

REGIONAL POLICY IN THE EASTERN SLOVENIA COHESION REGION - INNOVATIVE OPEN TECHNOLOGIES (SMART SPECIALIZATION)

REGIONALNA POLITIKA U KOHEZIJSKOJ REGIJI ISTOČNA SLOVENIJA - INOVATIVNE OTVORENE TEHNOLOGIJE (PAMETNA SPECIJALIZACIJA)

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ABSTRACT

Development initiatives are generated in the local environment. The ideas are being networked and this process includes policies of different economic sectors on a multi-institutional level. Awareness and recognition of local values, ecological, cultural and social ones, is the main motivational factor in local communities when setting up development projects.

Knowledge has become crucial for regional, innovation and development processes. The endogenous growth theories as well as the quadruple helix concept emphasize the role of institutions of knowledge, not only in the creation of knowledge and ideas, but also in their transfer into practical use. Scientific and research institutions as well as educational institutions play an indispensable role in contributing to the economic development and technological advancement of regions. In the case of the transfer of knowledge and scientific findings into practice, it is necessary to proceed from the whole complex of economic, social and ecological conditions for development. Knowledge institutions participate in solving global challenges and contribute to the economic and technological development and social progress of local communities and regions.

The goal of the University of Maribor is to develop an innovative ecosystem, which will create a symbiosis among the University, the economy and the local communities through open innovations and technologies, and through the creation of knowledge for new professions. The capacity of regions to support learning and innovation processes is a key source of competitive advantages. Human capital is essential driver of regional innovation. Innovation is not merely about technology – it is about change in human behaviour.

Ključne riječi: kohezijska regija Istočna Slovenija, regionalni razvoj, pametna specijalizacija, Sveučilište u Mariboru, Podravina, mreže znanja, inovativne otvorene tehnologije

Key words: Eastern Slovenia cohesion region, regional development, smart specialization, University of Maribor, Drava region, knowledge networks, innovative open technologies

INTRODUCTION

Regional development is intended to reduce the development gap among regions. The concept derives from the Latin word *regio, regionis*, and means a landscape, an area, a region or a territory, defined by similar or even identical natural and / or social characteristics. In this paper, we limited ourselves to the official division of the EU for regional statistics NUTS (Nomenclature of territorial units for statistics), which is used for the collection, development and harmonization of regional statistics, socio-economic analysis and regional policy. According to this nomenclature, Slovenia is divided into two cohesion regions NUTS 2 - Western and Eastern Slovenia and twelve NUTS 3 regions (Eurostat, 2010). Cohesion policy is essential for sustainable and balanced regional development of Slovenia. In the period 2014-2020, this policy has two priority objectives, namely »Investment for Growth and Jobs« and »European Territorial Cooperation«. In the future, it will be closely linked to the achievement of the objectives of the Europe 2020 Strategy (European Commission 1) and the EU Framework Programme for Research, Development and Innovation - Horizon 2020 (European Commission 2).

»Smart specialisation« as a strategic approach for an innovation-driven regional development policy is extremely important in the European policy context and a precondition for accessing significant amounts of funding. It will be the basis for European Structural and Investment Fund interventions in research and innovation (R&I) as part of the future Regional and Cohesion Policy's ambition to the European 2020 jobs and growth agenda (Asheim and Grillitsch, 2015). The innovation system approach was born in an OECD (the Organization for Economic Co-operation and Development) project on »Science, Technology and Competitiveness« in the beginning of the 1980s. It builds on the premise that innovation is the key for competitiveness in a knowledge economy. Moving away from price-competition and a focus on comparative advantages, the future for advanced economies was seen in introducing new and improved products and processes, organisational routines and marketing strategies by promoting increased learning and innovation capacity. Innovation, interpreted in a Schumpeterian sense, was given highest priority in order to promote the recombination of knowledge and resources in novel ways that create higher value (Asheim et al., 2015).

Knowledge is recognised as a key ingredient underlying the competitiveness of regions, nations, sectors and firms. At its most fundamental level, the knowledge-base of an economy can be defined as the capacity and capability to create and innovate new ideas, thoughts, processes and products, and to translate these into economic value and wealth (Huggins and Izushi, 2007; Huggins et al., 2008). At the most basic level, universities can be anchor institutions in local economies as major employers across a wide range of occupations, purchasers of local goods and services, and contributors to cultural life and the built environment of towns and cities. Regional investment in the infrastructure of an university to support its core business of research and teaching can therefore have a significant passive regional multiplier effect, even if the university is not actively supporting regional development. The main focus on promoting the active engagement of universities in regions has been in terms of their contribution to Regional Innovation Systems (RIS). This has gained a new salience in the context of the advancement of the notion of regional »smart specialisation« as a future focus for European regional policy (European Commission 3, 2011).

The ultimate objective of European cohesion policy for the period 2014–2020 is to promote business investments to strengthen research, technological development and innovation, and establish links among enterprises, research, development centres and higher education institutions. Development Programme »Innovative Open Technologies« (hereinafter IOT) is an example of the symbiotic integration among universities and research organizations, economy and local communities for the development of the Eastern Slovenia cohesion region. »Operational programme for the implementation of the European cohesion policy for the period 2014–2020« (Mariborska razvojna agencija, 2014) places the IOT primarily under thematic priority 1 – strengthening of the research, technological development and innovations, and secondarily under thematic priority 3 – increasing the competitiveness of small and medium-sized enterprises (University of Maribor).

In this paper, authors present the purpose and objectives of European cohesion policy for the period 2014–2020 for Slovenian cohesion regions NUTS 2 with an emphasis on development indicators of

Eastern Slovenia cohesion region regarding the cooperation of the local and regional environment with a modern approach of triple and/or quadruple helix. Knowledge institutions have the biggest opportunity and responsibility for the successful implementation of projects that provide regional development. University of Maribor (hereinafter UM or University) can as a leading knowledge institution in Eastern Slovenia together with relevant regional stakeholders contribute to regional development by assuming an active role in the process of regional innovation with smart specialization approach. The goal of the University is to develop an innovative ecosystem, which will create a symbiosis among the UM, the economy and the local communities through open innovations and technologies, and through the creation of knowledge for new professions.

PURPOSE AND OBJECTIVES OF EUROPEAN COHESION POLICY IMPLEMENTATION - ENCOURAGING DEVELOPMENT OF EASTERN SLOVENIA

European cohesion policy is the policy behind the hundreds of thousands of projects all over Europe that receive funding from the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the Cohesion Fund (Cohesion Fund applies to EU Member States which have a GDP lower than 90 % of the EU-27 average – Croatia not taken into account). Economic and social cohesion – as defined in the 1986 Single European Act – is about ‘reducing disparities between the various regions and the backwardness of the least-favoured regions’. The EU’s most recent treaty, the Lisbon Treaty, adds another facet to cohesion, referring to ‘economic, social and territorial cohesion’. The idea is that cohesion policy should also promote more balanced, more sustainable ‘territorial development’ – a broader concept than regional policy, which is specifically linked to the ERDF and operates specifically at regional level. In the 2014-2020 budgetary period, coordination and coherence between cohesion policy and the other EU policies contributing to regional development, namely rural development and fisheries and maritime policy, has been strengthened by laying down common provisions for the ERDF, the ESF, the Cohesion Fund, the European Agricultural Fund for Rural Development (EAFRD), and the European Maritime and Fisheries Fund (EMFF). All five funds together are known as the European Structural and Investment (ESI) Funds (European Commission 4).

