed to offer a practical, generic, transferable approach on 'how to do things' in the world of knowledge exchange and transfer.
Good Practice recipes are not stories. This template is designed to enable a structured analysis; any Case Study examples need to be distilled and described in a very concise, bulleted format on the template in order to transform them in to a recipe.
The template used by the TEMPUS OPUS Partners is shown at the end of this section. This allocates the Good Practice to the appropriate segment of the research triangle (education/ research/ innovation) and then further divides the GP into a structural or a content-driven example.

The template enabled each TEMPUS OPUS contributor to divide its analysis into a clear description of the GP and then to examine the contextual factors. This final part of the analysis will enable other groups to see if they would be able to adopt the GP at their own institutions or if they would need to make significant changes to their present environment.
Good Practice recipes are at their most powerful when they are developed jointly by the originator of the GP and another group who hope to adopt the GP. This joint approach often results in a robust transfer path.

Using the Case Study Template

The case study template used by the OPUS Partners is also shown at the end of this section. This allows the Good Practice to be placed in a more local context. It captures the objectives and motivation behind the activity. It records the outcomes for both internal and external stakeholders. It seeks success factors and key lessons learnt by the organisation.
Documenting a Case Study can be a good starting point from which to distil a transferable Good Practice. The most informative Case Studies will have been 'read and understood' by an external partner.

Explicitly linking a Good Practice to a Case Study

It can be very powerful to be able to express the key features of a Good Practice, in particular the structure and processes, in a few lines and then link it to an illustrative case study. At the end of this document are some examples from the project *Doctoral studies in Europe: excellence in researcher training.*

Tackling Bad Practice

Finally, although we publicize them less frequently, our experience of Bad Practice is also valuable to partners. Bad Practice can also be captured and analysed, and it may be most comfortable to do this anonymously ('University X'). However, Bad Practice by itself is less valuable than an analysis that includes robust suggestions of how do something better next time. Examples of how other organisations have approached a problem that overcomes a Bad Practice will add a further valuable learning layer for other groups and offer starting points for governments and other public sector organisations who may then be given the task of making structural changes to help resolve the problem.

TEMPUS OPUS

Good Practice Recipes and Case Studies

Education

GOOD PRACTICE 1, Education Recipe: Inter-university study (mathematics).
Contributor: University of Montenegro.

Title of Good Practice

Inter-university study (mathematics)

Triangle Portion (Research, Education, Innovation)	**Sub-stream (Structural/ Content)**
Education	Content

Key words to reference Good Practice/Recipe (e.g. relationships, consultancy, networks)

Relationship, networks

(WHAT) Description of Good KE Practice/Recipe

- **What barriers or problems is this KE Practice/Recipe designed to overcome?**

- Fragmentation of human resources
- Lack of quality assurance in education

What are the key steps? (e.g. do this / do that to achieve this / that)

1. Recognition of the problem (small number of staff, low enrolment of students, lack of student mobility, problems with recognition of student mobility, problems with quality assurance)
2. Improve commitment of faculty management
3. Publish rulebook at the university level on joint programmes and joint degrees
4. Define key partners with similar problems and similar awareness of the problems
5. Find more experienced partners who have already overcome this problem and are willing to contribute to the new network
6. Provide funding. The funding can be provided from EU or national funds. Initial funding does not have to be very high to achieve good results
7. Define a common policy on quality assurance in the network. Get formal letters of commitment from all partner institutions

8. After wider objectives have been agreed upon within the network, address the concrete issues: define common courses, syllabus, people to implement the idea. Keep in mind that all partners in the network are equal and that every partner has the right to be represented and to vote. At the same time, partners may be quite different in their size and strength. Therefore, some partners are to take a greater role in the project than others. Criteria should be very clear, so that small (or weak) partners are not neglected
9. Form common bodies to monitor progress. There should be an academic body (focused on academic issues such as syllabi, criteria for professors, student eligibility) and a management body (focused on financial issues, coordination, etc.). As mentioned, all partners should appoint their representatives in these bodies
10. Organize joint courses. Each partner should formally recognize these courses with ECTS points
11. Based on experience from joint courses, discuss the possibility of a joint degree
12. Possibly provide additional funding for joint degree establishment
13. Get commitment from partner faculties for joint degree programme. Get formal approval of joint programme from partner at the university level

How does it benefit partners/clients and how have users'/beneficiaries' needs influenced this model?

- Wider educational opportunities for students,
- Better quality assurance of the education.

(HOW, WHEN) What contextual factors need to be taken into account in the application of this good KE practice?

- **What resource and operational implications are there in the adoption and integration of this approach?**

- Faculty management willingness to 'share' students and approve joint degree,
- Regulations at universities allowing joint degrees and setting up clear procedures on quality assurance,
- Funding ensured,
- Transparent management of the project and confidence within the network.

- **What specific operating contexts and environments are important for its application and what key lessons have been learnt from the experiences?**

- Rapid reform of education and more frequent networking require a good QA policy,
- A faculty/university will be successful in mid term only if it is both open to new models of education and has a clear QA policy,
- A network can be set up in such a way that all partners gain from it,
- Small faculties/universities (as are most at WB) usually do not have quality post-graduate studies if they do not have cooperation with other institutions,

- **What are the limitations and risks of application of this good KE practice; is it applicable in the KE function of any HEI and are there any time-related or regulatory limitations?**

- Faculties are generally conservative and not very keen on entering networks,
- Many universities in the WB do not have papers on QA; some others have relevant papers, but do not use them in an appropriate way,
- Transparent management, including financial management, is of essential importance; if there is no confidence inside network, no academic results will be achieved.

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GOOD PRACTICE 2, Education Recipe: Croatian inter-university doctoral programme in mathematics. Contributor: Universities of Osijek, Rijeka, Split and Zagreb, Croatia.

Title of Good Practice

Croatian Doctoral Programme in Mathematics

Triangle Portion (Research, Education, Innovation)	**Sub-stream (Structural/ Content)**
Education	Structural

Key words to reference Good Practice/Recipe (e.g. relationships, consultancy, networks)

Relationships, networks, e-learning

(WHAT) Description of Good KE Practice/Recipe

- **What barriers or problems is this KE Practice/Recipe designed to overcome?**

Doctoral studies organized by only one university cannot use the capacities (advisors, lecturers) of the other universities in the neighbourhood. There are not many professors of mathematics in Croatia, so they (at different universities) will have to cooperate closely in order to become well recognized at the EU level.

What are the key steps? (e.g. do this / do that to achieve this / that)

1. An agreement was reached between mathematicians from four Croatian universities (Osijek, Rijeka, Split, Zagreb) to organize such a joint doctoral programme
2. Mathematicians from all four universities participate in making decisions of higher importance

How does it benefit partners/clients and how have users'/beneficiaries' needs influenced this model?

Researchers from four Croatian universities participate in the doctoral programme, hence the students benefit from a wide range of possible advisors and lecturers, e.g. a student from one university can choose an advisor from another university.

(HOW, WHEN) What contextual factors need to be taken into account in the application of this good KE practice?

- **What resource and operational implications are there in the adoption and integration of this approach?**

All four universities have already established post-graduate and graduate courses in mathematics, so they have already elected professors in that field. In order to establish a common doctoral programme, besides the involved professors, all the relevant institutions (faculties and universities) have to approve that programme.

- **What specific operating contexts and environments are important for its application and what key lessons have been learnt from the experiences?**

If students have to take courses in the scope of the doctoral programme, there is a need for videoconferences.

- **What are the limitations and risks of application of this good KE practice; is it applicable in the KE function of any HEI and are there any time-related or regulatory limitations?**

The university's senior managers / decision makers must support this form of doctoral programme.

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GOOD PRACTICE 3, Education and Innovation Recipe: Student entrepreneurship education and support at HEIs. Contributor: University of Saarland, Germany.

