Interreg
Danube Transnational Programme
Danube Energy+

DANUBE ENERGY +

D 3.1.5 Transregional situation analysis

Danube Energy +
(about the project)

Danube Energy+ tackles the need for change in regional ecosystems to support Young Innovators in transforming their disruptive ideas into ventures

General objective: create an enabling environment which will support Young innovators to pioneer a change in the energy efficiency area by setting up highly innovative startups in the Danube macro-region

Main innovation: ***Danube Energy+ ecosystem Package***

Danube Energy + ACTIVITIES

To support development of the *Package,* detailed mapping of:

- regional frameworks and available supporting policy tools
- Young innovators´ (YIs) current successful ventures in energy efficiency in the region and country
- and regional sources of young innovators (universities, sub-ecosystems, regional locations)

was carried out, and are available on project web as Regional maps of each participating region

Regional maps were inputs to the *Transregional situation analysis* with the aim to influence Danube energy + tool development

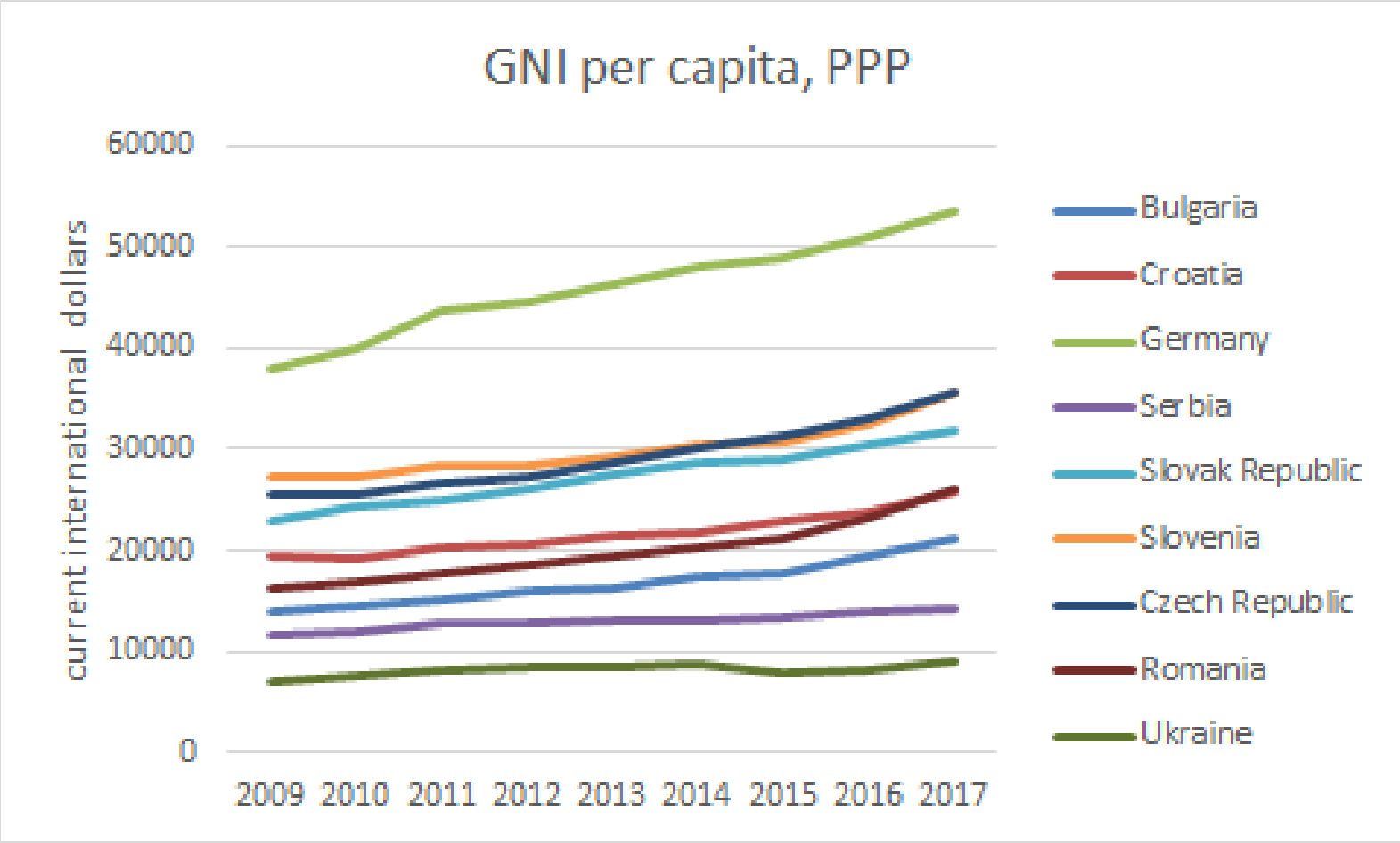
Danube Energy + partner countries

DE- Germany
CZ- Czech Republic
SK- Slovakia
SI- Slovenia
HR- Croatia
UA- Ukraine
RS- Serbia
RO- Romania
BG- Bulgaria

