

# Report on the regional potential of the Košice, Prešov and Žilina regions (Slovak Republic)

## EMERGING INDUSTRIES

- Active Aging
- Sustainable Development / Green Economy
- Sustainable / Intelligent Mobility

## CROSS-CUTTING ISSUES

- Internationalization
- Technology & Knowledge Transfer
- Gender in Innovation, including diversity aspects

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**Cluster AT+R**

On 3.3.2010, an Automation Technology and Robotics (AT+R) Cluster was founded in Košice in the form of an association of legal entities, Klaster AT+R z.p.o. Members of the cluster are active in four regions of the Slovak Republic: Košice, Prešov, Žilina and one member is located in Trenčín region. The founders of the cluster, innovative production companies, SPINEA, s.r.o. Prešov, ZŤS VVU, a.s. Košice, VUKOV Extra, a.s. Prešov, PROCONT, spol. s r.o. Prešov, EVPU, a.s. Nová Dubnica, CEIT, a.s. Žilina, SEZ Krompachy, a.s., Krompachy, R&D of the Technical University of Košice and Žilina University, with the support from the Prešov Self-Governing Region and Košice Self-Governing Region, secure the development of research and production and supply capacities for the field of the automation and robotic technology.

The goal of the initiative of its founders is to concentrate development capacity and deepen the home specialisation profile and participation in international groupings for AT+R. The basic goal of the cluster's participants is to do their own activities more effectively and more dynamically, which, in relation with other members, allow approaching the domestic and international markets with higher complexity and quality.

For the automation and robotic technology, the potential partners are from the fields of car industry, consumer electronics, measurement and control technology, drive, sensor and control technology components, manipulation and robotic technology and automated production systems.

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## 1 Introduction (Košice, Prešov and Žilina regions)

### Key characteristics:

Region / Indicator	Košice	Prešov	Žilina	Slovak Republic
Number of inhabitants (2011, Census)	791 914	814 706	688 948	5 398 384
Economically active population (2012)	357 784	387 288	330 640	2 702 281
Surface area (km <sup>2</sup> )	6 755	8 974	6 809	49 036
Rate of urbanisation (2011) - The proportion of city inhabitants to the total population	55,74	48,35	49,39	54,35
GDP per capita, PPS (2010) in EUR (at current prices)	14 109	10 104	15 26	17 865
Registered unemployment rate in % (2012)	19,58	20,66	12,79	14,44
Registered unemployment rate in % (2012) – women	20,28	21,08	14,34	15,30
Average nominal monthly earning (EUR)(2012)	735	613	726	805
Number of industrial establishments with 20 and more employes (2011)	240	269	361	2 421
Share of turnover in industry of the Slovakia (in %)	9,2	4,0	14,0	100,0
Percentage of R&D expenditure on GDP (2011)	n.a.	n.a.	n.a.	0,68
Gross domestic expenditures on R & D in ths. EUR (2011)	62 239	13 345	42 191	468 439
Number of R&D organisations and working places (2011)	n.a.	n.a.	n.a.	371
R&D personnel in head counts (2011)	3 879	1 046	2 506	28 596

Košice, Prešov, and Žilina regions (Slovak Republic) have good infrastructure in education in technical and humanity sciences, they are important crossroads in transport routes in Europe (in east-west and also north-south direction) and important centres of tourism and spa. All three regions are currently building up transport networks and creating opportunities for new investments for qualified workforce in industry and services. They are trying to build up innovation capacities. They can build on long tradition of other perspective industries like engineering industry, (bio)food industry, electrotechnical, chemical and pharmaceutical industries. Thanks to the foreign investments, also very perspective industries are automotive and metallurgical industry. However, at the same time, they are losing traditional industries like textile industry (including clothing industry) and woodprocessing industry.

All three regions are lagging behind of production in the sector of hi-tech technologies. Also science and research is very poor in all areas: infrastructure, expenditures, human resources. However, situation is improving with EU funds contributions, but most projects are focused on basic research.

Slovakia and regions concerned (Košice, Prešov and Žilina regions):



### **Košice region (industry)**

The main sectors of the industry in the Kosice region are: metallurgy, chemicals, and electrical engineering. Metallurgy represents 60% of industrial production and 50% of export of the region. The biggest company in the region is U.S.Steel Košice, which works in metallurgical sector. In electrical engineering operate the companies with the foreign capital, such as BSH Drives and Pumps and Siemens Automotive located in Michalovce. In the district of Michalovce are located the plants of Nafta Gbely, specialised in gas mining. Chemko Strážske, stock company, represents the chemical industry and it is located in Michalovce district. In Rožňava district the former mining industry has been transformed to machine, ecological and maintenance activities. Krompachy and Rudňany in Spišská Nová Ves district are important centres of colour metallurgy and iron ore. Metallurgical and metalworking treatment industries are represented in Gelnica district.