Title of Good Practice

Student Entrepreneurship Education and Support at HEIS

Triangle Portion (Research, Education, Innovation)	**Sub-stream (Structural/ Content)**
Education and Innovation	Structural and Content

Key words to reference Good Practice/Recipe (e.g. relationships, consultancy, networks)

Education, entrepreneurship, start-ups, business incubator

(WHAT) Description of Good KE Practice/Recipe

- **What barriers or problems is this KE Practice/Recipe designed to overcome?**

- Employment is seen as the only career path and income generation possibility for students and graduates of HEIs,
- The regional industry sectors' strength as main employment provider is decreasing,
- New industry sectors are emerging.

- **What are the key steps? (e.g. do this / do that to achieve this / that)**

1. Establishment of a Starterzentrum as a framework and infrastructure for start-up companies from HEIs throughout all phases of setting up a business
2. Motivation Phase: Academic courses and business games
3. Idea Phase: Business Angel Assessments and JUNIT
4. Preparation Phase: Crash Courses and Coaching Cheques
5. Establishing Phase: Starterzentrum
6. Consolidation & Productivity Phase: Coaching Programme with workshops, roundtable meetings, experts as consultants, international exchange of start-up profiles for international Business relations

- **How does it benefit partners/clients and how have users'/beneficiaries' needs influenced this model?**

- Students and graduates receive support and guidance in the process of becoming entrepreneurs during the first three years,
- Industry partners establish close links to start-up companies, and offer their expertise in the same field of operation,

- Young entrepreneurs get in contact with future investors, and companies have the possibility to invest in, sponsor or donate to start-up companies at an early stage.

(HOW, WHEN) What contextual factors need to be taken into account in the application of this good KE practice?

- **What resource and operational implications are there in the adoption and integration of this approach?**

- Professors/faculty members with expertise and interest should offer entrepreneurship courses,
- A visionary, dedicated and resilient team is needed to establish and run the Starter-Zentrum.

- **What specific operating contexts and environments are important for its application and what key lessons have been learnt from the experiences?**

- Strong support from strategic management of the HEI,
- Facilities to rent for start-up companies,
- Key lesson learnt,
- Involvement of all sectors of the Quadruple Helix Model as partners (University, industry, government and civil society) is the key factor for the success and sustainability of the programme.

- **What are the limitations and risks of application of this good KE practice; is it applicable in the KE function of any HEI and are there any time-related or regulatory limitations?**

- A long-term approach requires committed leadership from the faculty,
- Availability of funding is crucial for the sustainability of the program,
- The ELIAS Model must be followed.

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GOOD PRACTICE 4, Education and Innovation Case study: Student entrepreneurship. Contributor: Saarland University Germany

Title of Good Practice	Student Entrepreneurship at Saarland University Germany
Main Theme (Research/ Education/ Innovation)	Education and Innovation
Sub-theme (Structural/ Content)	Structural and Content
Related public funding scheme (if applicable)	Mainly Third-Party Funding (EU, national, regional) small contribution from Saarland University.
Context	Set up as an entrepreneurship study programme / courses at Saarland University which each student can attend (ECTS credit-bearing).
• **Internal**	Development of a range of support measures and facilities for students during the first three years to help them become entrepreneurs.
• **External**	The collapse of two main economic sectors (Steel and Coal) in Saarland has made it necessary to expose graduates of Saarland University to other career opportunities and income generation possibilities beyond employment.
Objectives	To create the Starterzentrum as an environment within Saarland University where students and graduates of Saarland University can start and grow their business ideas into sustainable companies.
Process	Motivation Phase Academic courses and business games Idea Phase Business Angel Assessments and JUNIT Preparation Phase Crash Courses and Coaching Cheques Establishing Phase Starterzentrum

Process	Consolidation & Productivity Phase Coaching Programme with workshops, roundtable meetings, experts as consultants, international exchange of start-up profiles for international business relations
Critical success factors	Reliable and strong links to and support from industry and government, Commitment to strategic management by Saarland University, External Funding available, A visionary, dedicated and resilient team to establish the program.
Outcomes – key concrete benefits for external beneficiaries	Development of Science Park in the immediate neighbourhood of the university, Innovative companies, Employment opportunities, Role model for other universities in the national and international context.
Outcomes – key benefits for HEI	Reputation of Saarland University in the international academic environment, Science Park directly linked to University, Attractiveness of Saarland University in the region.
Key lessons learnt	The involvement of all sectors of the Quadruple Helix Model as partners (University, industry, government and civil society) is the key factor for the success and sustainability of the program.
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GOOD PRACTICE 5, Education Recipe: Doctoral school at the central university level. Contributor: Ss. Cyril and Methodius University, Skopje, Macedonia.

Title of Good Practice

Doctoral School at the Central University Level

Triangle Portion (Research, Education, Innovation)	**Sub-stream (Structural/ Content)**
Education	Structural

Key words to reference Good Practice/Recipe (e.g. relationships, consultancy, networks)

Doctoral education, Transferable skills, Quality Assurance

(WHAT) Description of Good KE Practice/Recipe

- **What barriers or problems is this KE Practice/Recipe designed to overcome?**

  - To endorse a high level of doctoral education,
  - To certify the same level of quality at all faculties and research institutes,
  - To enable the more efficient use of researchers, research resources and research equipment.

- **What are the key steps? (e.g. do this / do that to achieve this / that)**

  1. Establishment of a Management Body for university-level coordination of activities regarding doctoral education
  2. Definition of an organisational scheme of all the participating partners (faculties, research institutes)
  3. Definition of procedures and guidelines for the organization of doctoral education
  4. Sharing of responsibilities at each level (transferable skills education to be organized by the University and disciplinary and research skills to be organised by faculties)
  5. Clear procedure for Quality Assurance

- **How does it benefit partners/clients and how have users'/beneficiaries' needs influenced this model?**

  - Higher quality of research results,
  - Interdisciplinary research.

(HOW, WHEN) What contextual factors need to be taken into account in the application of this good KE practice?

- **What resource and operational implications are there in the adoption and integration of this approach?**

- There is a need for both additional administrative and scientific staff,
- Additional funding as well as additional space for organization of supportive measures should be foreseen.

- **What specific operating contexts and environments are important for its application and what key lessons have been learnt from the experiences?**

- Some legislative prerequisites, such as the minimum integration of the university, are essential for implementation of this model,
- An awareness of the need to join efforts in order to attain higher quality should be present among academics at the University,
- A commitment on the part of the university's management to work toward this task.

- **What are the limitations and risks of application of this good KE practice; is it applicable in the KE function of any HEI and are there any time-related or regulatory limitations?**

- The larger the university is, the greater the risk is that additional coordination activities will arouse the feeling that it is not efficient and sustainable.

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GOOD PRACTICE 6 Education Case Study: Doctoral school at the central university level. Contributor: Ss. Cyril and Methodius University, Skopje, Macedonia

Title of Good Practice	Doctoral School at the Central University Level
Main Theme (Research/ Education/ Innovation)	Education
Sub-theme (Structural/ Content)	Transferable Skills, Education and Quality Assurance System of Doctoral Studies organized at the University level
Related public funding scheme (if applicable)	N/A
Context	The organisation of a more industry-oriented doctoral education
• **Internal**	Ss. Cyril and Methodius University, Skopje, Macedonia
• **External**	Institutions and companies from the Public and Real Sectors
Objectives	To have high quality research results, better doctoral training, interdisciplinary research
Process	• Establishment of a management body for the coordination of activities related to doctoral education at the university level, • Definition of an organisational scheme of all participating partners (faculties, research institutes), • Definition of procedures and guidelines for the organisation of doctoral education, • Sharing of responsibilities at each level (transferable skills education to be organised by the university, and disciplinary and research skills to be organised by faculties), • Definition of Quality Assurance procedure.
Critical success factors	• Existence of legislation ensuring the integration of the university and the existence of a structure for doctoral education, • Strong commitment by the university management.