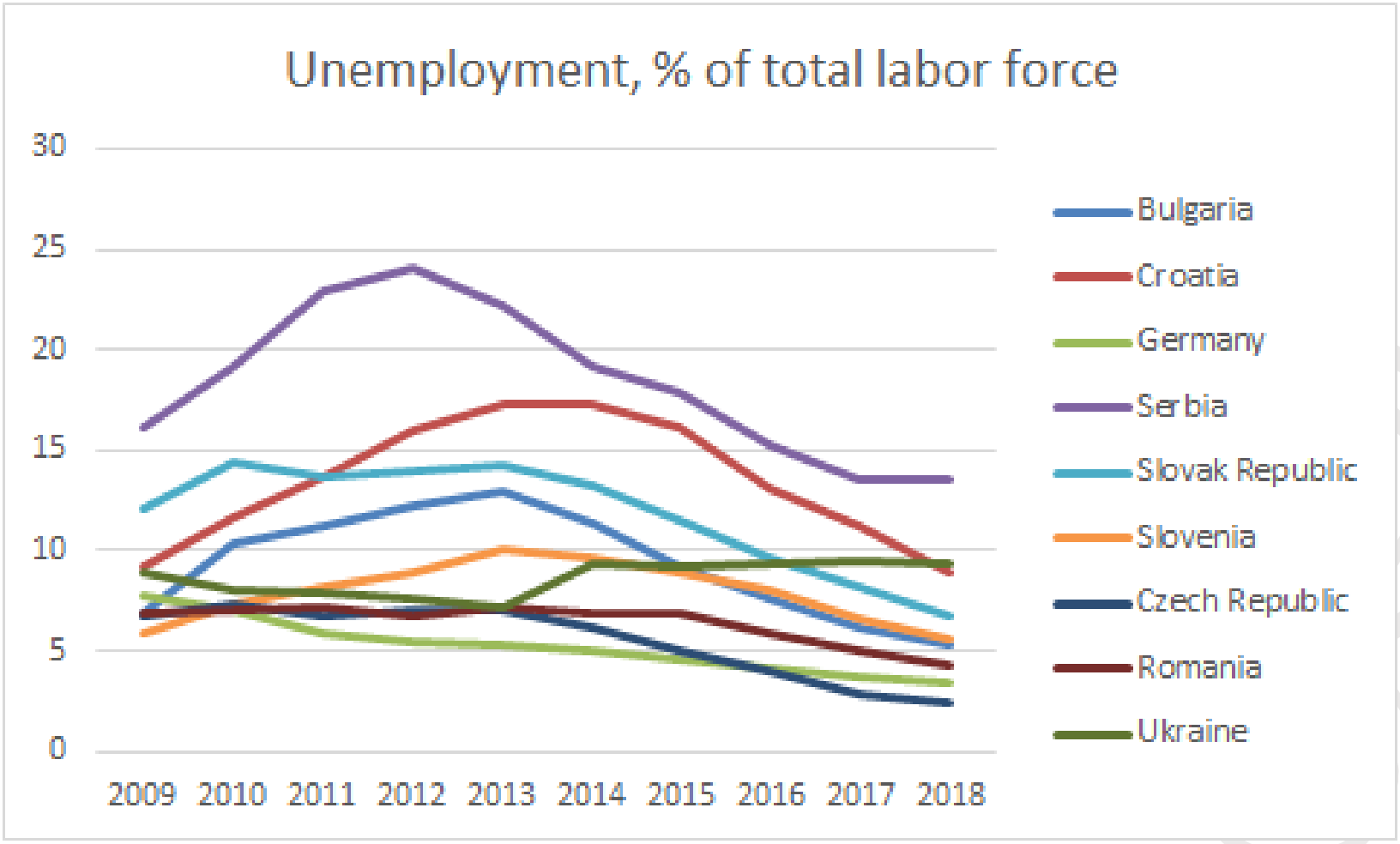
COMPARATIVE REGIONAL FRAMEWORK

data source: The World Bank Datasets