Each EU country has a different way of dividing its territory into administrative units. For the purposes of managing programmes and comparing statistics, the EU devised the NUTS system - dividing each country into statistical units (NUTS regions). The EU is currently divided into 274 ‘NUTS 2 level’ regions (from 800 000 to 3 million inhabitants). NUTS regions are not the same as ‘Euroregions’, which are in fact associations with no precise legal status, dating back to the period after the Second World War when local politicians in border regions tried to promote common interests on both sides of the border. Euroregions are separate from the EU, though they are often involved in European regional cooperation projects. Euroregions are represented by the Association of European Border Regions (European Commission 4).

Through its 11 thematic objectives, cohesion policy helps deliver the goals of the Europe 2020 strategy, the EU’s growth strategy, to deliver smart, sustainable and inclusive growth. The cohesion policy funds will be the main investment tool for measures supporting employment, innovation, education, inclusion, and the shift towards a low-carbon economy. Both the European Regional Development Fund (ERDF) and the European Social Fund (ESF) support a number of main priorities under the thematic objectives, and a certain amount of financing is allocated to these priorities. Less developed regions have to concentrate at least 50 % of their ERDF funding and 60 % of ESF allocations on these objectives; the figures are 60 % and 70 % respectively for transition regions, and 80 % for more developed regions. In order to maximise the impact of the available funding, the focus on results has been strengthened in the 2014-20 programming period, and certain conditions must be in place before funds can be channelled. These so-called ex ante conditionalities ensure that the right preconditions are in place for cohesion policy spending to have a real effect in the region (European Commission 4).

Slovenia is divided into two cohesion regions NUTS 2 - Western Slovenia and Eastern Slovenia. «Operational Programme for the Implementation of the EU Cohesion Policy in the period 2014-2020» will play a decisive role in encouraging economic development and ensuring prosperity for all citizens

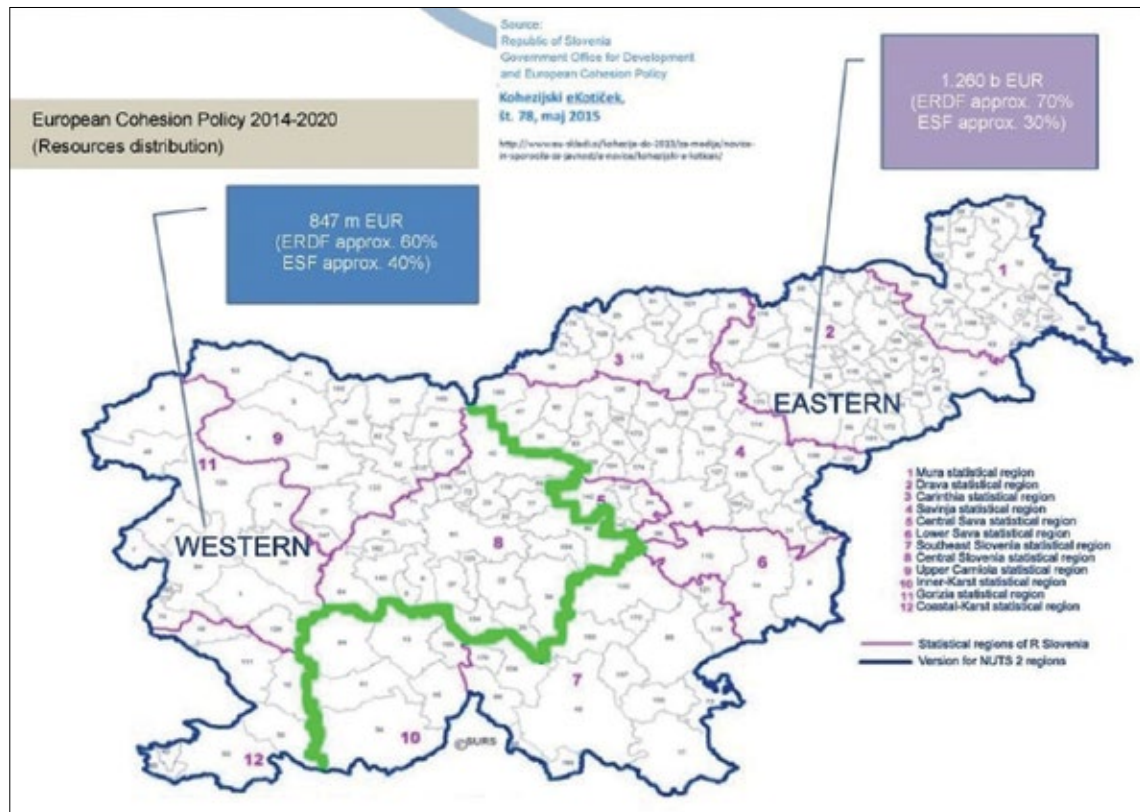


Fig. 1. EU Cohesion Policy 2014-2020 (Resources distribution).

Source: Republic of Slovenia Government Office for Development and European Cohesion Policy, 2015

in Slovenia while taking into account the specific characteristics of the two regions - Western and Eastern Slovenia (European Commission 5).

In this paper, we focused on a less developed Eastern Slovenia cohesion region, which physically comprises an area at the junction of the Alps, the Pannonian Plain and the Dinaric Mountains. It is characterized by a great landscape diversity: the north-western part of the Alps lowers to the east to the wine-growing hills on the edge of the Pannonian plain, and to the south to the karst of the Dinaric Mountains. Due to the sparsely populated border areas and large forest areas, the population density here is lower than the average in the country. It comprises of eight statistical regions (Mura, Littoral–Inner Carniola (or Inner-Karst), Drava, Lower Sava, Central Sava, Carinthia, Savinja, Southeast Slovenia), 12.212 km² or around 60 % of a total Slovenian land and of 1,093,545 inhabitants (more than half of the population of the Republic of Slovenia) (Republic of Slovenia Government Office for Development and European Cohesion Policy, 2015).

According to statistical data and socio-economic indicators, the Eastern Slovenia cohesion region reaches only about 70 % of the gross national product, and according to European standards ranks among underdeveloped. The concentration of economic activities and population in some areas have in the past caused heterogeneous conditions for life and work (differences in the spatial distribution of jobs, the unemployment rate and in the educational structure of the population), inadequate transport links among regions and unequal access to social infrastructure within the region. The problems are especially notable in structurally backward and economically underdeveloped areas, predominantly agrarian areas, in areas with demographic problems, with a low per capita income, in socially and economically unstable areas. With the accession of Slovenia to the European Union, such structural problems became obvious and in some areas even intensified (Maribor 2012 - Evropska prestolnica kulture, 2012).

Tab. 1. Selected socio-economic indicators on cohesion regions, Western and Eastern Slovenia.