Outcomes – key concrete benefits for external beneficiaries	Contemporary organised doctoral education for candidates from Academia, as well as from institutions and companies in the Public and Real Sectors.
Outcomes – key benefits for HEI	A more efficient Quality Assurance system in the field of doctoral education, more efficient organisation of research.
Key lessons learnt	Commitment is essential.
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GOOD PRACTICE 7, Education Case Study: Erasmus Mundus office. Contributor: University of Mostar, Bosnia and Herzegovina.

Title of Good Practice	Erasmus Mundus Office
Main Theme (Research/ Education/ Innovation)	Education
Sub-theme (Structural/ Content)	Structural
Related public funding scheme (if applicable)	European Commission & Erasmus Mundus
Context	The Erasmus Mundus Office was formed at the level of the University of Mostar as a part of the International Relations Office, when the University became a partner in Erasmus Mundus External Cooperation Window JOINEUSEE project. It works intensively on getting people involved in different programmes of student, teaching and administrative staff mobility. One part of the activities of the office includes taking care of the funding of student and teacher mobility (collectinginformation and funds), accommodation and bilateral agreements on mobility (exchange), as well as the university's participation in European educational projects.
• **Internal**	The University of Mostar, including all 10 faculties and 8 scientific-research institutes, The development of consciousness about the significance of student, teaching and administrative staff mobility with the aim of lifelong learning, as well as strengthening cooperation with other higher education institutions and companies from the EU, Information about mobility should reach every student, teacher and administrative staff member from all faculties of the university.
• **External**	Companies, higher education institutions

Objectives	To offer the experience of studying, work and life in different academic, cultural and social environments to individuals, To strengthen inter-university cooperation through bilateral agreements, To improve the quality of educational programmes through the exchange of teachers and associates and meet prerequisites for the opening of graduate and doctoral programmes with partners from the EU, To increase possibilities for the development and transfer of innovations in higher education.
Process	The main activities concerning the establishment of the Erasmus Office were the following: Reaching the decision to form the office and determining its scope of activity, Establishing the office in its full capacity – employing staff, acquiring equipment, raising funds, Promoting the office at the level of the university and at relevant institutions in the country and abroad, Drawing up a working plan and documents necessary for the Office to function, such as an Information Package for foreign students, a Reference Book about mobility, guidelines for application, etc, Establishing cooperation with authorised institutions in the country with the aim of enabling easier mobility (Foreign Affairs Service).
Critical success factors	Understanding the significance of student and staff mobility for themselves and for the institution, Improving conditions for incoming mobility through providing accommodation for students, social and health insurance, simplifying the student application process, getting student associations involved.
Outcomes – key concrete benefits for external beneficiaries	Increasing the level of qualifications compatibility in higher education through the experience of studying, work and living in different academic, cultural and social environments.

Outcomes – key benefits for HEI	Internationalisation of the University, professional training of teaching and administrative staff, exchange of innovations, increased level of qualifications compatibility in higher education, increased possibilities for the employment of graduated students, competitiveness on the market, possibility of opening joint graduate and doctoral programmes with partners from the EU.
Key lessons learnt	Exchange programmes bring great benefit to the entire academic community. Organising incoming mobility without courses in English is almost impossible.
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Research

8

GOOD PRACTICE 8, Research Recipe: Implementing a central research database. Contributor: University of Montenegro.

Title of Good Practice

Implementing a central research database

Triangle Portion (Research, Education, Innovation)	**Sub-stream (Structural/ Content)**
Research	Content

Key words to reference Good Practice/Recipe (e.g. relationships, consultancy, networks)

Consultancy; expertise.

(WHAT) Description of Good KE Practice/Recipe

- **What barriers or problems is this KE Practice/Recipe designed to overcome?**

- A lack of measuring of scientific facts and figures,
- Unclear criteria for the allocation of funds to support research,
- Insufficient data, making it impossible to compare university/country research output with other universities/countries.

- **What are the key steps? (e.g. do this / do that to achieve this / that)**

1. Establish/redesign criteria for competition for scientific grants
2. Design a new database or (better) agree upon using one of the existing databases on research output
3. Appoint a team for the development of a central research database at the university or ministry
4. Dissemination: present the new database and new requirements to the research community. Use direct presentations at universities and scientific institutes, as well as dissemination via the web and mailing lists
5. Ask all researchers to contribute by submitting their reference lists
6. For ongoing calls, set up the criteria so that researchers can be supported only if they are in the database. In other words, each research project application will be checked in the database. If researchers are not in the database, the project application is not eligible

- **How does it benefit partners/clients and how have users'/beneficiaries' needs influenced this model?**

- By developing the culture of measuring scientific facts/figures,
- By providing clear criteria for the allocation of funds for research,
- By gathering all relevant information on research in one database,
- By providing easy–to-follow research output of the university/country, making it easier to compare to other universities/countries, follow dynamics, get statistics, etc.

(HOW, WHEN) What contextual factors need to be taken into account in the application of this good KE practice?

- **What resource and operational implications are there in the adoption and integration of this approach?**

- There have to be calls for research project applications at least once per year. Calls should be attractive enough to attract most researchers from the university/country,
- An appropriate database framework should be selected. A team at the university/national ministry should implement the system.

- **What specific operating contexts and environments are important for its application and what key lessons have been learnt from the experiences?**

- Researchers have to be motivated to contribute to the database and to keep updating their entries,
- Different and fair criteria must be elaborated for different fields (Fundamental sciences, Social sciences, Engineering).

- **What are the limitations and risks of application of this good KE practice; is it applicable in the KE function of any HEI and are there any time-related or regulatory limitations?**

- Low budget for science and research. Different criteria for different fields of research (Life sciences, engineering, humanities, etc.).

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GOOD PRACTICE 9, Research Recipe: Establishing a current research information system. Contributor: University of Vienna Austria.

Title of Good Practice

Establishing a Current Research Information System (CRIS) at a university

Triangle Portion (Research, Education, Innovation)	**Sub-stream (Structural/ Content)**
Research	Content

Key words to reference Good Practice/Recipe (e.g. relationships, consultancy, networks)

CRIS; Research monitoring; Evaluation

(WHAT) Description of Good KE Practice/Recipe

- **What barriers or problems is this KE Practice/Recipe designed to overcome?**

- Lack of availability of research output data,
- Lack of transparency of research activities,
- Lack of standardised procedures for data collection,
- Lack of central reporting,
- Lack of data integration.

- **What are the key steps? (e.g. do this / do that to achieve this / that)**

1. Get the people
2. Define the project, including roles and responsibilities, project resources, milestones and timeframe
3. Get commitment from the top management
4. Define key players in both faculty and administration
5. Ensure sustainable maintenance and funding for the following:
   - IT (infrastructure, services, development);
   - CRIS team (helpdesk and support, training, quality assurance: data monitoring and data cleansing;
   - The training of staff
6. Start running the office: create processes and a policy that will be followed in everyday work
7. Raise the visibility of the CRIS
8. Populate the system with a sufficient time window
9. Provide data to the management for decision-making
10. Connect to the European CRIS community
11. Work on general presence, wherever CRIS is needed
12. Use workshops to inform and train the community
13. Identify success stories to get recognised

- **How does it benefit partners/clients and how have users'/beneficiaries' needs influenced this model?**

- Researchers: duplication of data and effort must be avoided: Single point of data collection; transparency of the data used in negotiations and performance agreements: everybody talks about the same data,
- University management: availability of standardised and comparable reports (internal and external).

(HOW, WHEN) What contextual factors need to be taken into account in the application of this good KE practice?

- **What resource and operational implications are there in the adoption and integration of this approach?**

- The budgeting of research units could be based on respective performance,
- A highly motivated set of 'start-up' people with an understanding of the pre-CRIS situation,
- A critical mass of software developers,
- A legal reporting obligation to the ministry,
- A university-wide policy regarding data collection and impact of the data for the faculty, departments and individual researchers is beneficial.