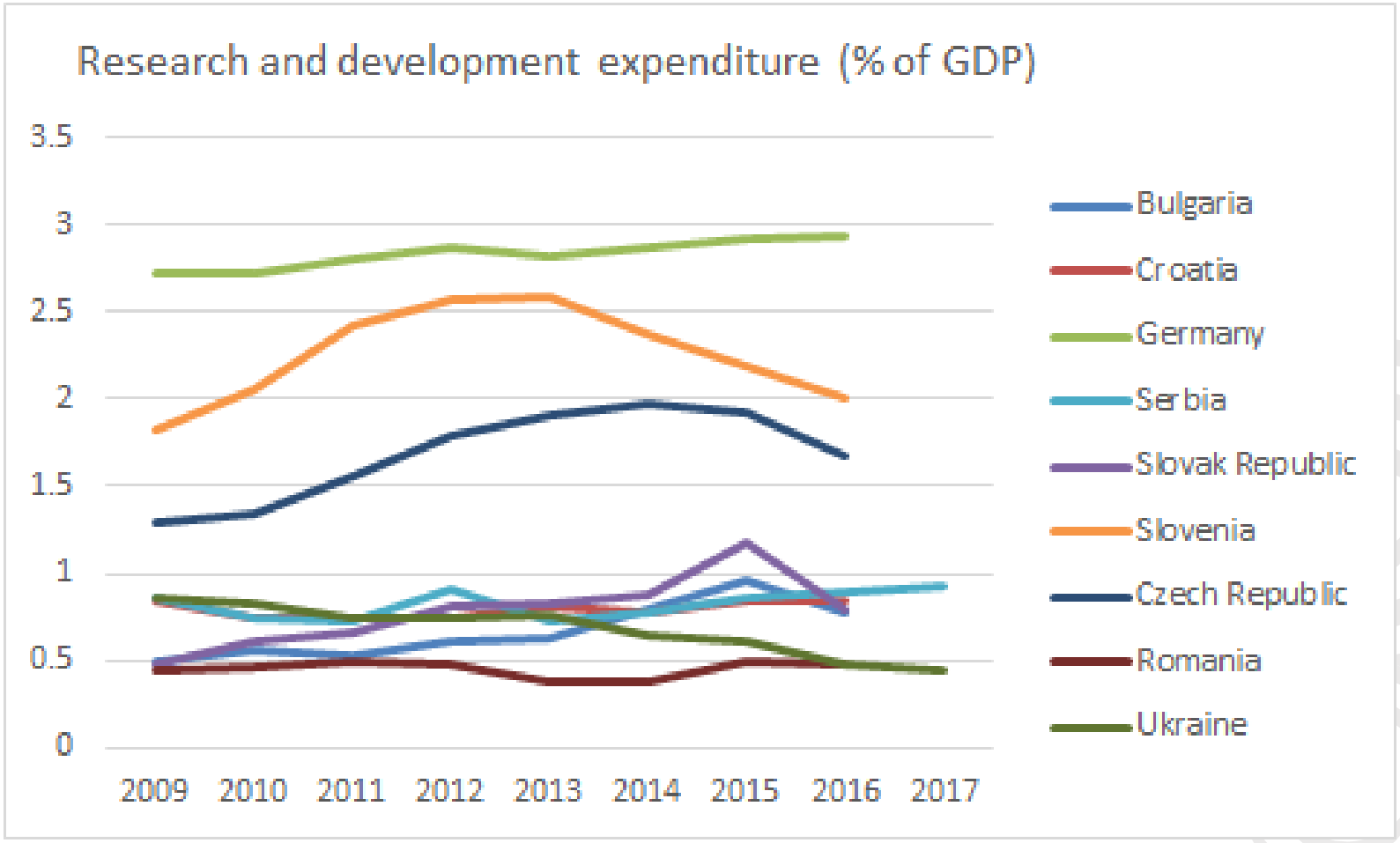
Gross national income per capita