### **Key R&D actors in Košice region:**

**Technical University of Košice** ([www.tuke.sk](http://www.tuke.sk)), it has nine faculties and currently 16 000 students are attending the University. The key workplaces for participation in the programs of emerging technologies and cluster initiatives are these faculties: Faculty of Mechanical Engineering, Faculty of Manufacturing Technologies, Faculty of Electrical Engineering and Informatics, Faculty of Metallurgy, Faculty of Civil Engineering, Faculty of Mining, Ecology, Process Control and Geotechnology.

**Pavol Jozef Šafárik University in Košice** ([www.upjs.sk](http://www.upjs.sk)). The current structure of P.J.Šafárik University includes four faculties – Faculty of Medicine, Faculty of Science, Faculty of Law and Faculty of Public Administration. 5 700 students study at the University.

**University of Veterinary Medicine and Pharmacy in Košice** ([www.uvm.sk](http://www.uvm.sk)) is the only institution in the Slovak Republic offering higher education and research in the veterinary field. The key workplaces for participation in the programs of emerging technologies and cluster initiatives (esp. in area of Active aging) are agricultural, veterinary, biological, food inspection and testing departments.

**University of Security Management in Košice** ([www.vsbm.sk](http://www.vsbm.sk)) provides a full-time and external study in the field of study: “Protection of Persons and Property” and “Security Management” Relevant departments of university to the emerging technologies within the project CluStrat are those which deals with: Security Management, Safety in transport and logistics processes, Information protection, and Management of environmental risks.

**Faculty of Business Economics** with the seat in Košice as a part of University of Economics in Bratislava. Science and research activities are grouped and developed in three basic pillars:

- developing and implementing new methods and approaches in the field of market research;
- preparing new and more effective policies in the field of effective using of energies, sustainable growth and regional innovation systems;
- research in field of competitiveness and innovation activities.

Important research institution in the region is also the **Institute of Materials Research of Slovak Academy of Science** ([www.imr.saske.sk](http://www.imr.saske.sk)). It became one of the leading institutions of Central Europe in the field of powder technologies/materials, nano-materials and ceramic matrix composites during its 55 years of existence. The scientific orientation of the Institute (staff 84) is focused on the development and testing of new materials (physical and mechanical properties and the deformation and fracture characteristics of different materials at low, room, and high temperatures) and of new technologies with potential applications in transportation, energy, information technology, etc.

**Cluster for Automation and Robotics (AT + R)** ([www.clusteratr.sk](http://www.clusteratr.sk)). Main goals of the cluster are:

- the cooperation in the area of R&D, technology transfer and know-how,
- the cooperation on production base development in individual cluster branches,
- the active exploitation and support of programmes offering participation for Slovak representatives in European platforms like EU Robotics, MANUFUTURE EU and EFFRA,
- the cooperation in evolvement of development, production and trade activities within Cluster AT+R members and partners.

**Cluster IT Valley** (<http://www.kosiceitvalley.sk/en>) goal is to build a Centre of Excellence of Information and Communication Technologies in the region of Eastern Slovakia.

**BITERAP Cluster** ([www.biterap.sk/](http://www.biterap.sk/)) is a non-profit cluster that was created with the aim of creating and providing a solutions in the area of budget creation and management as a key-tool in fulfilling the mission of the organizational components of state administration and municipalities, and eventually

also of other subjects within the Slovak republic in the form of a technologic and communication system accessible as an ASP service via Internet communication channels.

**Košice Self-Governing Region** ([www.vucke.sk](http://www.vucke.sk))

The role of the self-governing region is to prepare analysis and develop strategies for different part of economics, provide coordination between different social and economic partners, create and cultivate on regional level business and innovation environment. Competences of self-governing regions concerns these areas: ground communications, rails, road transport, civil defence, social help, education, sport, theatre, museums and galleries, enlightenment activities, libraries, health service, human pharmacy, regional development, travel and tourism.

**Slovak Chamber of Commerce and Industry** ([www.sopk.sk](http://www.sopk.sk)) and its regional office in Košice, Žilina and Prešov is a public institution, which operates to promote and protect the business of its members at home and abroad. Chamber acts as an intermediary centre for searching business partners at home and abroad; provides advisory and consulting services in all matters related to businesses in the economic sphere; organizes educational activities; establishes and manages facilities and institutions to promote business development and education in this area; and promotes environmentally friendly forms of production, products and business.