- **What specific operating contexts and environments are important for its application and what key lessons have been learnt from the experiences?**

- Information for the researchers' community about the currently offered set of services, planned developments and their possible impact is crucial,
- Stakeholders (university management, the ministry) should have clear strategic directions about the need for CRIS and its status,
- The University should develop a policy concerning data collection and reporting according to the needs of the management of the university and should not be based only on the requirements of the ministry (frequent changes possible!),
- The idea of the CRIS project as a joint endeavour should be stressed,
- Government policy should understand CRIS activities and incorporate them into rules and laws applying to research activity,
- Responsibilities and non-responsibilities must be transparent.

- **What are the limitations and risks of application of this good KE practice; is it applicable in the KE function of any HEI and are there any time-related or regulatory limitations?**

- Insufficient resources for maintenance and staff.

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10

GOOD PRACTICE 10, Research Case Study: Implementing a central research information system. Contributor: University of Vienna Austria.

Title of Good Practice	Implementing a central research information system
Main Theme (Research/ Education/ Innovation)	Research
Sub-theme (Structural/ Content)	Content
Related public funding scheme (if applicable)	n/a
Context	-
• **Internal**	University of Vienna AT Development involved 4 university offices: Research Services and International Relations, CIT, University Library; Accounting and Finance (Reporting System) 6.700 researchers at 15 faculties and 3 centres of the University Rectorate, Faculty Management, Quality Assurance, Research Services and International Relations.
• **External**	Federal Ministry of Science and Research; public; data and service providers.
Objectives	to create a central and integrated research information system with consistent and standardised data (publications, talks, projects, researcher profiles) for reporting and decision-making purposes.
Process	Main activities necessary to establish a CRIS are the following: 1. Analysis of existing databases (usefulness, scalability, up-to-dateness, expandability) 2. Project set-up (definition of project goals, project team, funding, timescale) 3. Application development 4. Roll-out in phases for de-centralised data-collection 5. Interface with data warehouse/reporting system 6. full and continuous operation - technical support - establishment of a CRIS team: first-level support, training, maintenance, communication
Critical success factors	Backing by top management of the university, clear vision and common understanding of the importance within the project team, acceptance by faculty.
Outcomes – key concrete benefits for external beneficiaries	Availability of high quality data and standardised reports.
Outcomes: key benefits for internal context	Availability of high quality data and standardised reports for management and individual researchers; transparency; single point of data entry; one single data source.
Key lessons learnt	involvement of researchers as end-users is crucial, permanent communication, usability, added value for researchers must be prioritised from the very beginning.
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11

GOOD PRACTICE 11 Research Recipe: Stakeholder engagement in Research Strategy formulation. Contributor: KU Leuven, Belgium.

Title of Good Practice

Stakeholder engagement in Research Strategy formulation

Triangle Portion (Research, Education, Innovation)	**Sub-stream (Structural/ Content)**
Research	Structural

Key words to reference Good Practice/Recipe (e.g. relationships, consultancy, networks)

Stakeholders, strategy, research

(WHAT) Description of Good KE Practice/Recipe

- **What barriers or problems is this KE Practice/Recipe designed to overcome?**

- a reluctance to think out of the box; an essential prerequisite for making progress on a higher level,
- sub-optimal coordination,
- a dislike of quantifying objectives,
- a tendency to think in conflicting terms.

- **What are the key steps? (e.g. do this / do that to achieve this / that)**

- Set up informal consultation rounds (not in existing, formal meetings) and define the general objective,
- Formulate objectives in an open-ended way,
- Anticipate specific types of resistance and listen carefully in order to find out what the basis for this kind of attitude is,
- Set up discussions in diversified and broadly defined groups (encourage people to take one another's perspective).

- **How does it benefit partners/clients and how have users'/beneficiaries' needs influenced this model?**

- Broad consulting fulfils the need for mutual respect,
- Identifying with institutional objectives is an extra source of motivation/satisfaction if the objectives are made true,
- If successful, it will lead to improved conditions for all parties involved,

(HOW, WHEN) What contextual factors need to be taken into account in the application of this good KE practice?

- **What resource and operational implications are there in the adoption and integration of this approach?**

- It is essential to have a small team that is devoted to the process, with good and frequent contacts with everyone involved.

- **What specific operating contexts and environments are important for its application and what key lessons have been learnt from the experiences?**

- Create the conditions for broad interaction and the diffusion of ideas,
- Make the initiative part of a larger initiative, so that a failure can be more easily compensated for or new action can be taken.

- **What are the limitations and risks of application of this good KE practice; is it applicable in the KE function of any HEI and are there any time-related or regulatory limitations?**

- All too often, the existing structures constitute a problem. On the one hand, there is the risk of disrespect for the existing structures or people involved in these structures, and on the other hand there is a danger that existing structures have a monopoly over the process,
- Set your own deadlines and time schedules, but do not announce them officially for everyone to know.

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12

GOOD PRACTICE 12 Research Case Study: Stakeholder engagement in Research Strategy formulation. Contributor: KU Leven Belgium.

Title of Good Practice	Stakeholder engagement in Research Strategy formulation
Main Theme (Research/ Education/ Innovation)	Education
Sub-theme (Structural/ Content)	Content
Related public funding scheme (if applicable)	not applicable
Context	—
• **Internal**	There is a long-standing university tradition of faculties taking a strong and independent position, and huge resistance against the quantification of objectives, The Executive Board is convinced that identifying with common quantitative objectives (such as citations, the number of PhDs, scholarships and grants) can serve as an important basis for high ambition and new dynamics.
• **External**	A highly competitive European environment, New opportunities for research innovation and European funding.
Objectives	• Announcing a broader strategy initiative that also includes qualitative targets (such as better perspectives for junior researchers and newly appointed professors, appreciative measures for established researchers, career flexibility for academics, international recruitment), • Drawing up a non-exhaustive list of qualitative and quantitative objectives (after having extensively and informally consulted a number of key persons at the faculties).
Process	• Setting up brainstorming sessions at the different faculties on the advantages of reaching quantitative and qualitative targets; faculties should also think about possible ways to reach these targets; the result is at least one tentative summary per faculty, • Organising a broad and open meeting for all the staff involved, • Setting up joint meetings with junior and senior researchers and deans, • Writing a concluding document for the Academic Council and the Board of Governors, • Finding a productive balance between top-down (executive board) and bottom-up (faculties, researchers).
Critical success factors	• Realising that 'quantitative' does not conflict with 'qualitative', and that 'faculty autonomy' does not conflict with 'identification with the institute'.
Outcomes – key concrete benefits for external beneficiaries	Not planned in an explicit way, but possibly implied if the achievements are substantially enhanced: advantages at the national (Flemish, Belgian) level - industry, economy, more prestige.
Outcomes: key benefits for HEI	Improved resources for research and higher research quality, A positive identification with the institute, a positive spiral of dynamics. Security and improvement of the competitive position.
Key lessons learnt	Take the perspective of the people involved and find out in an honest and open way what the basis is for fear of change. Try to reconcile this with your major objectives. Combine determination with openness.
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Innovation

13

GOOD PRACTICE 13, Innovation Recipe: Croatian Business-Scientific Club. Contributor: Croatian Chamber of Economy.

Title of Good Practice

Business – Scientific Club

Triangle Portion (Research, Education, Innovation)	**Sub-stream (Structural/ Content)**
Innovation	Content

Key words to reference Good Practice/Recipe (e.g. relationships, consultancy, networks)

Collaboration, University, Industry, Club meetings, New technologies.