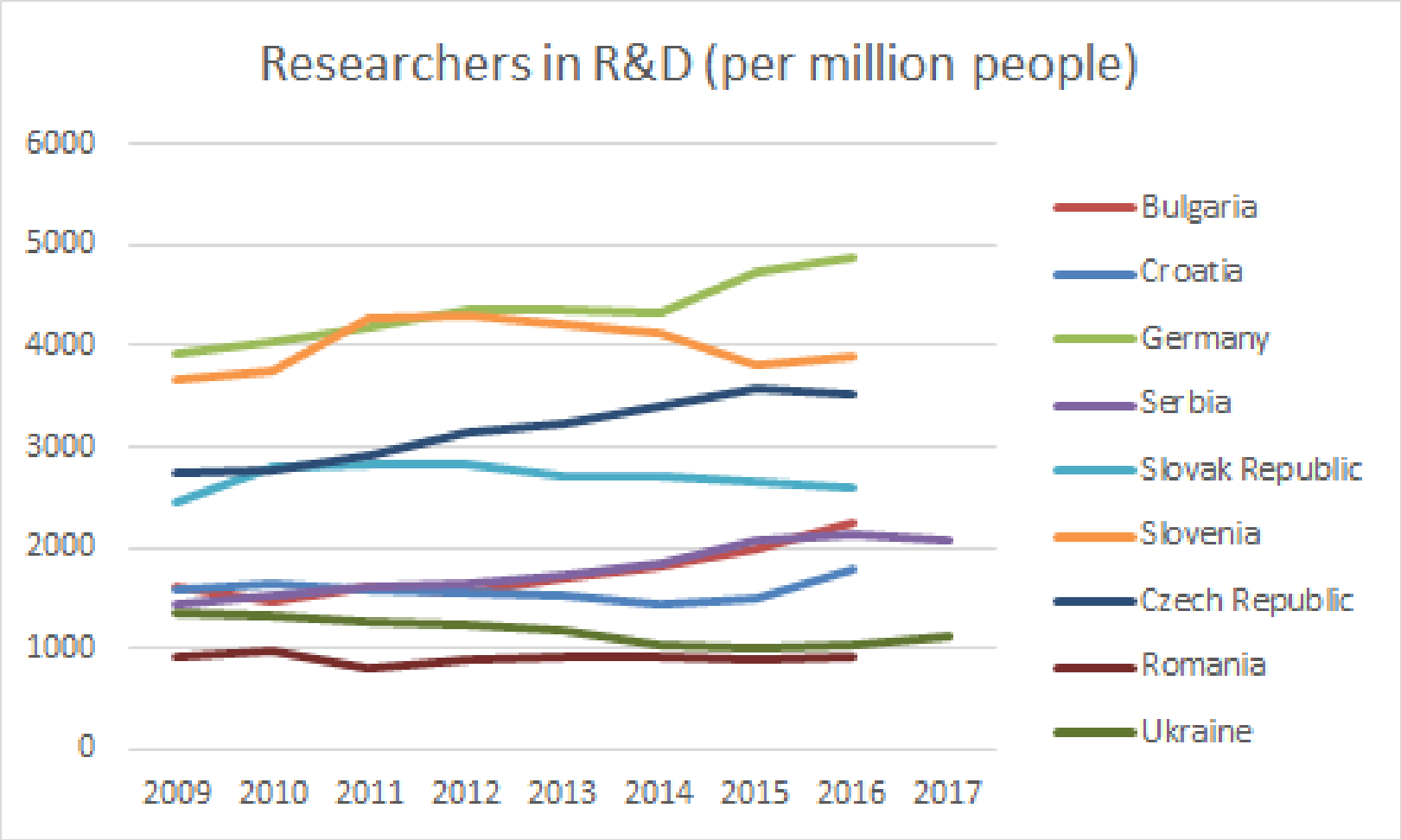
Unemployment



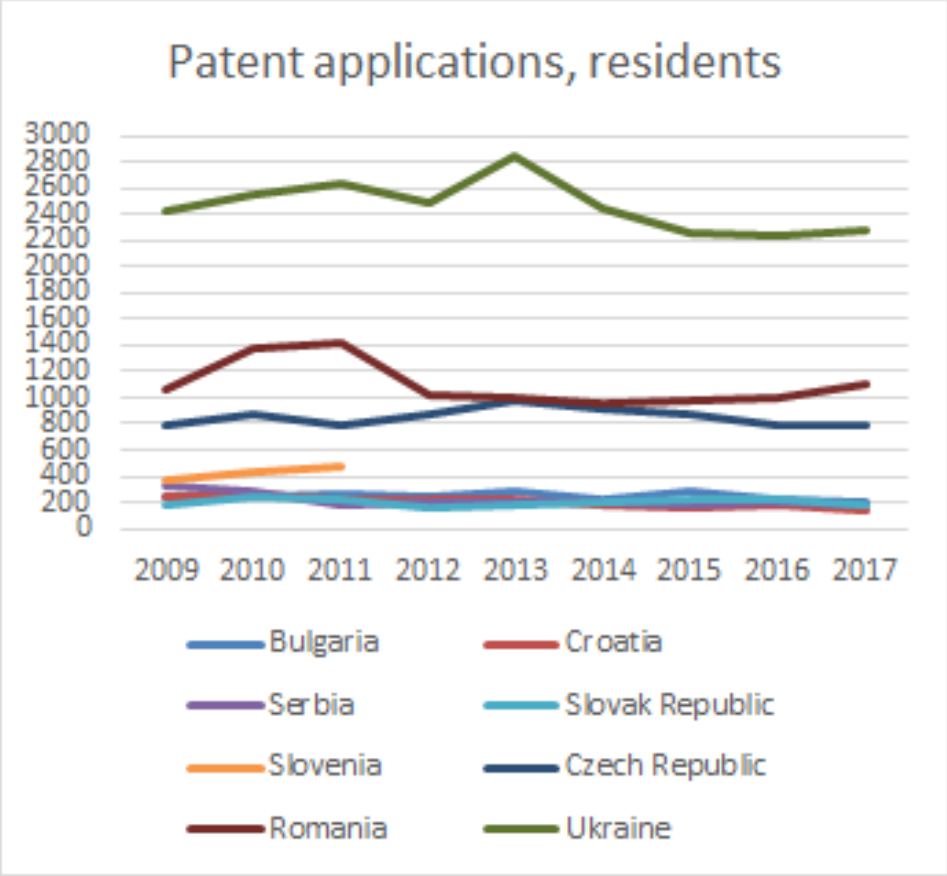
R&D expenditure