**Prešov region (industry)**

The major industries in the region are mostly processing industries, especially food production based on agriculture, clothing, textiles, woodprocessing and machines, as well as the electrotechnical, chemical and pharmaceutical industries. Engineering and electrotechnical industries are traditional regional industries in the Prešov region, however, after drop of production, they require new investment for the use of still existing potential and for increase of employment in these two sectors. Approximately 34% of the economically active population work in industry. Given the great tourist potential of the region, however, there is still a lack of good quality accommodation and catering services here.

The most expanding sectors in the Prešov region are:

- mechanical engineering and mechatronics (also for production of driving components, automation technology components and robotics): Spinea, s.r.o., Prešov, Vukov-extra, a.s., Prešov, Procont, s.r.o, Prešov, KŘIŽÍK GBI, a. s., Prešov, Regata, s.r.o., Prešov; Elcom, s.r.o., Prešov;
- electro technical engineering (in frame of system integration there will be new products with high technological level for specialized medical equipment, as well as large area displays for industrial applications, new models with standardized interfaces as required by customers): Tesla Stropkov, a.s., Stropkov; TATRAMAT - ohrievače vody, s.r.o., Poprad; Elen, s. r.o., Prešov; MKEM, s.r.o., Stará Lubovňa;

- Engineering industry, train and car production engineering and production of parts for automotive industry (e.g. production of roller bearings for the automotive industry): Tatravagónka, a.s., Poprad; ZŤS Sabinov, a.s., Sabinov; Potravínárske strojárne, a.s., Svidník; Tatramat – ohrievače vody, s.r.o., Poprad; Schule Slovakia, s.r.o., Poprad; Strojchem, a.s., Svit; ZVL Auto, s.r.o., Prešov;; Chemosvit Strojsevis, a.s., Svit; Tatramat, a.s., Poprad; Fragokov Prešov, v.d., Prešov; Chemes, a.s., Humenné;
- chemical production (new products in nanotechnology and in new materials): Nexis Fibers, a.s., Humenné, Terichem, a.s., Svit, Chemosvit Fibrochem, a.s., Svit, Chemosvit, a.s., Svit;
- food industry (innovation in food technology), biotechnology (products encouraging eco-innovation) and pharmaceutical industry (innovations in producing of pharmaceuticals): Agrokarpaty, s.r.o. Plavnica, Milk - Agro Prešov, s.r.o., Prešov; Pivovar Šariš, a.s., Veľký Šariš; Mecom, a.s., Humenné; Tatranská mliekárň, a.s., Kežmarok; Baliarne obchodu, a.s., Poprad; Humenská mliekárň, a.s., Humenné; Šarišské pekárne a cukrárne, a.s., Prešov; Podvihorlatské pekárne a cukrárne, a.s., Humenné; Mäsokombinát Nord Svit, s.r.o., Svit; Zlatá Studňa, s.r.o., Široké, Minerálne vody, a.s., Prešov;
- tourism and health resorts (innovation in tourism and the therapeutic spa, recreation and rehabilitation): Bardejovské kúpele, a.s., Kúpele Vyšné Ružbachy, Aqua-park Poprad;
- textile and clothing industry: VSK, s.r.o., Humenné; Tatravit Svit – Socks, a.s., Svit; Tytex Slovakia, s.r.o., Humenné; Twista, s.r.o., Humenné; ODEVA, s.r.o., Lipany; Ozex, s.r.o., Prešov; Svik, s.r.o., Svidník; Gemor Fashion, s.r.o., Prešov.

### **Key R&D actors in Prešov region:**

The key regional research and development institution is the **University of Prešov** ([www.unipo.sk](http://www.unipo.sk)) that has eight faculties, but the key workplaces for emerging technologies are: Faculty of Arts, Faculty of Humanities and Natural Sciences, Faculty of Health Care, and Faculty of Management.

In Prešov is also located **Faculty of Manufacturing Technologies**, which belongs to the Technical University of Košice. It provides higher education in an accredited study program "Production Engineering".

**Educational Center of Faculty of Chemical and Food Technology of Slovak University of Technology** in Bratislava, is located in Humenné. The aim of this center is to prepare graduates at bachelor level in a daily and an external form in the study programs of automation, computerization and management in chemistry and food technology for the food processing.

**Prešov Self-Governing Region** ([www.po-kraj.sk](http://www.po-kraj.sk)) prepares analysis and evaluates the development of the region and its parts, provides and coordinates the development of economic and social development of the region. Provides and coordinates the development of sector policies and strategies for economic and social development in the region.