	SLO	W SLO	E SLO
Number of population in 1000, 1. 1. 2016	2.064	972	1.092
Mean age, 1. 1. 2016	42,7	42,2	43,2
Surface area of territorial unit (sq. km), 1. 1. 2016	20.273	7.840	12.432
Population density, 1. 1. 2016	101,7	124,0	87,8
GDP per capita, index SI = 100, 2014	100	118,3	83,3
Activity rate (in %), 1. 1. 2016	55,8	56,9	54,9
Registered unemployment persons, 1. 1. 2016	8,9	7,5	10,2
Person in employment whose workplace is not in cohesion region of their residence, 2015	9,4	3,6	14,0

Source: Adopted from Lorber, 2015, and Statistical Office of the Republic of Slovenia <http://www.stat.si/statweb>

Tab. 2. Research and development activity indicators by indicators, year and cohesion region.

	SLO		W SLO		E SLO	
	2008	2014	2008	2014	2008	2014
Gross domestic expenditure on R&D (% of region. GDP)	1,7	2,4	2,1	2,7	1,1	2
Gross domestic expenditure on R&D (of total Slovenia)	100	100	71,3	64	28,7	36
Share of business enterprise funds in GERD	62,8	68	55,1	59,4	81,9	84
Share of government funds in GERD	31,3	22	38,1	28,2	14,4	10
Share of higher education funds in GERD	0,3	1	0,2	0,5	0,6	1
Share of private non-profit organisations funds in GERD	0	0	0	0,1	0	0
Share of funds from abroad in GERD	5,6	9	6,6	11,9	3,1	5
Researchers by region (% of total Slovenia)	100	100	80,5	75	19,5	25

Source: Statistical Office of the Republic of Slovenia <http://www.stat.si/statweb>

When planning a balanced regional development, it is necessary to examine the actual situation in the regions. The data in Table 1 and Table 2 show the economic and social backwardness of the Eastern Slovenia cohesion region. Accelerating process of deindustrialization has created new methodological approaches and the shift of economic activities from the secondary to the tertiary sector. Economic changes during the deindustrialization period firstly emerged in the regions dominated by an old classic industrial production. New development trends strengthened the service sector, while the importance of secondary and especially primary economic activity has decreased (Lorber, 1999). Changes in the post-industrial period have been accompanied by rapid urbanization, which also affected the structural changes in space. Special focus was given to the target identification of local strengths and the use of untapped resources. In order to achieve the development goals, the investments in utility and IT infrastructure as well as in new forms of economic activity, including supplementary activities, are crucial. The success of investments depends on the optimal use of local resources, natural and cultural potentials of the region in interdependence with human capital (Lorber, 2005 and 2015; Lorber and Žiberna, 2014).

»Operational Programme for the Implementation of the EU Cohesion Policy in the period 2014-2020« will significantly contribute to the achievement of the national and Europe 2020 targets for smart, sustainable and inclusive growth. It aims to strengthen efforts particularly in the area of research and development, boost the innovation potentials of small and medium sized enterprises (SMEs), promote resource efficiency and reduce environmental pressures, further develop the transport sector, boost the growth of employment rates and reduce the number of people at risk of poverty and social exclusion.

The Programme encompasses all 11 thematic objectives and corresponding investment priorities, which are strongly correlated and interdependent. The most relevant for this study are:

- thematic priority 1: research and innovation - improving the infrastructure for research and innovation while strengthening its links with enterprises and the higher education sector and improving the responsiveness of the education;
- thematic priority 3: SMEs competitiveness - Increasing the international competitiveness of enterprises, particularly of SMEs, to accelerate economic development and the creation of jobs;
- thematic priority 10: education and training - improving the responsiveness of the education and training systems to the needs of the labour market and ensuring equal access to education, trainings and lifelong learning for all groups (European Commission 5).

When one considers the actual knowledge bases and competences of various industries and sectors of the economy, it is clear that knowledge creation and innovation processes have become increasingly complex, diverse and independent in recent years. There is a larger variety of knowledge sources and inputs to be used by organisations and firms, and there is more collaboration and division of labour among actors (individuals, companies and other organizations). The process of knowledge exploration and exploitation requires a dynamic interplay between, and transformation of, tacit and codified forms of knowledge as well as a strong interaction of people within and between organizations. Thus, these knowledge processes have become increasingly inserted into various forms of networks and innovation systems - at regional as well as national and international levels (Asheim et al., 2011).

Based on these facts, we have to underline that knowledge exchange not only appears between firms but is often found between firms and institutions. Universities, research institutes, science parks, incubators and other knowledge institutions are actively in a state of relationships occurring in the business environment and are particularly seen as lead players in the innovative activity of firms providing scientific research inputs for innovating firms. In addition to channelling information and knowledge, support organizations can also help translate academic codified knowledge into practical and accessible know-how. In line with the modern understanding of innovation, the research process is oriented toward problem-solving and as such requires two-way research interaction between knowledge organizations and industry actors combined with several other institutions (Cotič Svetina and Prodan, 2008).

When these complex and diverse exchanges of knowledge are taking place within individual regions, we speak about knowledge regions, where development is conditioned by the ability of the environment to deploy and search for new innovative solutions. The knowledge region is clearly a triple helix phenomenon par excellence: universities, governments and industries combine their efforts to construct a common advantage, which they would not be able to offer on their own. They develop ideas, which are enhanced by each other's perspectives, difficult as it may be sometimes to bridge different perspectives and interests. Intermediary organisations play a decisive role as the key facilitators of such interrelations, as motors of the triple helix interaction (Reichert, 2006).

Triple helix model emerged from the analysis of academic research on restructure of the Boston economy in the 1930s through cooperation of universities, industry and government (Etzkowitz, 2002). In the beginning, the government had a leading role (exogenous approach), followed by the industry (endogenous approach), and in the third stage, knowledge-based society and knowledge institutions (holistic approach) in partnership with economy and government in a joint initiatives for balanced models (Etzkowitz and Leydesdorff, 2000; Etzkowitz, 2008; Leydesdorff, 2012). Regional development, to meet broader social needs, depends not only on economic development but also the development of non-economic activities. In many countries and regions citizens also became increasingly aware of the importance of the knowledge economy in general, and the role of the universities in particular, to ensure current and future wealth creation (Reichert, 2006). The idea of the importance of the public as a fourth party in the system was already proposed by Michael Mehta (2002) at the International Workshop on Science, Technology and Society in Singapore. Mehta proposed that the science and innovation system should include the public as a »fourth helix«, given its influential role e.g. regarding the acceptance and resistance of new technologies (Reichert, 2006; Arnkil et al., 2010). Thus, the public may constitute a fourth party whose concerns and ideas have to be taken as seriously as those of the others.

Indeed, we could say that knowledge regions are not so much built on triple helix interactions but constitute a quadruple helix system (Reichert, 2006; Lorber, 2015).