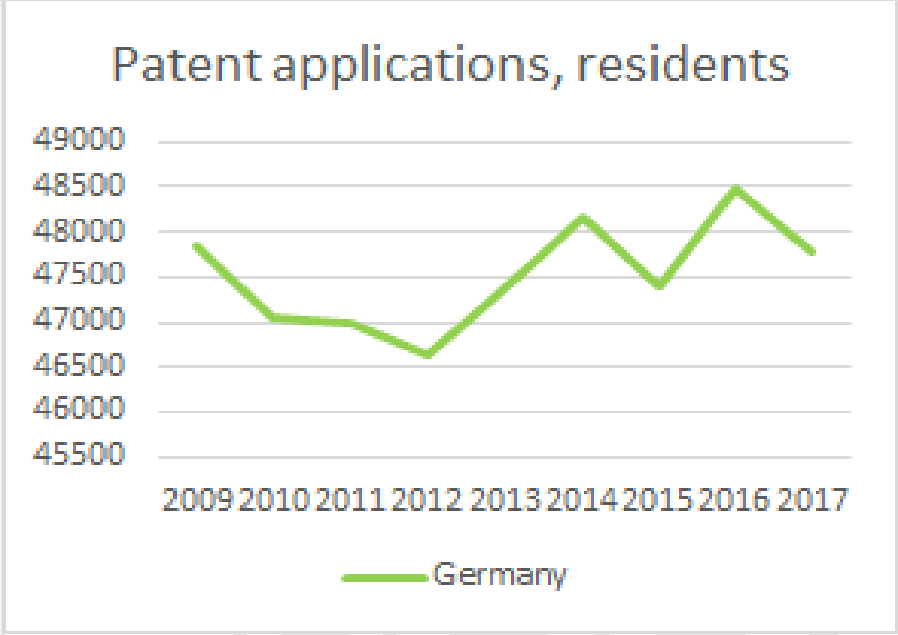


Number of researchers in R&D

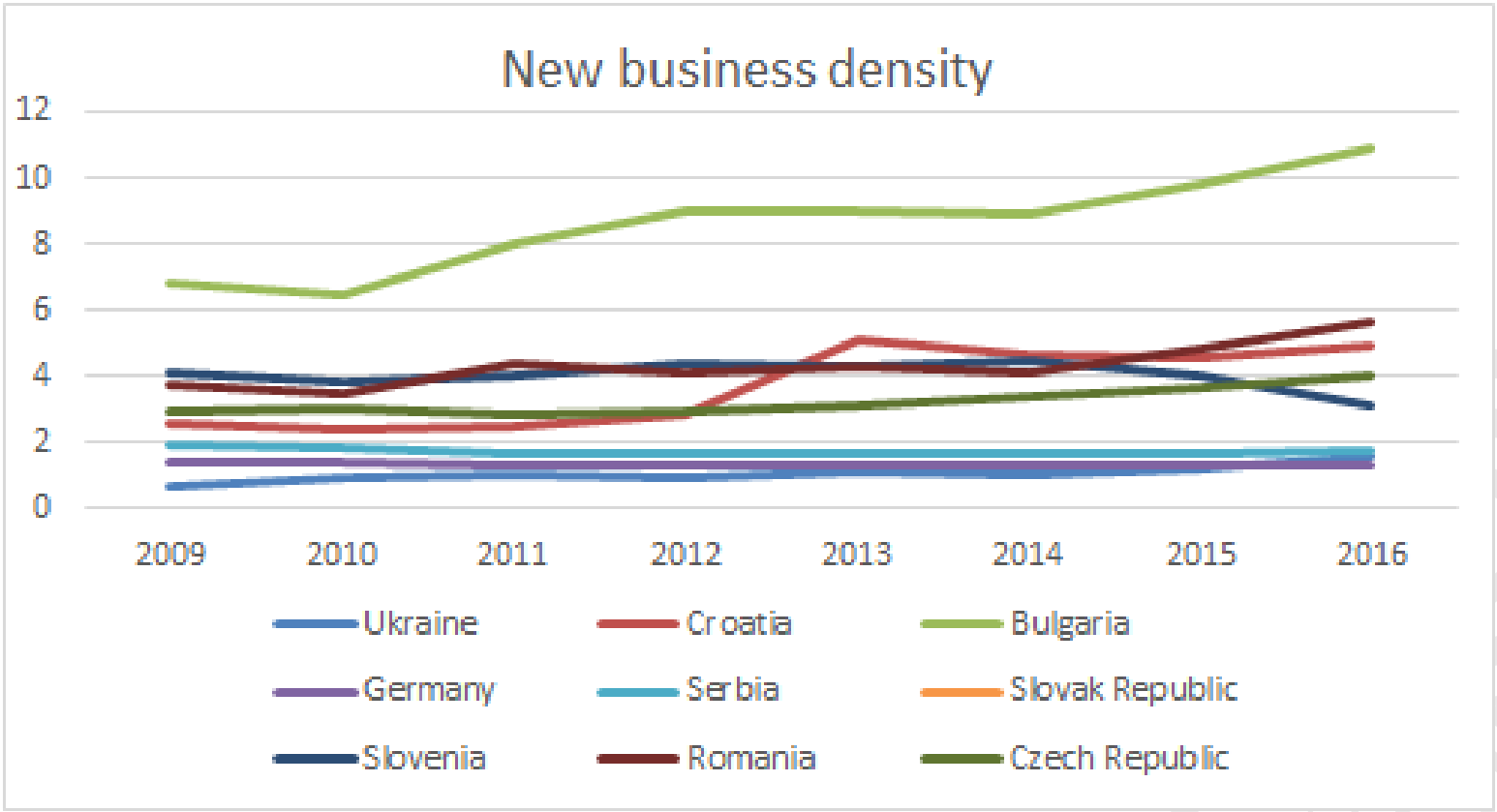