**Innovation Partnership Centre** (<http://www.po-kraj.sk/sk/samosprava/projekty/norsky-financny-mechanizmus/ipc.html>) goals are:

- ensure coordination of regional institutions on the basis of public-private partnerships that have the potential to promote positive change for the benefit of the region - enhancing the professional skills of human resources and strengthen regional capacity,
- transfer of experience of successful operation of the Molde Knowledge Park (Norway) and the application model Molde Knowledge Park on the conditions in the Prešov region,
- preparation and evaluation of the Prešov Regional Innovation Strategy.

**Regional Advisory and Information Centre** in Prešov ([www.rpicpo.sk](http://www.rpicpo.sk)) is a non profit organization dealing with business support for small and medium sized enterprises. It has the Technology Incubator Centre, in which it provides support and services for entrepreneurs. It also participates in various regional, national and international projects.

**Prešov regional chamber** (<http://po.sopk.sk>) of the Slovak Chamber of Commerce and Industry is a leading business consultancy organization in the region and has also its branch in Poprad. It's also very active in various international projects.

**Cluster AT+R** ([www.clusteratr.sk](http://www.clusteratr.sk)) has in Prešov its branch, which specializes on R&D in automation technologies, on training of workers for engineering companies, specializes on transfer of new technologies in AT+R fields for the needs of innovative companies and SMEs in the region and on development and implementation of projects for the automation of engineering works (CAD/CAM/CAE), testing, rapid technologies as part of research and innovative projects for manufacturers of components of production robotic technologies and new technologies.

**Energy cluster in Prešov** was established just in 2012. The key roles of the cluster are to provide coordination and management activities of the project focus on the implementation of renewable and low-carbon technologies, to promote and assist in business development and the development of green energy in the field of science, research, energy conservation, waste energy recovery, and development of local energy concepts in the Prešov region.

### **Žilina Region (industry)**

The economy of the region is represented by all sectors, however the most important are automotive industry, construction machine industry and the construction sector. Telecommunications and wood processing also have strong positions in the region. The main story in the region is the new Kia Motors plant in Teplička nad Váhom near Žilina. Žilina is also the seat of the biggest Slovakian construction and transportation engineering company Váhostav, a.s. The chemical industry is represented by Považské chemické závody, a.s. and Tento, a.s., a paper mill company. Siemens Mobility also has an engineering center in Žilina.

The sectors with the greatest potential for innovation are:

- automotive industry,
- mechanical engineering,
- electrical industry (including information and communication technology)
- woodprocessing
- tourism.

Key companies in the Žilina region:

Neusiedler SCP a.s. – leading manufacturer of wood-free graphic and office papers and boards in Slovakia and one of the leading manufacturers in Europe, KIA Motors Corporation – investment of volume 1,3 mld € (automotive), INA (machine), Volkswagen (automotive), Tento (chemical).

Key industries in Žilina region:

- Electricity, gas, steam, hot water production – Stredoslovenská energetika, j.s.c. Žilina, Žilinská teplárenská, j.s.c. Žilina, Martinská teplárenská, j.s.c. Martin, Severoslovenská vodárenská spoločnosť, j.s.c. Žilina
- Cellulose, paper and papery products production – Neusiedler SCP, j.s.c. Ružomberok, Tento, j.s.c. Žilina
- Machine and mechanism production – INA Kysuce, j.s.c., Kysucké Nové Mesto, Kinex, j.s.c., Bytča, Kinex-KLF, j.s.c., Kysucké Nové Mesto, GGB Slovakia, l.l.c. Sučany, Liptovské strojárne, j.s.c. Liptovský Mikuláš, Drevoindustria Mechanik, l.l.c.. Žilina
- Electric and optic equipment production – Tesla L. Hrádok, j.s.c. Liptovský Hrádok, Alcatel Slovakia, j.s.c. Liptovský Hrádok, OVP Orava, l.l.c.. Trstená, Panasonic Electronic Device Slovakia, l.l.c.. Trstená, Punch Campus Námestovo, l.l.c. Námestovo, CRT-Electronics l.l.c. Nižná, XPS Slovakia l.l.c.. Nižná, Elteco, j.s.c. Žilina
- Food production – Hyza, j.s.c. Žilina, Liptovská mliekárň, j.s.c. Liptovský Mikuláš, St. Nicolaus, j.s.c. Liptovský Mikuláš, Pivovar Popper, l.l.c. Bytča, Kysucké pekárne, j.s.c. Čadca, Tvrdošínska mliekárň, j.s.c. Tvrdošín, Kofola, j.s.c. Rajecká Lesná, St. Nicolaus, j.s.c. Liptovský Mikuláš, PEZA, j.s.c. Žilina
- Metal production – OFZ, j.s.c. Itebné, KLF-ZVL MTK, l.l.c. Martin, Elektrovod Žilina, j.s.c., KLF-ZVL Kováčňa, j.s.c. Kysucké Nové Mesto, Miba Winter Slovakia, l.l.c. Dolný Kubín

Tourism is also important economic sector in the Žilina region. The area of the Žilina region is the place with the highest density of protected territories in Slovakia like natural parks (55,8 %). A number of mineral springs and geothermal waters (Korytnica, Lúčky, Rajecké Teplice, Turčianske Teplice, Bešeňová, Liptovský Ján) create great conditions for spa & wellness.