In order to achieve the goals of the Europe 2020 strategy, we need to strengthen the integration of knowledge at the local level. The link between research and regions today is not as strong as it should be because most regions do not yet have clear strategies and because national research is mostly focused on sectors, not regions (Drabenstott and Henderson, 2006; Lorber, 2003a). In Slovenia, it can be noted that cooperation of development institutions and individual researchers is largely limited to projects and individual bilateral contracts. Only recently, Slovenian universities have started a trend to create a strategy to include research into the local environment. UM as a leading knowledge institution in Eastern Slovenia along with its primary mission, the implementation of educational and research activities, increasingly develops its third mission, cooperation with the environment, which is vital to innovative, sustainable and socially responsible development of less developed Eastern Slovenia cohesion region. An important strategic approach to an innovation-based policy for regional development is smart specialization.

REGIONAL INNOVATION STRATEGIES - SMART SPECIALIZATION

Regional Innovation Strategies (RIS) have been initiated and implemented in many OECD regions, in particular in those regions with important responsibilities and resources for innovation. The European Union has sponsored such exercises in over 150 regions since the mid-nineties, in the form of RITTS (Regional Innovation and Technology Transfer Strategies), RTP (Regional Technology Plans), RIS and derived exercises. Regions in other OECD countries are also developing strategies as required by a national government or through their own initiative. Implementing a RIS involves typically six steps:

1. Initiating a regional dialogue on innovation
2. Analysis of regional innovation needs and capacities
3. Shaping the innovation strategy with direct involvement of all relevant stakeholders
4. Selection of priorities for innovation support
5. Implementation of the strategy
6. Establishment and use of a monitoring and evaluation system for the strategy (OECD, 2010).

Typical priorities and their associated lines of actions, emerging from RIS are:

- Enhancing regional research and development (R&D) and innovation capacities in line with regional economic development objectives by supporting industry or technology-specific competence centres, competitiveness poles involving public and private organisations, promoting technology transfer, etc.
- Stimulating innovation in SMEs by promoting university-enterprise cooperation networks; by supporting business networks and clusters of SMEs, by facilitating SMEs' access to advanced business support services, and by improving the effectiveness of these services (networks).
- Promoting entrepreneurship and new firm creation by facilitating the economic exploitation of new ideas, by fostering the creation of new firms from universities and existing firms, by creating new financial instruments and incubation facilities; by developing entrepreneurship training in education institutions, etc.
- Improving human capital for innovation by developing curricula tailored to the innovation system needs in different fields (not only science and technical aspects but also in management of innovation and other fields), fostering mobility between public research and businesses, encouraging companies to recruit innovation specialists, etc. (OECD, 2010).

Smart specialization (RIS3) is a strategic approach to an innovation-based policy for regional development. It will be the basis for European Structural and Investment Fund interventions in R&I as part of the future Regional and Cohesion Policy's ambition to the European 2020 jobs and growth agenda (Asheim and Grillitsch, 2015). It is currently probably the largest innovation policy experiment in the world. Its aim is to move the EU less developed countries and regions on path of R&D-based growth (Radosevic and Ciampi Stancova, 2015). RIS3 is basically not about »specialization« as is known from

previous regional development strategies, i.e. Porter based cluster strategies, but about diversification or diversified specialization/specialised diversification. Thus, »smart diversification« would have been a better description of the strategy. This means that regions should identify areas or domains of existing and/or potential competitive advantage, where they can specialize in a diversified way compared to other regions. A RIS3 strategy implies maximising the knowledge-based development potential of any region, with a strong R&I system or with a high-tech or low-tech industrial structure. Moreover, regions should diversify their activities based on existing strengths and expertise by moving into related areas through regional branching (Boschma and Frenken, 2011). The »smart« in the RIS3 strategy refers to the way domains of competitive advantage should be identified, which is through what is called »entrepreneurial discovery«, to secure specialized diversification across related technologies. We must underline that »entrepreneurial« should be understood broadly to encompass all actors that have the capacity to discover domains for securing existing and future competitiveness:

- individual entrepreneurs,
- organisations - including firms and universities through intrapreneurship, knowledge based entrepreneurship and spin-offs), and
- agencies - technology transfer offices and regional development agencies (Asheim and Grillitsch, 2015).

EU-13 countries (Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia) are losing competitive advantage built strategically around cheap production factors and qualified workforce to other fast-growing big economies such as China, India or Brazil. EU-13 countries find themselves unable to compete internationally for foreign direct investment (FDI) on terms of low-cost labour force, and thus, they are searching for new strategic approaches to ensure continued economic growth. One of the possible ways is through technological development, science-based innovation and capital involvement. This means in practice technological convergence, modernisation and upgrading as well as intensification of applied and technological research connected to business application. This is closely related to inter-sectorial and international cooperation as well as collaboration between scientific and business actors, and in consequence to smart specialisation. Smart specialisation offers a unique opportunity for EU-13 countries to reinvent their R&I strategies while building on their national / regional assets, strengths and potentials. At the same time, EU-13 countries can improve international, inter-sectorial and private-public collaboration, as well as focus on niche activities to stimulate growth. By developing and implementing RIS3, EU-13 countries have opportunity to address challenges and bring expected growth in their regions (Radosevic and Ciampi Stancova, 2015).

The EU-13 countries and regions have grown based on FDI, but investment has often been unrelated to domestic research and development and innovation (R&D&I) capacities. This dualism between FDI and domestic innovation efforts has created a structurally weak innovation environment, which, despite improvements in productivity and R&D, does not provide a basis for long-term growth. Upstream, R&D systems in the EU-13 have become integrated into EU R&D and Horizon 2020 networks, which gradually has led to improvements in research excellence, but not necessarily to improved local relevance. Downstream, multinational enterprises' (MNE) subsidiaries have played an important role in integrating the EU-13 into international production networks. However, weak horizontal linkages between business sectors (foreign and domestic) and increasingly internationalised R&D are evidence of structurally weak innovation eco-systems. In this context, smart specialisation has emerged as a unique strategic opportunity to strengthen regional innovation systems in the EU-13 by coupling domestic innovation efforts with foreign R&D&I networks (Radosevic and Ciampi Stancova, 2015).

This opportunity can be realized through strong cooperation of universities, industry, government and public (quadruple helix). In order to achieve development goals, we need to strengthen the integration of the so-called knowledge triangle - education, research and innovation - to establish healthy and productive innovation eco-systems.

The first distinctive feature of the smart specialisation approach relates to the fundamental logic of the innovation system, and assumes that context matters for the potential technological evolution of the

system (*knowledge ecology*). In other words, the potential evolutionary pathways of an innovation system depend on the inherited structures and existing dynamics including the adaptation or even radical transformation of the system. The second distinctive feature of the smart specialization approach relates to the perceived mechanisms by which the strategy operates. The smart specialisation proposers envisage that the identification of the knowledge-intensive areas for potential growth and development are related to the role of certain classes of players (researchers, suppliers, manufacturers and service providers, entrepreneurs, users) and to the public research and industry science links. The players are regarded as being the agents who use their knowledge-acquisition facilities and resources (human capital, ideas, academic and research collaborations) to scan the available local economic and market opportunities, to identify technological and market niches for exploitation, and thereby act as the catalysts for driving the emerging transformation of the economy (McCann and Ortega-Argilés, 2011).