Patent applications



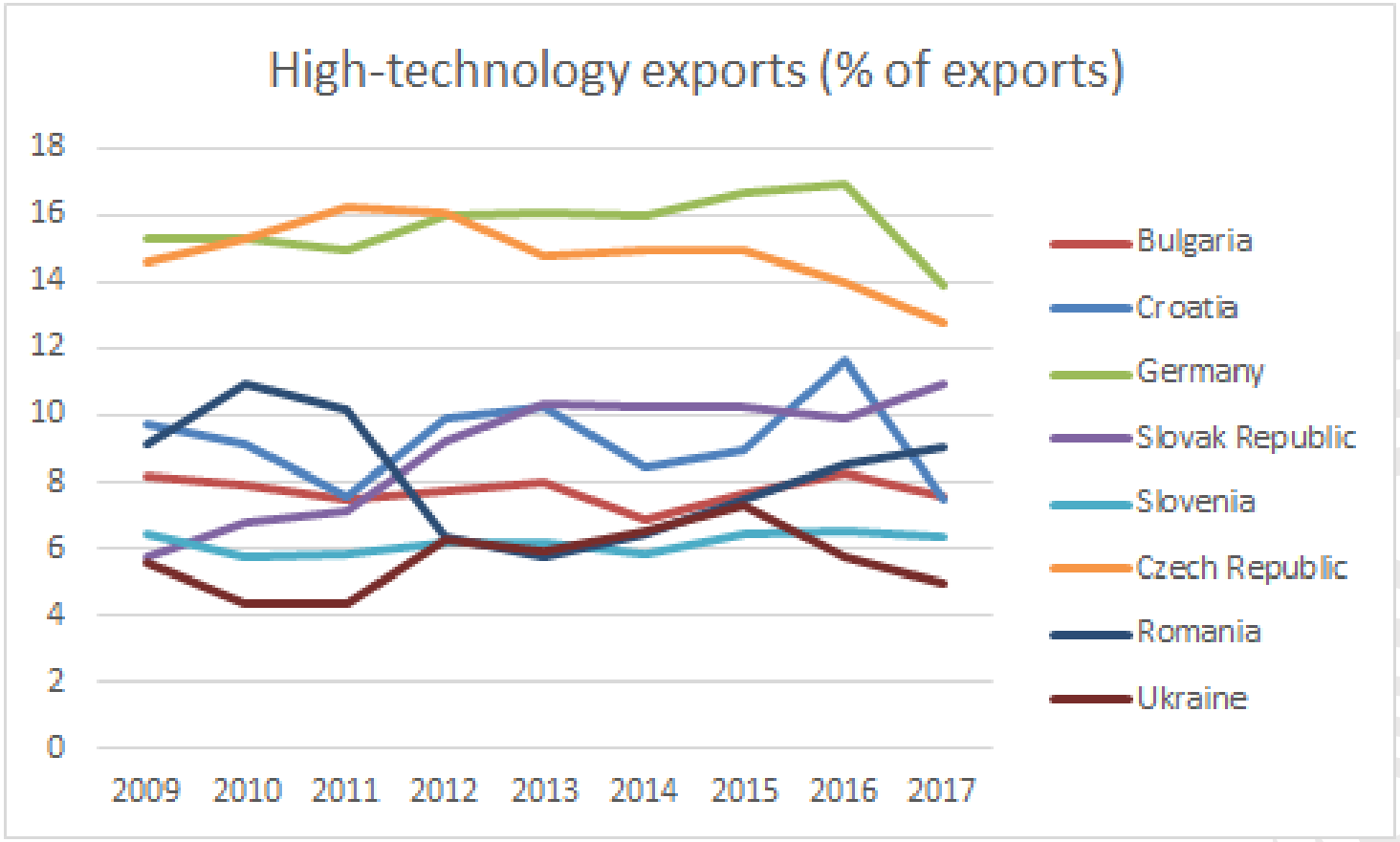


New business density