**Key R&D actors in Žilina region:**

The key knowledge and education institution in the Žilina region is the **University of Žilina** ([www.uniza.sk](http://www.uniza.sk)). It has a long tradition of providing education in the fields of transport and communications. The University contributes to the technological and operational development of transport and telecommunication systems, networks and services. It has 7 faculties: Faculty of Operation and Economics of Transport and Communications, Faculty of Mechanical Engineering, Faculty of Electrical Engineering, Faculty of Civil Engineering, Faculty of Management Science and Informatics, Faculty of Special Engineering, Faculty of Humanities.

**CEIT SK - Central European Institute of Technology** was established in 2007 as a spin-off of the Slovak Productivity Center directly integrated to European Research Area. CEIT SK focuses its activity on technological progress, support of entrepreneurship and innovations and creates basis for productivity and competitiveness growth. It provides the support of transfer, implementation and further development of new advanced technologies. The key-services of CEIT SK are in these areas: mechanical systems R&D and automation of manufacturing systems, intelligent systems (Mobile robotic devices, Virtual simulation, Image recognition), calculations and analyses (Optimization of Mechanical Components, Hyperplastic Materials Elements Analyses), application of progressive technologies (Rapid technologies), digital factory (3D design of manufacturing systems, Simulation and optimization of production and logistic systems).

In close cooperation with the University of Žilina and CEIT, **Cluster AT+R** has its branch in Žilina. It focuses on building up capacity in the research, development, designing and implementation of intelligent solutions for advanced production. Jointly they are running these laboratories: Laboratory of Intelligent Production Systems, Laboratory of a Digital Company, Laboratory of Quality Control, Testing and Diagnostics, Laboratory of Reverse Engineering, Laboratory of Rapid Prototyping, Laboratory of Virtual Reality and Immersive Technologies.

**Žilina self-governing region** ([www.regionzilina.sk](http://www.regionzilina.sk)) is the key intermediary in the region.

Its main activities related to economy and innovation development are: creating a reciprocal linking of innovation strategies at national, regional and corporate levels - strategic level; defining a mechanism for innovation processes formation in a company or an institution, including the underpinnings of innovative activities within firms - tactical level; building systems of innovation activities by local authorities and institutions - the operational level.

## 2 Emerging Industries & Priorities for Pilot Actions

From regional interviews collected within qualitative research (mapping activity) and organised 3 regional dialogues, it is possible to realise the analysis of potential of firms, knowledge producers and intermediaries for creation or regional, national and international networks.

Some of the respondents are already working in developed cluster structures or thematic associations. Among those are mostly a group of companies, universities and higher territorial units in the sectors: Green economy / sustainable development and Active aging. For these two areas in the regions Košice-Prešov-Žilina are expected activities and the greatest potential for development of innovation, know-how at all three levels: regional, national and international.

Inside these sectoral themes in the emerging sectors (AA, GE / SD, SM), we identified 9 priority themes:

### Active ageing

- AA 1: Bio-active foods
- AA 2: Health care
- AA 3: Wellness & Tourism

### Green economy & sustainable development

- GE/SD 1: Energy efficiency
- GE/SD 2: New materials
- GE/SD 3: Intelligent production systems (Factories of the future)

### Sustainable mobility

- SM 1: Alternative engines
- SM 2: Public transport
- SM 3: Industrial transport systems

In some sectors and thematic areas, there is a relatively significant difference in qualitative and quantitative potential, as well as the structure and proportion capacity of firms, holders and producers of know-how and the necessary infrastructure of intermediaries and cluster structures. In sectors AA1, SM3, GE / SD 1 and GE/SD3 the structure is relatively balanced when speaking about proportions of partners. In sectors AA2 and GE2 outweigh carriers and producers of know-how, and in sectors AA3, SM1, SM2 outweigh companies. In all sectors it is required to strengthen the role of intermediaries – creators of infrastructure for clustering, transfer of know-how and international cooperation. E.g. the real number of active clusters in all three region is minimum.

The highest initiative for clustering seems to be currently in sectors GE/SD1 and GE/SD3 where already exist clusters and associations that work closely with universities and regional authorities.