(WHAT) Description of Good KE Practice/Recipe

- **What barriers or problems is this KE Practice/Recipe designed to overcome?**

- Decrease of industry production and growth,
- Lack of business collaboration between domestic scientific researchers and entrepreneurs,
- Lack of commercialization of research results,
- Low awareness of the need for better University/Industry collaboration,
- Need for presenting good practice and successful innovation projects,
- Finding new possibilities and points for exchanging experiences between the Academy and Industry.

- **What are the key steps? (e.g. do this / do that to achieve this / that)**

1. Arouse interest in the idea of a Business-Scientific Club among responsible people in institutions (universities, government) and industry
2. Ensure funding
3. Identify existing successful projects
4. Define the address list for sending invitations to universities, industry and government institutions
5. Organize regular club meetings
6. Ensure the presentation of successful projects

- **How does it benefit partners/clients and how have users'/beneficiaries' needs influenced this model?**

- Provides for the exchange of experiences and ideas for better collaboration between universities and industry,
- Increases awareness of the need for better collaboration,
- Disseminates information about new technologies,
- Provides the opportunity for members to meet potential business partners during the 13 meetings of the club,
- Helps members learn about new business projects such as high-technology SME and spin-off companies.

(HOW, WHEN) What contextual factors need to be taken into account in the application of this good KE practice?

- Existing collaboration between universities and industry,
- Existing common points and networks for technology transfer,
- Interest of universities and other science institutions,
- The Business-Scientific Club was established on the initiative of BICRO (Business Innovation Centre) and in cooperation with the Croatian Chamber of Economy, the company Ruđer Inovacije d.o.o. and the Technology Transfer Office of University of Zagreb,
- Available funding,
- IPR concept and policy on universities.

- **What specific operating contexts and environments are important for its application and what key lessons have been learnt from the experiences?**

- Researchers should be interested in commercialization of R&D,
- Universities should establish Transfer Technology Offices and provide transparent IPR policy,
- Industry should show more interest for financing new market-driven technologies,
- Entrepreneurs should seek more information about new technologies from domestic universities.

- **What are the limitations and risks of application of this good KE practice; is it applicable in the KE function of any HEI and are there any time-related or regulatory limitations?**

- It is difficult to arouse enough interest from scientific researchers and entrepreneurs for the idea in this time of crisis.

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GOOD PRACTICE 14, Innovation Recipe: Managed university-industry cooperation. Contributor: Ericsson NT Croatia.

Title of Good Practice

Managed university-industry cooperation

Triangle Portion (Research, Education, Innovation)	**Sub-stream (Structural/ Content)**
Innovation	Structural

Key words to reference Good Practice/Recipe (e.g. relationships, consultancy, networks)

Cooperation, legal framework, result sustainability.

(WHAT) Description of Good KE Practice/Recipe

- **What barriers or problems is this KE Practice/Recipe designed to overcome?**

- Lack of common understanding (needs versus opportunities),
- Understanding of the relation between a product for sales and a technology prototype,
- Lack of time horizon (sense of urgency and appropriate long-term planning),
- Individual interests without an institutional view.

- **What are the key steps? (e.g. do this / do that to achieve this / that)**

1. Find common interests in general (convince general management of cooperating institutions to recognize the potential of common cooperation)
2. Find a promising and challenging first problem that can be solved by a common research project – then produce a visible result (organise the project)
3. Find appropriate persons on both sides to make the direction of the project operational
4. Sign a formal contract on cooperation and regulate IPR issues in the contract before the work has started

- **How does it benefit partners/clients and how have users'/beneficiaries' needs influenced this model?**

- University: practical problems, additional money for research, knowledge/technology transfer, marketing,
- Industry: faster and modern solution, social responsibility, new knowledge, marketing, business case,

(HOW, WHEN) What contextual factors need to be taken into account in the application of this good KE practice?

- **What resource and operational implications are there in the adoption and integration of this approach?**

- There must be a formal contract between institutions, with key persons responsible for expected concrete results, such as the outcomes of the agreed job to be done (project based execution enables tracking and visibility),
- The people on both sides must be dedicated, insuring operational execution, tracking and reviewing,
- The money, terms of payment and IPR (background and foreground IPR) must be agreed upon,
- There must be project participants from both sides (direct knowledge/problem transfer).

- **What specific operating contexts and environments are important for its application and what key lessons have been learnt from the experiences?**

- Periodic review and proper reporting of achieved results and potential risks,
- Always have something of achieved results to demonstrate,
- Enable flexibility on both sides regardless priorities and focus,
- Always present/report results, either positive or functionally negative, of executed job,
- Find the appropriate user of the achieved research results in the industry context.

- **What are the limitations and risks of application of this good KE practice; is it applicable in the KE function of any HEI and are there any time-related or regulatory limitations?**

- Understanding of the project management in the research tasks (time, money, risks, uncertainties),
- Wrong initial plan without risk management,
- Inappropriate reporting,
- Without any other special limitations this good practice is broadly applicable.

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15

GOOD PRACTICE 15, Innovation Recipe: Science and Technology Park.
Contributor: University of Rijeka Science and Technology Park (STeP) Croatia.

Title of Good Practice

Science and Technology Park, University of Rijeka (STeP)

Triangle Portion (Research, Education, Innovation)	**Sub-stream (Structural/ Content)**
Innovation	Structural

Key words to reference Good Practice/Recipe (e.g. relationships, consultancy, networks)

Consultancy, networks, innovation, incubation.

(WHAT) Description of Good KE Practice/Recipe

- **What barriers or problems is this KE Practice/Recipe designed to overcome?**

Insufficient transfer of knowledge and technology from the University of Rijeka to the business sector.

- **What are the key steps? (e.g. do this / do that to achieve this / that)**

1. Developing a business model for establishing a Science and Technology Park (STeP)
2. Establishing the required infrastructure (building with required facilities)
3. Locating and recruiting qualified people to run the STeP
4. Providing required know-how and managed space for the entrepreneurs in STeP

- **How does it benefit partners/clients and how have users'/beneficiaries' needs influenced this model?**

- Existing and future entrepreneurs and SMEs have a well-known place (STeP) at the new campus of the University of Rijeka where they can find information, seminars and workshops regarding their innovative activities,
- They can also rent a space and find themselves in the optimum surroundings for their business projects.

(HOW, WHEN) What contextual factors need to be taken into account in the application of this good KE practice?

- **What resource and operational implications are there in the adoption and integration of this approach?**

- The University of Rijeka has established close cooperation with the Croatian agency BICRO (Business Innovation Centre), the city of Rijeka and Primorsko-goranska County in order to make this project possible,
- All of them are now supporting STeP, and soon it will become self-sustainable.

- **What specific operating contexts and environments are important for its application and what key lessons have been learnt from the experiences?**

- The transfer of knowledge from the academic to the business sector requires well-developed research at universities and well-developed SMEs that need that knowledge,
- At present in Croatia those two premises have not quite been achieved, so STeP, as an intermediate operator, should also raise awareness about the importance of improvement as well as cooperation between those two sectors.

- **What are the limitations and risks of application of this good KE practice; is it applicable in the KE function of any HEI and are there any time-related or regulatory limitations?**

- The university leaderships as well as the leaderships at the national and local levels of government have to support the transfer of knowledge and technology transfer through STeP in its synergy with the Transfer Technology Office (TTO).

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GOOD PRACTICE 16, Innovation Recipe: IP protection through the Technology Transfer Office. Contributor: University of Rijeka, Croatia.

Title of Good Practice

IP Protection through the Technology Transfer Office

Triangle Portion (Research, Education, Innovation)	**Sub-stream (Structural/ Content)**
Innovation	Structural

Key words to reference Good Practice/Recipe (e.g. relationships, consultancy, networks)

International Patenting, IP Policy, Intermediaries, Researchers.

(WHAT) Description of Good KE Practice/Recipe

- **What barriers or problems is this KE Practice/Recipe designed to overcome?**

- Lack of protection of IP at the institutional level (University/Faculty),
- Individual researcher patenting limited to national patenting strategies.