In meeting major societal challenges, which have both a global and local dimension, universities and other higher education institutions have a key role to play in knowledge creation and its translation into innovative products and public and private services, a process that can engage the creative arts and social sciences as well as scientists and technologists. Universities in the round have potentially a pivotal role to play in the social and economic development of their regions. They are a critical 'asset' of the region; even more so in less favoured regions where the private sector may be weak or relatively small, with low levels of research and development activity. Successful mobilisation of the resources of the university can have a disproportionately positive effect on their regional economies and achievement of comprehensive regional strategies (European Commission 3, 2011).

UNIVERSITIES AS ACTORS OF REGIONAL DEVELOPMENT

As universities potentially form part of both regional and globally connected knowledge networks and systems of innovation, the means by which the knowledge they generate flows, or not as may be the case, as well as their characteristics and capabilities, the types of knowledge they generate and the constituency of their networks and modes of engagement are of clear importance (Huggins et al., 2008). Universities in the round have potentially a pivotal role to play in the social and economic development of their regions. They are a critical 'asset' of the region; even more so in less favoured regions where the private sector may be weak or relatively small, with low levels of research and development activity. Successful mobilisation of the resources of the university can have a disproportionately positive effect on their regional economies and achievement of comprehensive regional strategies. In meeting major societal challenges, which have both a global and local dimension, universities and other higher education institutions have a key role to play in knowledge creation and its translation into innovative products and public and private services, a process that can engage the creative arts and social sciences as well as scientists and technologists (European Commission 3, 2011).

Mobilising universities needs to be addressed in a 'holistic' way and not just by focussing on transactional interventions such as consultancy services for local companies. It is tempting to focus on transactional mechanisms as they have clear outputs such as the number of firms assisted. However, they are less likely to have the longer-term outcomes and impacts that can be achieved with 'transformational' and more developmental programmes such as contributing through teaching to a regional human capital development programme linked to research based support to firms in a key regional business cluster.

At the most basic level, universities can be anchor institutions in local economies as major employers across a wide range of occupations, purchasers of local goods and services, and contributors to cultural life and the built environment of towns and cities. Regional investment in the infrastructure of a university to support its core business of research and teaching can therefore have a significant passive regional multiplier effect even if the university is not actively supporting regional development.

Universities can make active contributions in four areas:

1. business innovation which is closely linked, although not exclusively, to the research function of the university;

2. human capital development linked to the teaching function;
3. community development linked to the public service role of universities;
4. institutional capacity of the region through engagement of its management and members in local civil society.

These are the four areas (shown on Fig. 2.) covered in the OECD reviews of the universities and regions. Where these four domains are integrated, the university can be seen to be occupying a »proactive« and not just »passive« role in the regional development process (European Commission 3, 2011).

There are a range of ways in which universities can and do contribute to regional development and smart specialisation. However, within each of these roles there are a range of mechanisms which can be employed, either as individual projects or collectively as part of a wider programme or strategy to support a regional development agenda. The following sections explore each of these under the four key areas through which universities most commonly engage in regional development, depicted in Fig. 3.

As the role of universities in bolstering technology communities and shaping innovation cultures has become more widely recognized, regional engagement and innovation capacity have become core themes in university mission statements. The triple helix model role formalises this role and views universities as increasingly 'entrepreneurial' or 'generative' institutions where the spillover of knowledge is the result of strategic internal re-organization which facilitates the development of incubators or science parks and human capital development programs (Etzkowitz, 2006; Etzkowitz and Zhou, 2006; Gunasekara, 2006; Huggins et al., 2008). Scholars have also identified a new type a university that is even more entrenched in regional economic and social development. They argue that the 'engaged' university is one that is not only entrepreneurial in technology development but that is also adaptive and responsive to the needs of the region and plays a wider role in building social and civic capital through community service and leadership in regional social and civic structures (Chatterton and Goddard, 2000; Huggins et al., 2008). These engaged universities play a »developmental« role in learning regions by establishing programmes, building institutions and facilitating networks, which are tailored to the needs of the regions they serve (Gunasekara, 2006; Huggins et al., 2008).

Universities and researchers must accept the fact that research is no longer an isolated activity and that the research interest is shifting from individual researchers to teams and global research networks (Jenniskens, 2001). When transferring scientific findings into practice, it is necessary to proceed from the whole complex of economic, social and ecological condi-

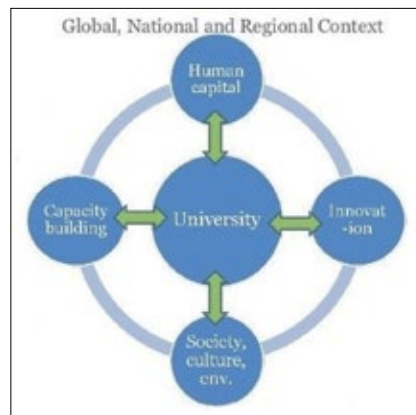


Fig. 2. Four areas covered in the OECD reviews of the universities and regions.

Source: OECD reviews of higher education in regional and city development - building stronger, fairer and cleaner regions, 2012

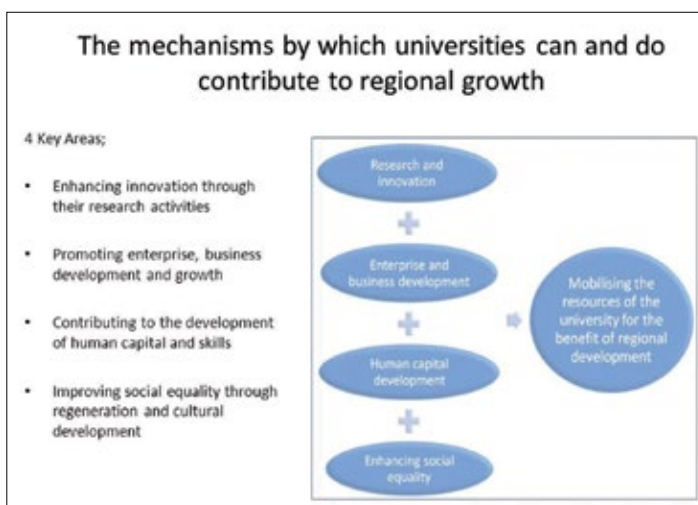


Fig. 3. Four key areas for university engagement in regional development.

Source: European Commission 3, 2011

ons for development. In the new forms of production (of scientific knowledge), which were established in the 1990s in the scientifically and technologically developed countries, applicative and developmental role of science is crucial. Knowledge transfer is as a model network, transferring from academic and other non-industrial institutions to the industrial sector. In this way, it is no longer a one-way course from basic to applied knowledge, from research to development, but the constant interplay of various factors (Lorber, 2003b and 2010). Exchange of academic research and knowledge with the economy and society is still inadequate and undervalued within the academic community. Knowledge is a far broader concept than R&D. Knowledge transfer has weak effects on the economic and social development; researchers with PhDs remain in academic circles at the universities and do not continue their careers in particular economic sectors and entrepreneurship (Clark, 1998; Lorber, 2010).