The highest interest and regional capability of stakeholders to organise international clustering activities were identified in these 6 topics in emerging industries:

1. Networking for development of new concepts for ***zero energy buildings with renewable energy used***. Overall aim is cross clustering and networking of stakeholders to design and offer advanced technology retrofit options, demonstrations, trainings and transfer of know-how of new concepts for zero energy buildings with renewable energy used.
2. Technology transfer in ***advanced materials*** for increasing the innovation of products and technologies. Aims are:
  - a. to enlarge network of laboratories and experimental workplaces for testing and application of light-weight materials.
  - b. to implement joint training program for application of light-weight materials, their constructional utilisation of technological processing and testing.
3. Networking of stakeholders in mechatronic, ICT and security modules for development of ***the man-machine systems***. Aims are:
  - a. to elaborate roadmap in the area of mechatronic components, ICT and security systems that are the basis for interactive-flexible systems (also based on ergonomics aspect and evaluation) of man-machine development.
  - b. to enlarge the cooperation in the field of man-machine systems in frame of cross-clustering mechatronic platform for assembly and manipulation technological operations.
  - c. to exchange the training and best practice applications of the man-machine projects.
4. ***Ambient Assisted Living***: homecare mobile/handling platforms technologies, and ICT systems for smart houses, and for social and health services. Aims are:
  - a. to metacluster existing stakeholders, networks and platforms in the emerging sector of Ambient Assisted Living (AAL).
  - b. to support of technology transfers, especially in ICT based services, mobile/handling systems, tele-health services, sensors and augmented reality for AAL.
5. Networking in ***Bio-active Food preparations*** made from organic plant materials
  - a. to map potential of international clustering of partners in bio-active food sector by elaboration of road map and creating pre-conditions for establishment of joint research and testing laboratories
  - b. to enlarge and link existing networks and platforms in bio-food (internationally)
6. Strategical Partnerships in ***BioAdditive Manufacturing and Intelligent Bionic Implants***. Aim is to create strategic partnerships for internationalization and technology transfer in bioadditive R&D and manufacturing (BioAM technologies and materials), additive manufacturing (AM) in medicine, and in intelligent bionic implants (IBI).

In the area of ***tourism / spa***, there are some stakeholders in the regions that are interested in joint projects, but they do not have capacities to be a project leaders.

### 3 Cross-cutting Issues

When speaking about the cross-cutting issues, there is huge interest esp. on know-how transfer and internationalization among all stakeholders in all three concerned regions. Gender is not the priority topic and it's mostly covered on by small research units at universities. However, some regional intermediaries are participating in some EU projects that are touching this issue.

All three regions are lagging behind in all three cross-cutting issues, however some positive examples were identified:

1. Gender
  - a. WOMENG – project of the Technical University in Košice with aim to get acquainted with training degrees in engineering in Europe in order to determine why women are not attracted to engineering training, at what level females are eliminated, how it happens and why.
  - b. Guardian Angels for Female Entrepreneur (Prešov region) – aim was to create network of mentors for women entrepreneurs aiming to further promote women's entrepreneurship. Inherently linked to the project Promotion of women's entrepreneurship in Slovakia, which aimed to inspire potential entrepreneurs, and through business stories and practical advice ambassadors to embark on the path of self-employment. The aim of project and its main actors - Mentors for women start-ups is to help them in times of its business beginnings.
  - c. Extraordinary women of the Žilina - National Project on Gender Equality Institute and Žilina self-governing region has managed the contest for the extraordinary women of Žilina.
2. Internationalisation
  - a. RAPID - Promoting innovation by the public sector in the region in favour of innovative SMEs. Project was aimed to promote and develop links between businesses (especially SMEs) with universities, colleges and research and development departments, which are essential for increasing the innovative potential of Prešov region. Project was implemented with the participation of 13 partners from 11 countries of the Europe.
  - b. FLAME - Future Laboratory for the Diffusion and Application of Innovation in Materials Science and Engineering (Prešov region). Within the FLAME project the partners experimented innovative co-operation modules that facilitate the information flows and interactions among the regions in Europe. The project implemented a brand new cooperation model: the Future Lab that helps to make better use of local and regional potentials, kick-start innovation in the MS&E sector and support regional development.

- c. Virtual Factory Framework (VFF) project (Žilina) – VFF objective was a research and implementation the underlying models and ideas at the foundation of a new conceptual framework designed to implement the next generation of Virtual Factory, constantly synchronized with the real one. 30 organizations from 10 EU countries participated on the project.
3. Know-how transfer
- a. Regional training / demonstration center for green economy in Košice – Knowbridge project with aim to establish RTDC – Green Economy as a regional organization that works with EU, national level and regional level with innovation-development and energy agencies, industry players, and other stakeholders (universities, public institutions, SME to promote green economy.
  - b. IPC - Coordination of regional development in Prešov region by establishing Innovative Partnership Center. The objective of the project was to create an institution named Innovative Partnership Centre based on transfer of know-how from model Molde Knowledge Park (Norway), including the administration and operation of the public-private partnership. Main tasks of the IPC are: building partnerships, development of international cooperation, improving institutional coordination and cooperation, business support, promoting innovation, research and development.