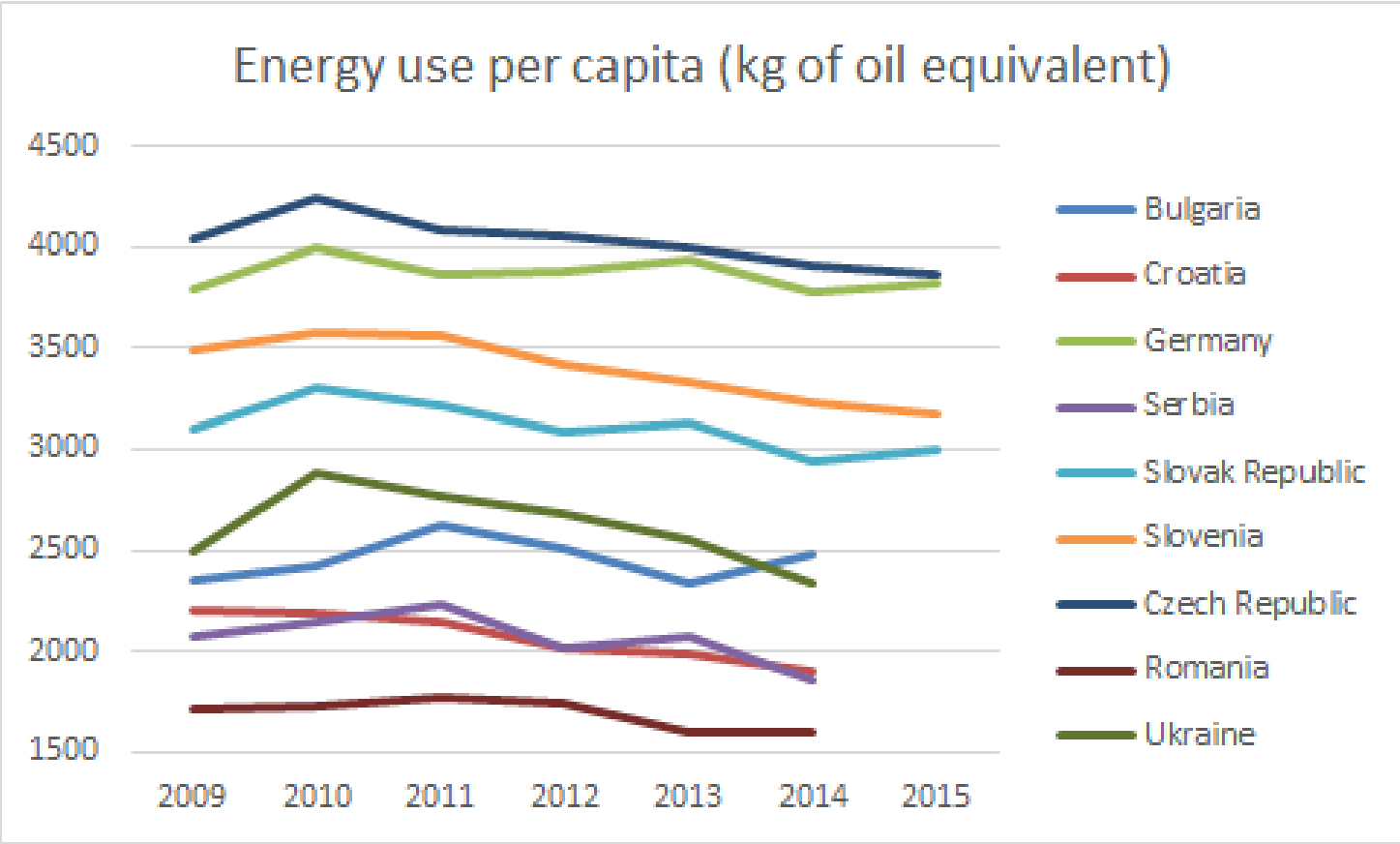


New business density (new registrations per 1,000 people ages 15-64)