University of Maribor (UM) is trying to reduce this »academic isolation« and contribute to regional development by assuming an active role in the process of regional development, together with relevant regional stakeholders. As a leading knowledge institution in Eastern Slovenia cohesion region, UM is deeply involved (many times as a driving force) in the process of regional innovation with smart specialization approach. The goal of the University is to develop an innovative ecosystem, which will create a symbiosis among the UM, the economy and the local communities through open innovations and technologies, and through the creation of knowledge for new professions.

THE UNIVERSITY OF MARIBOR AS A REGIONAL DEVELOPMENT PARTNER IN EASTERN SLOVENIA COHESION REGION

In Maribor, the higher education institutions were formed in the 1960s in order to meet the needs of the economy and the labour market. By strengthening the economy, the need for an increased role of knowledge and technological development emerged, and therefore in 1975 the higher education institutions were united under the UM. The University has currently 17 faculties, around 15,000 students and 1,800 employees, and is the second largest and second oldest university in Slovenia. In the year 2015-2016, UM ranked among the best 600 universities in the world and earned the highest score among Slovene universities on Times Higher Education World University Ranking examining how universities fulfil their primary mission in different areas. In 2014, UM also received an award for the well-being of foreign students at higher education institutions (University of Maribor). With the spatial distribution of its faculties in six Slovenian NUTS 3 regions, the UM today represents a regional university, which is actively involved in regional development through research projects, patents and innovation in collaboration with economy, development agencies and stakeholders in decision-making at local and regional level.

For this purpose, *TechnoCenter* at the UM was established in 2005 as a *Technology Transfer Office*. Its mission is to provide services for promoting and supporting technology and knowledge transfer, thus contributing to national and especially regional economic development. The most important goals include:

- transfer of knowledge and new technologies to industry;
- greater diversity of research activities and increased support for research at faculties;
- creating innovation culture;
- protection and management of intellectual property;
- connecting industry and public research organizations in order to achieve greater synergy.

TechnoCenter UM works as an interface between university research area, industry, state and other persons and institutions concerned. Key competences can be divided into three sections:

1. technology transfer and commercialization of innovations;
2. professional and administrative support for different forms of research collaboration (contracts, grants, and other initiatives) between sides mentioned above;
3. development of business and research partnership between University and organizations from private or public sector (spin-off companies, licensing, etc.).

Supporting activities to key competences of the TechnoCenter UM are:

- commercialization of inventions,

- protection of intellectual property,
- providing assistance to spin-out and/or spin-off companies and
- assisting in obtaining venture capital.

As part of its mission to enhance university-industry cooperation, TechnoCenter UM provides various services to facilitate knowledge and technology transfer. They organize educational activities, trainings and awareness raising events about intellectual property rights protection, while creating opportunities for establishing contacts and networking between entrepreneurs and researchers. In order to support transfer of knowledge and technologies to the industry, they consult during the research and provide assistance in the acquisition procedures of employee inventions and inventions of students and external collaborators at the UM as well as in the intellectual property rights protection processes. In addition, they record the technology transfer activities and monitor the validity of industrial property rights and the implementation of contractual obligations proceeding from sale and license agreements of the UM and external partners. To ensure that the inventions become successful innovations on the market, they assess the market potential of inventions, identify suitable partners from the industry, negotiate for sale or license of patents and provide assistance in acquiring of the spin-out or spin-off company status (TechnoCenter Univerze v Mariboru).

Business incubators at the UM were established with an intention to shape the partnerships networks at the regional and national level as well as in the international arena. An important element of the innovation ecosystem of the UM is the *University Incubator Venture Factory*, established in 2001 to promote and support entrepreneurial engagement of students, researchers and professors at the UM as well as other innovative individuals (Start:up Alpe-Adria). Venture Factory operates within the pillar »Entrepreneurship in innovation« in the auspices of consortium RAZ:UM (Research and Arts Zone at the University of Maribor), formed by the University to create and coordinate business-friendly environment for students and researchers, and to consolidate the leading position of the UM in knowledge transfer in the region (RAZ:UM). The pillar offers the consortium partners excellent programs and services which aim to promote and protect intellectual property in finding solutions for its successful commercialization within the framework of cooperation with existing companies (licensing, sales and intellectual property rights, contract research in research in collaboration with industry) and the establishment of the development of new start up companies (especially spin-out in the spin-off companies). Venture Factory implements programs to promote entrepreneurship, consulting to (potential) entrepreneurs and start-ups (spin-off in the spin-out). In the promotional entrepreneurship Venture Faculty is running regional events in the scope of *Start:up Maribor* and national events in the scope of initiative *Start:up Slovenia*. Venture Factory team provides to the entrepreneurs consultancy services within the *Center for business planning* with the aim of providing consultancy and mentorship in the field of business idea development, business model, market analysis, marketing strategy, networking with business investors, assistance in global market penetration etc. (Start:up Alpe-Adria).

University has also founded a *Scientific Institute for Regional Development (ZIRRUM)* as an instrument of regional development and regional policy, especially in support of the development of structurally weak regions. Taking into account the proportion of students, the number of employees at the University, a significant proportion of income in urban services, share in the total income of the local economy, investments, knowledge and information transfer, we can say that the UM is playing an active role as a regional development partner.

The management of the UM is aware that close ties between the university as a central educational and research institution and its local environment and the industry are of the utmost importance. For this reason, various activities aimed at integrating knowledge and R&D with the industry are being implemented in order to initiate concrete projects contributing to new jobs and new products with high added value. The UM is thus bringing together knowledge, research findings and the industry. The central programme in this area is called *Innovative Open Technologies (IOT)*. The information portal *Vzhodna.si* will serve as an entry point also in other development projects (University of Maribor).

IMPLEMENTING SMART SPECIALIZATION APPROACH THROUGH »INNOVATIVE OPEN TECHNOLOGIES« PROGRAMME (IOT)

University of Maribor can as a knowledge institution contribute to regional development by assuming an active role in the process of sustainable and socially responsible regional development, together with relevant regional stakeholders. Necessary activities are identified and included in the »Development strategy of the University of Maribor 2013–2020« (Strategija razvoja Univerze v Mariboru, 2014):

- focus on the needs and requirements at the local and regional level,
- dialogue with regional stakeholders,
- transfer of research results into regional development processes.

The ultimate objective of European cohesion policy for the period 2014–2020 is to promote business investments to strengthen research, technological development and innovation, and establish links among enterprises, research, development centres and higher education institutions. Development Programme »Innovative Open Technologies« (hereinafter IOT) is an example of the symbiotic integration among universities and research organizations, economy and local communities for the development of the Eastern Slovenia cohesion region. »Operational programme for the implementation of the European cohesion policy for the period 2014–2020« places the IOT primarily under thematic priority 1 – Research and innovation, and secondarily under thematic priority 3 – SMEs competitiveness (European Commission 5).

IOT is all-Slovenian development programme whose main objective is to create a symbiotic link among the universities and research organizations, business, support organizations and local communities through open innovation and technology. The IOT brings together the key stakeholders for the development breakthroughs of regions that follow the programme and its objectives (IOT - Inovativne odprte tehnologije):

- increasing the number of high-tech enterprises and the competitiveness of small and medium-sized enterprises in the region through the development and marketing of new innovative products, processes, business models, etc.;
- creating new high value-added jobs and in this way stem the brain drain and enable long-term development of the region.