For the pilot actions, stakeholders of 3 concerned regions are ready to provide their capacities for internationalisation and know-how transfer. Potential for joint project in the area of gender and equal opportunities is limited by low know-how, capacities and interest of stakeholders.

## 5 Conclusions for pilot development

When speaking about the policy instruments, most of the teams expressed their main interest to test and implement strategic partnerships, cross clustering, networking, technology mapping, elaboration of feasibility studies and training programs. Almost all participants at the regional dialogues also requested regional administrations of 3 regions concerned to also start preparing regional funding/support programs and include emerging sectors to prepared regional development and innovation programs.

The most balanced emerging sectors in 3 Slovak regions (Kosice, Presov, Zilina) while covering R&D institutions, clusters, companies and intermediaries are in Energy Efficiency and Renewable Energy sector, New materials, and in Intelligent production and transport systems. Good cooperation between R&D actors and companies is also in the sectors of Ambient assistant living, Bioactive foods and Technologies and services for health care and diagnosis. However, there are no clusters or intermediaries existing. When speaking about the Creative industry for wellness and tourism, there are a lot of companies providing tourism services and also intermediaries. But the R&D is very week in

the region and also there are only few small companies that are producers of technologies for this topic.

When speaking about the cross-cutting issues, there is huge interest esp. on know-how transfer and internationalization among all stakeholders. Gender is not the priority topic and it's mostly covered on by small research units at universities. However, some regional intermediaries are participating in some EU projects that are touching this issue.

Generally, there is huge interest of participating stakeholders for participation at the pilot projects within CluStrat. Most of the stakeholders are in favor for international networking and testing new cluster initiatives, which will foster transfer of know-how in emerging sectors.

Key leading cluster for all pilot projects will be Cluster AT+R. We expect also active participation in the pilot action of the Energy Cluster in Prešov and possibly ICT cluster (IT Valley) in Košice.

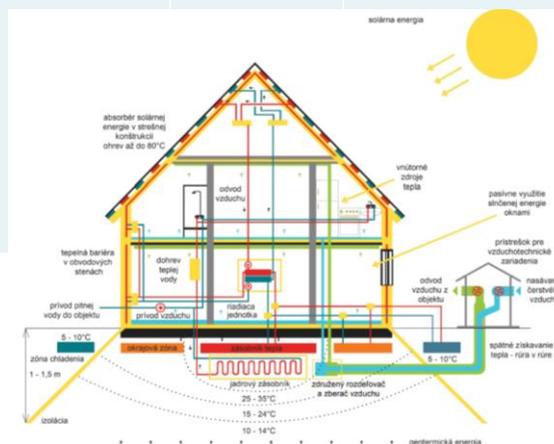
**Examples of proposed pilot projects for Košice, Prešov and Žilina regions** (including confirmed stakeholders that would like to participate at the project implementation):



## Energy Efficiency and Renewable Energy

Topics	K-H producers & R&D	Companies	Intermediaries
<ul style="list-style-type: none"> <li>- Energy savings in heating and cooling of buildings;</li> <li>- Replacing fossil fuels with renewable energy sources, including the development of new technologies (especially solar energy, heat pumps, and so forth);</li> <li>- Energy storage systems;</li> <li>- The development of a market for renewable energy sources (small energy sources) and more effective organization and management of the energy market;</li> <li>- Mechatronic and robotic systems for technologies securing energy efficiency and renewable energy production.</li> </ul>	TUKE (M) STU (P)	HONORS (P) ENECO (P) VSE (P)	Cluster AT+R VUC KE & PO (M) Environmental Energy Agency in Prešov (P) SIEA Košice (P)

Notes: M – Cluster At+R member, P – partner, K-H – know-how



# New materials

Topics	K-H producers & R&D	Companies	Intermediaries
<ul style="list-style-type: none"> <li>- new materials for production of plastic moldings aimed at a pressing method of injection molding or compression;</li> <li>- development of electrical steels with high permeability;</li> <li>- composites based on Al, Fe, and plastics for industry and production of mechatronic components;</li> <li>- research in the field of nanomaterials, ceramics and metal powder technologies;</li> <li>- new materials for packaging of food products based on flexible films;</li> <li>- new materials based on polypropylene, propylene and fine yarns for the textile and automotive industries;</li> <li>- tribotechnologies for new materials.</li> </ul>	<ul style="list-style-type: none"> <li>TUKE (M)</li> <li>UNIZA (M)</li> <li>SAV (P)</li> <li>UNIPO (P)</li> </ul>	<ul style="list-style-type: none"> <li>SPINEA (M)</li> <li>ZTS VVU (M)</li> <li>CEIT (M)</li> <li>VUKOV EXTRA (M)</li> <li>SEZ Kropachy (P)</li> <li>CHEMOSVIT (P)</li> </ul>	<ul style="list-style-type: none"> <li>Cluster AT+R</li> <li>SOPK (P)</li> </ul>