- **What are the key steps? (e.g. do this / do that to achieve this / that)**

1. Develop an IP Policy
2. Develop an associated IP Rulebook
3. Establish associated procedures for IP protection
4. Establish the required infrastructure (trained personnel, patent attorney, IP protection fund)
5. Bridge the gap between academic and entrepreneurial ways of thinking
6. Offer complete support to researchers in IP protection

- **How does it benefit partners/clients and how have users'/beneficiaries' needs influenced this model?**

Researchers are encouraged to protect their IP and have support to follow existing procedures at the university level as well as support in IP protection toward authorised institutions.

(HOW, WHEN) What contextual factors need to be taken into account in the application of this good KE practice?

- **What resource and operational implications are there in the adoption and integration of this approach?**

- The University of Rijeka has established close cooperation with the Ministry of Science, Education and Sports and the World Bank and has used IPA funds in order to make this project possible,
- Strong commitment of the faculties as separate legal entities and the university is necessary for the success of this model.

- **What specific operating contexts and environments are important for its application and what key lessons have been learnt from the experiences?**

- The faculties and the university have to embrace IP protection and accept this model,
- Researchers have to believe, in a positive way, that the TTO will support the protection of their IP and act in the best manner in order to protect the interests of all stakeholders,
- The TTO has to be very professional and act as an intermediary between the faculties, researchers, the university, patent attorneys and authorized institutions.

- **What are the limitations and risks of application of this good KE practice; is it applicable in the KE function of any HEI and are there any time-related or regulatory limitations?**

- The University leaderships, as well as the leaderships at the national and local levels of government must support IP protection,
- International IP patenting strategies are very expensive, and for relatively small universities like the University of Rijeka, this is presently not possible without national and local government support,
- Faculties have to encourage researchers to protect their IP and validate it with the help of the TTO.

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17

GOOD PRACTICE 17, Innovation Case Study: Founding spin-off companies. Contributor: Ruđer Bošković Institute Croatia.

Title of Good Practice	Founding spin-off companies at Ruđer Bošković Institute Croatia
Main Theme	Strategic and structural change
Sub-theme (Structural/ Content)	Commercialisation of research results through spin-off companies
Related public funding scheme (if applicable)	WB Loan for the Science and Technology Project in Croatia
Context	—
Internal stakeholders	Ruđer Bošković Institute Ruđer Inovacije Ltd. Scientists
External stakeholders	Scientists, companies, healthcare institutions, Private Equity/Venture Capital funds,
Objectives	• To motivate R&D society and create a system for technology transfer of IP through the formation of spin-off companies, • To define a possible route for commercialisation (spin-off companies) and to set up the necessary procedures ('Regulations for the formation of spin-off companies from Ruđer Bošković Institute (RBI)') spin-off companies, • To use a commercialisation model/system as a base for structuring a national legal and institutional framework for innovations.
Process	• Proposals of innovations to external experts, • Licensing of innovations of RBI to Ruđer Innovations (RI) according to the Master Cooperation Agreement (between RBI and RI), • Evaluation & protection of innovations by RI (Patenting, know-how, trademark, etc.), • Market and technology evaluation by RI, • Team formation (RBI, RI, scientists, external stakeholders),

Process	• Business plan preparation by RI and scientists (according to 'Regulations for the formation of spin-off companies from Ruđer Bošković Institute (RBI)'), • Approvals by MSES, WB, RBI and RI, • Formation of spin-off company with initial funding, • Monitoring of company's growth through supervisory board.
Critical success factors	• Commitments and motivations of scientists, • Support from the institutional management, • Available and sufficient pre-commercialisation financing of innovative ideas with good commercialisation potential, • Good IP or idea, • Prior assessment and identification of market needs, • Human resources with professional skills and expertise, • Business plan, • Adequate financing.
Outcomes – key concrete benefits for external beneficiaries	• Access to the scientific infrastructure and know-how, • Commercialisation of the R&D results and IP through a structured and defined process, • Establishment of an innovation and IP system (defined processes and procedures), • Building and improvement of awareness of IP importance, • Acceptance and recognition of RI role and scientists in the commercialisation of R&D results, • Benefits to the Croatian economy - gaining value through new products/services accomplished by cooperation between industry and R&D.
Outcomes: key benefits for HEI	• Increasing number of innovations applied for commercialisation through spin-off companies, • Motivation of scientists for IP protection and commercialisation of R&D results, • Success stories – showing good examples, • Generation of income for RBI, • Knowledge transfer from labs to industry.
Key lessons learnt	• Having a defined legal framework for the formation of spin-offs, • Long-term process, • Structured IP policies and a motivation system for scientists in case of commercialisation through spin-offs, • RI as a commercialisation infrastructure for the innovation system at RBI.

GOOD PRACTICE 18, Innovation Case Study: The development of an IP commercialisation rulebook. Contributor: University of Zagreb, Croatia.

Title of Good Practice	The development of an IP commercialisation rulebook at the University of Zagreb
Main Theme (Research/ Education/ Innovation)	Innovation
Sub-theme (Structural/ Content)	Structural
Related public funding scheme (if applicable)	STP -Science and Technology Project co-funded by the World Bank and the Ministry of Science Education and Sports.
Context	—
• **Internal**	University of Zagreb, Croatia, This project involved support from the university management, input from commercialisation and legal experts, further input from representatives of various scientific fields, and finally the support of the University Senate, Internal stakeholders include university researchers with research results or expertise and an interest in commercial collaboration with the outside world.
• **External**	Industry open to innovation, in Croatia and abroad.
Objectives	To provide a transparent framework for the commercialisation process (including revenue sharing) through the University in order to allow the TTO to engage with researchers and begin technology transfer activities.
Process	the IP Rulebook Development Process involved the following steps: 1. Development of the Rulebook draft in consultations with university management and commercialisation and legal experts 2. Consultations with the University Senate appointed Committee for Research, Development and Technology Transfer; inclusion of the feedback in the Rulebook draft 3. Public presentation of the Rulebook draft to the committees of various scientific disciplines; inclusion of their feedback in the Rulebook draft 4. Presentation of the Rulebook to the University Senate and Senate vote
Critical success factors	Support of the university management, Availability of expertise necessary to draft and present the Rulebook, Having stakeholders understand the need for technology transfer internal regulation.
Outcomes – key concrete benefits for external beneficiaries	Increase in the number and quality of technologies offered for commercialisation, and improved transparency in the IP situation. Industry will receive technology commercialisation offers from a professional service that has conducted initial assessment and due diligence and protected the IP accordingly.
Outcomes: key benefits for HEI	A new transparent route for IP protection and the commercialisation of research results was established.
Key lessons learnt	The goal needs to be achievable, The University Senate should be approached with mature propositions that have already been through the internal consultation process. Support of the university management is critical, It was important that the researcher representatives saw engaging with the TTO as a voluntary activity, Enough time and care should be given to public consultations and the inclusion of the resulting amendments.
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GOOD PRACTICE 19, Innovation Case Study: Establishing a technology transfer office. Contributor: University of Zagreb, Croatia.