IOT follows the principle of a polycentric and complementary development. The foundations of the IOT were formed in the Drava region; several other Slovenian regions already joined the programme (Mura, Savinja, Carinthia, Coastal-Karst, Gorizia) and form the regional programs following the same concept and principles.

UM has for the implementation of European cohesion policy formulated three pillars of the project: innovation-support, infrastructural, and research and development (R&D).

Innovation-support pillar establishes effective supportive environment according to the principle »all in one place«. It brings together the professional services needed by enterprises and research institutions: the search for suitable partners in the region and beyond, acquiring European assets, intellectual property protection, assistance in entering foreign markets, assistance in introducing new product lines or the creation of spin-offs, attracting investors, etc.

Innovation-support pillar is part of a wider network *Danube Transfer Centres*, coordinated by *Steinbeis Europa Zentrum* in the German region of Baden-Württemberg. Operating within the Danube Transfer Centres network gives the UM and the entire regional environment access to new knowledge and methodologies, and facilitates the improvement of services and the effects of international connections.

To provide these services, the following institutions have joined forces and knowledge: Innovation Ecosystem of the University (afore mentioned *RAZ:UM* - the research and arts zone, *TehnoCenter UM* - technology transfer office, and *Venture Factory* - business incubator), *Maribor Development Agency*, *Scientific Research Centre Bistra Ptuj*, *Styrian Chamber of Commerce and Industry* and *Styrian Technology Park*. *Scientific Research Centre Bistra Ptuj* is the head of the co-location of Ptuj, one of the

centres of the IOT. *The Chamber of Craft and Small Business of Slovenia* is also included in the innovation-support pillar.

Infrastructural pillar is essential for effective research and development breakthrough - only with the most modern equipment and technology we can compete with the more developed regions. This pillar is about sharing of research equipment with enterprises and other research institutions, and the establishment of a network of collocations.

Research and development pillar is in accordance with smart specialization focused on priority area of »Horizon 2020« - »Health, demographic change and well-being« societal challenge, which is especially important for Drava region and Slovenia as a whole. Research and development work is focused on the needs of enterprises and tackling with societal challenges in the region. Research and development programs are designed in cooperation between knowledge institutions and business partners to jointly set conceptual intersections in Drava region: advanced technologies, food safety, light metals and functional renewable resources. In addition, this pillar supports the participation of students and young graduates in innovating companies. Worth mentioning is also an extremely successful initiative Demola, which promotes cooperation of students, businesses and higher education institutions through solving project tasks, interesting for the economy (IOT - Inovativne odprte tehnologije).

IOT follows all relevant current European guidelines and strategies. It is based on a smart, sustainable and inclusive strategy, and supports the European technology policies KET (»Key Enabling Technologies«). KET are identified as key technologies to accelerate sustainable competitiveness and growth, tackling societal challenges and the development of innovative products. It follows the guidelines of energy-efficient buildings and energy efficiency directive.

With international partners, IOT programme gained the Danube dimension and was upgraded to programme DO-IT - Open Danube Innovative Technologies. Three universities from Graz (Karl Franzens University, Medical University and Technical University), University of Trieste and University of Novi Sad will with regional partners in their areas also follow the vision of IOT in achieving greater involvement of universities in the environment, increasing competitiveness of the economy and the exploitation of synergy effects in joining the international networks in the Danube region. DO-IT was in 2014 confirmed as the so-called »flagship« - a model project of the EU Strategy for the Danube Region in Priority 7: Knowledge Society. This is an important international recognition, which increases chances to succeed in tenders and liaising with foreign partners. With the aforementioned universities and other institutions in their environment, UM already participates in the preparation of joint projects, through which gradually and by complementary sections the objectives of the IOT will be realized (IOT - Inovativne odprte tehnologije).

In 2016 (Fig. 4.), we detected a decrease in the number of projects with the economy that last over one year, and increase in the number of projects that last less than one year. Based on this fact, we can conclude that the needs of the economy for quick solutions and rapid deployment of these solutions and the results into the ongoing business activities are growing, reinforcing the competitive advantage of the economy. The number of international research projects is increasing and shows that the UM successfully integrates into the broader interregional research area. Activities of the UM in 2016 aim to strengthen the cooperation with municipalities in the Eastern Slovenia cohesion region. Thus, we expect that the cooperation with both the communities and the economy will strongly intensify in the coming years.

During the last three years, the number of young doctoral graduates is increasing (Fig. 5.). This growth trend is encouraged by co-financing of doctoral studies by the state. In practice, this means that we can expect more joint projects with the economy and society in the context of doctoral studies, what is in accordance with the holistic approach to research and development, and quadruple approach to knowledge transfer from institutions to the local environment.

The success of the UM in the regional development depends on the creation of an entrepreneurial mindset, the introduction of new open innovation educational contents and research achievements in cooperation with the local and regional environment, with a modern approach of triple and/or quadruple helix. Moreover, it supports the participation of students and young graduates in the companies innovation processes (University of Maribor).

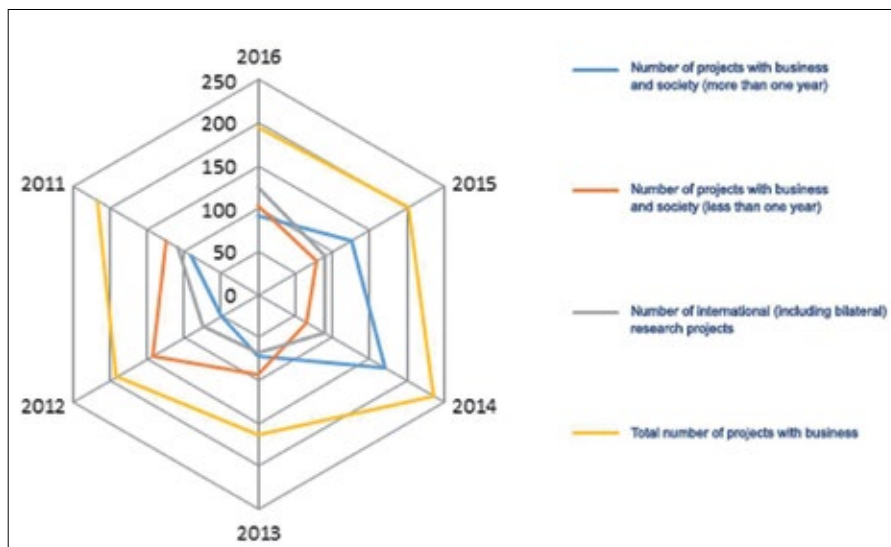


Fig. 4. Number of projects with business and society, and number of international projects.