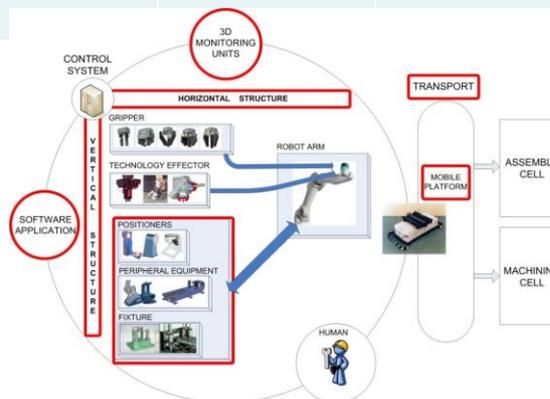
- Ultra vysokopevné ocele
- Extra vysokopevné ocele
- Progressive vysokopevné ocele
- Vysokopevné ocele
- Ocele různých akostí
- Hliník
- Horčík



Notes: M – Cluster At+R member, P – partner, K-H – know-how

# Intelligent production systems

Topics	K-H producers & R&D	Companies	Intermediaries
<ul style="list-style-type: none"> <li>- Mechatronic components based on precision bearing reducers for robotics and technological equipment;</li> <li>- Conveyors, handling equipment and systems;</li> <li>- Flexible and intelligent production systems;</li> <li>- Smart information and communication technologies in production systems;</li> <li>- Intelligent drive and control system;</li> <li>- Service robotics.</li> </ul>	<ul style="list-style-type: none"> <li>TUKE (M)</li> <li>UNIZA (M)</li> <li>SAV (P)</li> <li>STU (P)</li> </ul>	<ul style="list-style-type: none"> <li>SPINEA (M)</li> <li>ZTS VVU (M)</li> <li>PROCONT (M)</li> <li>VUKOV EXTRA (M)</li> <li>CEIT (M)</li> <li>EVPÚ (M)</li> <li>Kybernetika (P)</li> </ul>	<ul style="list-style-type: none"> <li>Cluster AT+R</li> <li>SOPK (P)</li> <li>VUC KE (M)</li> <li>VUC PO (M)</li> <li>VUC ZA (P)</li> <li>UKal (P)</li> </ul>





## Intelligent transport systems

Topics	K-H producers & R&D	Companies	Intermediaries
<ul style="list-style-type: none"> <li>- Robotics and Mechatronics for logistic;</li> <li>- Navigation and advanced communication technologies, including sensor;</li> <li>- Robotic trucks for urban and internal companies' transport;</li> <li>- Safety and rescue robotic systems;</li> <li>- Intelligent handling systems and equipment for loading and storage of goods;</li> <li>- Autonomous ground vehicles for agricultural and forestry applications;</li> <li>- Flexible and intelligent railway transport.</li> </ul>	TUKE (M) UNIZA (M) VUD (P) CETRA (P) VSBM (P)	ZTS VVU (M) SPINEA (M) VUKOV EXTRA (M) CEIT (M) EVPÚ (M) MANEX (P) Kybernetika (P)	Cluster AT+R VUC KE (M) VUC PO (M) VUC ZA (P) IT Valley (P)



## Mechatronic systems and robotics for health care

Topics	K-H producers & R&D	Companies	Intermediaries
<ul style="list-style-type: none"> <li>- Precision mechanics and mechanical modules for medical devices and equipment;</li> <li>- Bionics, biomedical technology and engineering in medicine;</li> <li>- Rehabilitation equipment, orthotics and prosthetics;</li> <li>- Biomedical engineering, research, development and innovation for the medical health care;</li> <li>- Biosensors, bionics, nanomaterials for medical care.</li> </ul>	TUKE (M) UPJS (P) UNIPO (P) SAV (P)	CEIT Kosice (M) ORTOPROplus (P) Protetika (P) Nemocnica Košice-Šaca (P) Nemocnica L.Pasteura Košice (P) Nemocnica J.A. Reimana Prešov (P)	Cluster AT+R VUC KE (M) VUC PO (M) VUC ZA (P)