Title of Good Practice	Establishing a technology transfer office at the University of Zagreb
Main Theme (Research/ Education/ Innovation)	Innovation
Sub-theme (Structural/ Content)	Structural
Related public funding scheme (if applicable)	Project funded by STP for establishing and running the office.
Context	—
• **Internal**	University of Zagreb, Croatia, Development involved researchers from all entities of the university - 29 faculties and 3 academies, The specific population that is covered consists mainly of researchers of all ranges with inventive topics applicable as technology or as new transferable knowledge.
• **External**	Innovative industries, the Ministry of Science, Education and Sports (MZOŠ), other research institutions.
Objectives	Commercialisation of research results through IP management, IP transfer and management promotion where there is a benefit for both industry and researchers.
Process	The main steps to take in the establishment of a TTO are the following: 1. IPR policy creation - ensures a legal framework is in place 2. Establishment of full TTO operation - people, funding 3. IP Protection: regulations, promoting the culture, commercialisation 4. Spin-out: regulation, development of spin out/start-up activity (through workshops), development of spin-out support (PoC, spin-out programme) 5. Knowledge exchange (preparation, workshops, support) 6. Team development (training of TTO team)
Critical success factors	Understanding of the importance of TTO within the context, Following the policy and process introduction that helps researchers and the industry, Having stakeholders understand the need of the office in the future.
Outcomes – key concrete benefits for external beneficiaries	Single entry point that understands how the industry accepts technology and where industry can ask for the presence of certain know-how within the university.
Outcomes: key benefits for internal context	Point that helps in pre-commercialization activities, educates about how to deal with commercialization and technology transfer activities between two universities.
Key lessons learnt	Setup process takes more time than anticipated. Stakeholders need a lot of effort to convince about importance of TTO sustainability. Overall economy situation has impact on the context of TTO subjects.
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GOOD PRACTICE 20, Innovation Case Study: Managed university-industry cooperation. Contributor: Ericsson NT Croatia

Title of Good Practice	Knowledge transfer between University and Industry
Main Theme (Research/ Education/ Innovation)	Innovation
Sub-theme (Structural/ Content)	Structural and Content
Related public funding scheme (if applicable)	Private investment (financing customised development)
Context	—
• **Internal**	Innovation is a key factor for survival in the business environment. Innovative services and products for the end customer are the main differentiator on the market, but it is a great plus is to internalise operational innovation for faster and more qualitative production, In the university environment a lot of interesting prototypes are often produced without a sense for applicability and real problem solving, Relevant discussion between the two communities (business and the university) can be beneficial to finding solutions for some on-going problems.
• **External**	Being innovative, cooperation between the university and industry, knowledge transfer.
Objectives	Transfer of a university-based research prototype to industrial relevant prototype and potentially to a marketable product.
Process	• Have a regular discussion between the university and industry about potential and needs. Part of regular meetings should be exploring common interests, • One precondition is an agreement/contract on cooperation.
Critical success factors	• Understanding research prototype outcome and applicability in the industrial environment (state of completion, bug proneness, user interface), • Understanding the real industrial requirements, • Time to achieve a result (detailed intermediate delivery plans and constant common reviews), • Both sides have direct involvement in solution creation.
Outcomes – key concrete benefits for external beneficiaries	• A useful product prototype is tested in the real industrial environment, • Practical solution execution with theoretical proof, • Involvement of the students in the project – more direct knowledge transfer if students start to be employees.
Outcomes - key benefits for HEI:	• Visibility of university knowledge and potential, • Innovative knowledge transfer, • Money for further research, • Employment of collaborative research staff, • Student involvement in practical work.
Key lessons learnt	• Common success of university and industry, • Appropriate planning, • Continuous risk management during project execution, • Students appreciate very much their involvement in such work.
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21

GOOD PRACTICE 21, Innovation Recipe: European Information and Innovation Centre. Contributor: Ss. Cyril and Methodius University, Skopje, Macedonia.

Title of Good Practice

European Information and Innovation Centre in Macedonia

Triangle Portion (Research, Education, Innovation)	**Sub-stream (Structural/ Content)**
Innovation	Structural

Key words to reference Good Practice/Recipe (e.g. relationships, consultancy, networks)

EEN, Networking, Technology transfer, Expertise, EU funding support, internationalisation.

(WHAT) Description of Good KE Practice/Recipe

- **What barriers or problems is this KE Practice/Recipe designed to overcome?**

- Improving technology and knowledge transfer and innovation support for researchers and SMEs,
- Finding international contacts for technology transfer, business and innovation, R&D,
- Sharing and exploitation of the results of research,
- Support in EU funding and finding partners for various projects (FP7, Eureka, LLL and mobility programs, transnational cooperation, IPA, etc.).

- **What are the key steps? (e.g. do this / do that to achieve this / that)**

- To establish a project consortium (member of Enterprise Europe Network) coordinated by the university. The members of the consortium are the Economic Chamber of Macedonia, the Agency for the Support of Entrepreneurship of the Republic of Macedonia and the Foundation for Management and Industrial Research. For this purpose, a project proposal was submitted to the National Consortium of Enterprise Europe Network in Macedonia,
- To define Consortium Working Program covering: 1. R&D support actions; 2. Innovation support and technology transfer; 3. Business support related to industry-academia partnership; 4. Internationalisation of SMEs, researchers and innovators,
- To build a team of skilled professionals from the university, the business sector and the Economic Chamber.

- **How does it benefit partners/clients and how have users'/beneficiaries' needs influenced this model?**

- By increasing the competitiveness of Macedonian SMEs,.
- By increasing participation in R&D and EU projects and internationalising research,
- Researchers closely cooperate with the industry sector for technology transfer and the commercialisation of knowledge.

(HOW, WHEN) What contextual factors need to be taken into account in the application of this good KE practice?

- **What resource and operational implications are there in the adoption and integration of this approach?**

- It requires skilful project coordination and management to build maximum synergy between academic and non-academic staff in the consortium,
- It can lead to technology transfer, collaborative research and participation in other EU-funded projects for R&D.

- **What specific operating contexts and environments are important for its application and what key lessons have been learnt from the experiences?**

- A fully serviced operation required a successful project proposal for the CIP programme in order to establish the Enterprise Europe Network consortium,
- Strong synergy between academic staff and professionals from the other sectors mentioned. Commitment of participating institutions is crucial.

- **What are the limitations and risks of application of this good KE practice; is it applicable in the KE function of any HEI and are there any time-related or regulatory limitations?**

- Differences in local policy lack of commitment, differences between academic and non-academic staff, dependence on other sources of financing.

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GOOD PRACTICE CASE STUDY 22, Innovation: European Information and Innovation Centre. Contributor: Ss. Cyril and Methodius University, Skopje, Macedonia

Title of Good Practice	European Information and Innovation Centre in Macedonia
Main Theme (Research/ Education/ Innovation)	Enterprise Europe Network / National Consortium
Sub-theme (Structural/ Content)	Technology transfer, R&D Support, EU funding support for SMEs, researchers and innovators
Related public funding scheme (if applicable)	Competitiveness and Innovation Framework Programme, a grant by the European Commission and co-financing from the Government of the Republic of Macedonia
Context	—
• **Internal**	Ss. Cyril and Methodius University in Skopje, coordinator Foundation for Management and Industrial Research, Agency for the Promotion of Entrepreneurship of the Republic of Macedonia, Economic Chamber of Macedonia.
• **External**	Member of network present in more than 50 countries. Partner of more than 600 organizations.
Objectives	Technology and knowledge transfer, innovation support, internationalisation, sharing and exploitation of the R&D results, support from EU funding.
Process	Establish a project consortium (member of Enterprise Europe Network) coordinated by the university, Define the working programme of the consortium, Build a team of skilled professionals from the university, the business sector and the Economic Chamber of Macedonia.
Critical success factors	Differences in local policy lack of commitment, differences between academic and non-academic staff, dependence on other sources of financing.
Outcomes – key concrete benefits for external beneficiaries	Improving technology and knowledge transfer and innovation support for researchers and SMEs, Finding international contacts for technology transfer, business and innovation, R&D, Sharing and exploitation of the results of research , Support in EU funding and finding partners for various projects (FP7, Eureka, LLL and mobility programs, transnational Cooperation, IPA, etc.).
Outcomes - key benefits for HEI:	Establishment of a new service for the support of SMEs, researchers, academic staff and the business community. KT professional roles and capacity are linked to areas of academic expertise which were previously unsupported.
Key lessons learnt	Becoming a member of an international network significantly improved international cooperation for technology transfer and R&D.
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GOOD PRACTICE IN KNOWLEDGE EXCHANGE – GP MODEL TEMPLATE

Title of Good Practice

.....