Source: Annual Reports of UM, Professional services UM 2017

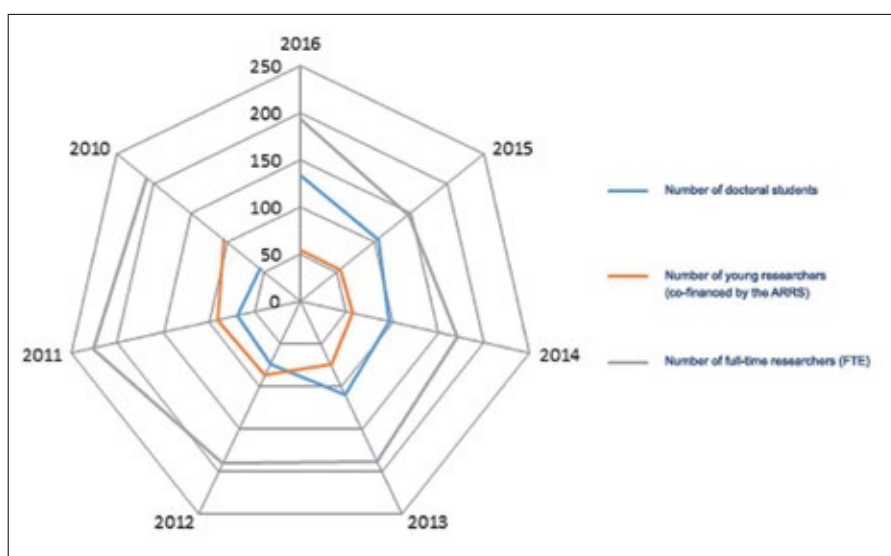


Fig 5: Number of doctoral students, young researchers and full-time researchers.

Source: Annual Reports of UM, Professional services UM 2017

CONCLUSIONS

»Operational Programme for the Implementation of the EU Cohesion Policy in the period 2014-2020« will significantly contribute to the achievement of the national and Europe 2020 targets for smart, sustainable and inclusive growth. It aims to strengthen efforts particularly in the area of research and development, boost the innovation potentials of small and medium sized enterprises (SMEs), promote resource efficiency and reduce environmental pressures, further develop the transport sector, boost the growth of employment rates and reduce the number of people at risk of poverty and social exclusion (European Commission 5).

In order to achieve the goals of the Europe 2020 strategy, we need to strengthen the integration of knowledge at the local level. Through its combined tasks to carry out education and research, universities have always been essential knowledge producing sites for their surrounding society (Coenen, 2007). Universities have potentially a pivotal role to play in the social and economic development of their regions. To effectively engage universities, public authorities need to understand the principles underlying why universities can be important agents in regional development. There is also a range of mechanisms available to support engagement, many of which are already being deployed. However, it is the strategic coordination of these within a wider policy context that will produce the maximum impact. It is important to recognise that there may well be a series of complex barriers and challenges to be over-

come, both internal to the universities and in the wider enabling environment. If public authorities and the key regional partners understand the principles, practices and barriers and how to overcome them, the potential for maximising the contribution of universities is almost boundless. Achieving this is a long term objective and will require a staged approach moving from simple projects to more integrated collaborative programmes (European Commission 3, 2011).

Slovenian universities have recently started a trend to create a strategy to include research into the local environment. UM as a leading knowledge institution in Eastern Slovenia along with its primary mission, the implementation of educational and research activities, increasingly develops its third mission, cooperation with the environment, which is vital to innovative, sustainable and socially responsible development of less developed Eastern Slovenia cohesion region. An important strategic approach to an innovation-based policy for regional development is smart specialization. The goal of the University is to develop an innovative ecosystem, which will create a symbiosis among the UM, the economy and the local communities through open innovations and technologies, and through the creation of knowledge for new professions. UM is actively involved in regional development through research projects, patents and innovation in collaboration with economy, development agencies and stakeholders in decision-making at local and regional level.

For this purpose, UM established a technology transfer office TechnoCenter, business incubator Venture Factory, research and arts zone RAZ:UM, Scientific Institute for Regional Development (ZIRRUM) and the central programme to bring together knowledge, research findings and the industry called Innovative Open Technologies (IOT). Main objective of the IOT is to create a symbiotic link among the universities and research organizations, business, support organizations and local communities through open innovation and technology. The partnership has formed a solid, long-term programme, whose implementation begins with both mental shift and enhanced cooperation as well as with a search of much-needed financial resources, especially from the European structural and investment funds (IOT - Inovativne odprte tehnologije).

To a large extent, the success of regional development depends on regional consciousness or regional affiliations of the population and the creation of a positive image of the region. In the Slovene economy, people are aware that effective restructuring of industry requires synergy between industry and science. Inclusion in the world market will only be successful if companies grow based on the technologically more demanding products and processes in production and service activities. Investment in research and development is the primary requirement for the economic development of regions. Employing a highly skilled work force, capable of innovative creations, an aggressive appearance in competitive markets and the ability to cope with the demands of the world market through permanent upgrading of skills will ensure successful regional development (Lorber, 1999).

»Regions matter for innovation, and innovation matters for regions.« The core challenge for regional innovation policies is to ensure a favourable environment for entrepreneurship and business growth. This is all the more evident in the current difficult economic context, as strengthening SMEs and reviving entrepreneurial dynamics are crucial for a job-rich recovery. Regions need to develop policies with the end in mind, but they also need to learn along the way. That is why policy learning processes, both at the policy-making level and among the firms and institutions receiving public funds, are needed. The monitoring and evaluation phase should thus be a core component of a regional innovation strategy, so as to learn from past experiences and better design strategies and policy instruments (OECD International Roundtable Innovative and Competitive Regions, 2012).

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SAŽETAK

Razvojne inicijative generiraju se u lokalnoj okolini. Ideje se mreže i taj proces uključuje politike različitih gospodarskih sektora na multi-institucionalnoj razini. Svijest i prepoznavanje lokalnih vrijednosti, ekoloških, kulturnih i društvenih, je glavni motivacijski faktor u lokalnim zajednicama prilikom postavljanja razvojnih projekata.

Znanje je postalo presudno za regionalne, inovacijske i razvojne procese. Teorije endogenog rasta, kao i koncept četverostruke spirale naglašavaju ulogu institucija znanja, ne samo u stvaranju znanja i ideja, ali i u njihovom prijenosu u praktičnu primjenu. Znanstveno-istraživačke institucije, kao i obrazovne institucije imaju nezamjenjivu ulogu u doprinosu gospodarskom razvoju i tehnološkom napretku regija. U slučaju prijenosa znanja i znanstvenih spoznaja u praksu, potrebno je krenuti od cijelog kompleksa gospodarskih, socijalnih i ekoloških uvjeta za razvoj. Institucije znanja sudjeluju u rješavanju globalnih izazova i doprinosu ekonomskom i tehnološkom razvoju i društvenom napretku lokalnih zajednica i regija.

Cilj Sveučilišta u Mariboru je razviti inovativni ekosustav, koji će stvoriti simbiozu između Sveučilišta, gospodarstva i lokalne zajednice kroz otvorene inovacije i tehnologije, te kroz stvaranje znanja za nova zanimanja. Kapacitet regija za potporu procesa učenja i inovacija ključni je izvor konkurentne prednosti. Ljudski kapital je osnovni pokretač regionalnih inovacija. Inovacije nisu samo o tehnologiji - riječ je o promjeni u ljudskom ponašanju.