Triangle Portion (Research, Education, Innovation)

.....

Sub-stream (Structural/ Content)

.....

Key words to reference Good Practice/Recipe (e.g. relationships, consultancy, networks)

.....

(WHAT) Description of Good KE Practice/Recipe

- **What barriers or problems is this KE Practice/Recipe designed to overcome?**

.....

- **What are the key steps? (e.g. do this / do that to achieve this / that)**

.....

- **How does it benefit partners/clients and how have users'/beneficiaries' needs influenced this model?**

.....

(HOW, WHEN) What contextual factors need to be taken into account in the application of this good KE practice?

- **What resource and operational implications are there in the adoption and integration of this approach?**

.....

- **What specific operating contexts and environments are important for its application and what key lessons have been learnt from the experiences?**

.....

- **What are the limitations and risks of application of this good KE practice; is it applicable in the KE function of any HEI and are there any time-related or regulatory limitations?**

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Contact/main contributors

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email

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GOOD PRACTICE IN KNOWLEDGE EXCHANGE
– CASE STUDY MODEL TEMPLATE

Title of Good Practice	**.....**
Main Theme (Research/ Education/ Innovation)	.....
Sub-theme (Structural/ Content)	.....
Related public funding scheme (if applicable)	.....
Context	.....
• **Internal**	.....
• **External**	.....
Objectives	.....
Process	.....
Critical success factors	.....
Outcomes – key concrete benefits for external beneficiaries	.....
Outcomes - key benefits for HEI:	.....
Key lessons learnt	.....
Contact/main contributors	Name: Email:

Examples of Best Practice in a doctoral training project

Best Practice Transferable skills. Doctoral candidates must be trained to develop strong transferable skills that will add to their employability and enhance the quality of their research project. Throughout the PhD programme, training in general research methods, academic writing and communication skills, research grant proposal writing, teacher training, time and career management should be provided.

Best Practice Example Documenting PhD candidates' competencies at K.U. Leuven

K.U. Leuven has developed a competencies profile for doctoral students. During the doctoral process, doctoral students gain academic, technical and intellectual competencies, but also communication competencies (e.g. by presenting their results), self-management competencies (such as independence and perseverance), and leadership and innovation management competencies (e.g. by instructing masters programme students). For doctoral students, the competencies matrix is a guideline and an awareness instrument helping them to build a strong CV. It also makes the responsibilities of the doctoral school, supervisor, and research group more visible. Outside academia it functions as a 'quality label' enhancing the career opportunities of PhDs.

Best Practice Thesis and final evaluation. Doctoral theses are expected to give a substantive and original contribution, in either content or method, to the candidate's field of study. The evaluation of the thesis manuscript should be the responsibility of a dissertation committee. The committee should not, where possible, include the supervisors and must have at least one member from another university, either national or foreign. Final examinations must consist of an in-depth oral discussion with a panel of reputed scholars in which the candidate 'defends' her/his thesis. There should be open access to PhD theses to enhance the impact on academia, society and business of young scholars' research.

Best Practice Example open access to PhD theses at the Universities of Amsterdam, Leiden and Utrecht

The Universities of Amsterdam, Leiden and Utrecht have introduced an open access system in which the University library runs a repository storing and providing access to electronic versions of all defended PhD theses. The number of electronic downloads from these repositories is impressive, and shows that the impact of these theses is greatly enhanced.

Best Practice Partnerships - Links to business and industry.

PhD graduates represent an important link between universities and the business world. It has been estimated that Europe will need 700,000 additional researchers to fulfil the ambitious Lisbon Agenda, a substantial number of whom will have to be employed by knowledge- and research-intensive companies. It is important that better knowledge exchange processes are set up between universities and businesses, in particular at the doctoral training level, in order to increase the uptake of PhD graduates in the business world.

Best Practice Example. Enhancing career development through the 'Doctoriales' at the Pierre and Marie Curie University in Paris (UPMC) and the University of Paris-Sud

The 'Doctoriales' programme is a national French initiative designed by the Ministry of Defence and the Association Bernard Gregory, with annual calls for proposals from the Ministry of Research. Twice a year the University of Paris-Sud organises a week-long seminar aiming to develop business skills. In multidisciplinary groups PhD students reflect on the competencies needed and on defining their professional goals. This is combined with visits to businesses and interactions with business professionals. The Institute of Doctoral Training (IDT) at Pierre and Marie Curie University also organises 'Doctoriales' seminars. The IDT develops UPMC's strategy on doctoral training, supports the disciplinary-based doctoral schools, ensures the quality and transparency of doctoral candidate recruitment and follow-up, and organises activities in support of career planning.

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6.

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The List

List of TEMPUS OPUS Good Practice Recipes and Case Studies

GOOD PRACTICE 1	Education Recipe: Inter-university study (mathematics). Contributor: University of Montenegro
GOOD PRACTICE 2	Education Recipe: Croatian inter-university doctoral programme in mathematics. Contributor: Universities of Osijek, Rijeka, Split and Zagreb, Croatia
GOOD PRACTICE 3	Education and Innovation Recipe: Student entrepreneurship education and support at HEI's. Contributor: University of Saarland, Germany
GOOD PRACTICE 4	Education and Innovation Case Study: Student entrepreneurship. Contributor: Saarland University Germany
GOOD PRACTICE 5	Education Recipe: Doctoral school at the central university level. Contributor: Ss. Cyril and Methodius University, Skopje, Macedonia
GOOD PRACTICE 6	Education Case Study: Doctoral school at the central university level. Contributor: Ss. Cyril and Methodius University, Skopje, Macedonia
GOOD PRACTICE 7	Education Case Study: Erasmus Mundus Office. Contributor: University of Mostar, Bosnia and Herzegovina

GOOD PRACTICE 8	Research Recipe: Implementing a central research database. Contributor: University of Montenegro, Montenegro
GOOD PRACTICE 9	Research Recipe: Establishing a current research information system. Contributor: University of Vienna, Austria
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GOOD PRACTICE 13	Innovation Recipe: Croatian Business-Scientific Club. Contributor: Chamber of Economy, Croatia
GOOD PRACTICE 14	Innovation Recipe: Managed university-industry cooperation. Contributor: Ericsson Nikola Tesla, Croatia
GOOD PRACTICE 15	Innovation Recipe: Science and Technology Park. Contributor: University of Rijeka Science and Technology Park (STeP), Croatia
GOOD PRACTICE 16	Innovation Recipe: IP protection through a technology transfer Office. Contributor: University of Rijeka, Croatia
GOOD PRACTICE 17	Innovation Case Study: Founding spin-off companies. Contributor: Ruđer Bošković Institute, Croatia
GOOD PRACTICE 18	Innovation Case Study: The development of an IP commercialisation rule book. Contributor: University of Zagreb, Croatia
GOOD PRACTICE 19	Innovation Case Study: Establishing a technology transfer office. Contributor: University of Zagreb, Croatia, cooperation. Contributor: Ericsson Nikola Tesla, Croatia
GOOD PRACTICE 21	Innovation Recipe: The European Information and Innovation Centre. Contributor: Ss Cyril and Methodius University, Skopje, Macedonia
GOOD PRACTICE CASE STUDY 22	Innovation: The European Information and Innovation Centre. Contributor: Ss. Cyril and Methodius University, Skopje, Macedonia
GOOD PRACTICE IN KNOWLEDGE EXCHANGE – GP MODEL TEMPLATE	—
GOOD PRACTICE IN KNOWLEDGE EXCHANGE – CASE STUDY MODEL TEMPLATE	—

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- MLAZ, Croatia (Student Organisation)
  Contact: Iva Kavčić
- EURICE, Germany (Enterprise)
  Contact: Jörg Scherer

NAMED INDIVIDUAL EXPERTS

- Lisa Cowey, Innovation Expert, The Technology Transfer Interface Company, UK