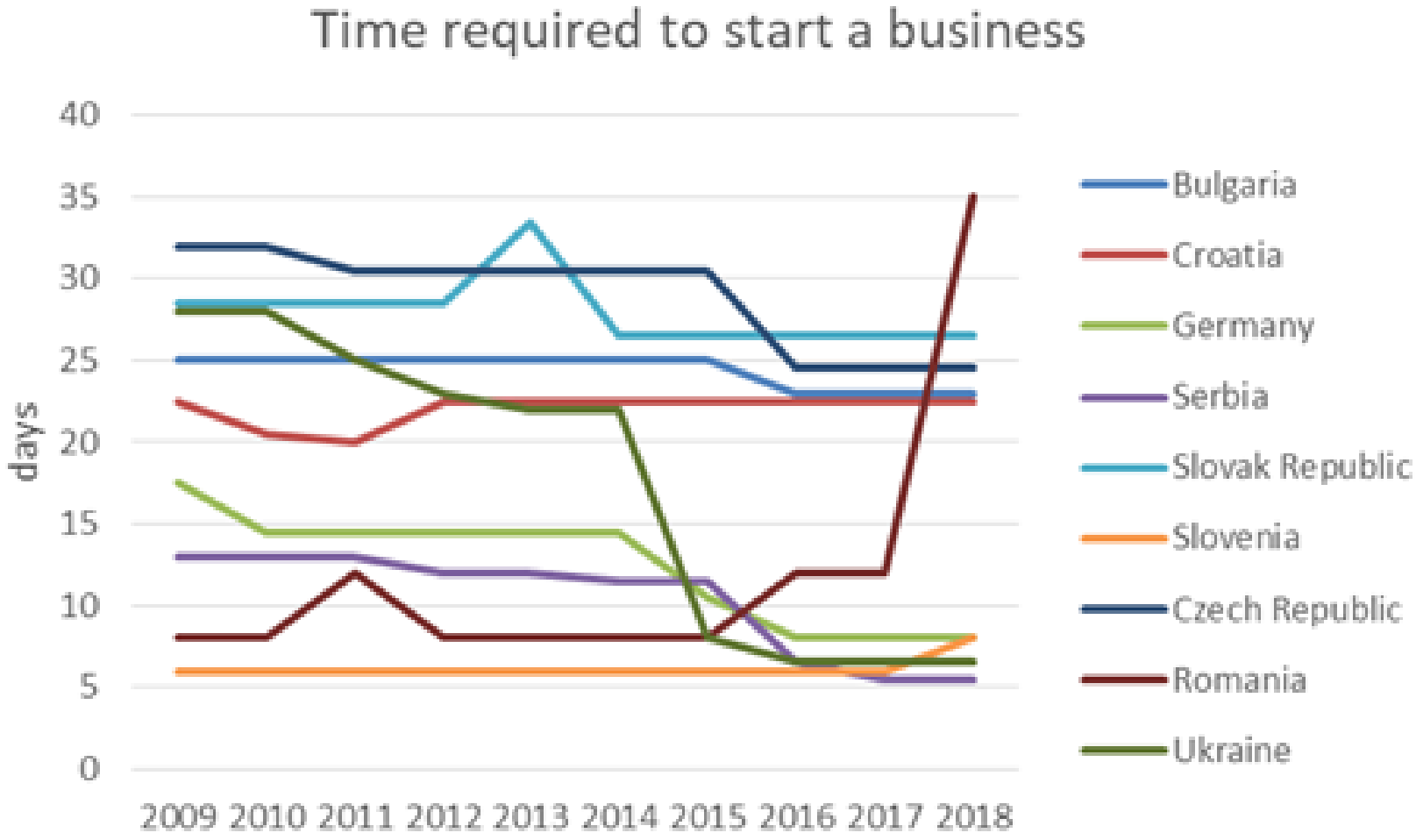
High technology exports



Energy use per capita

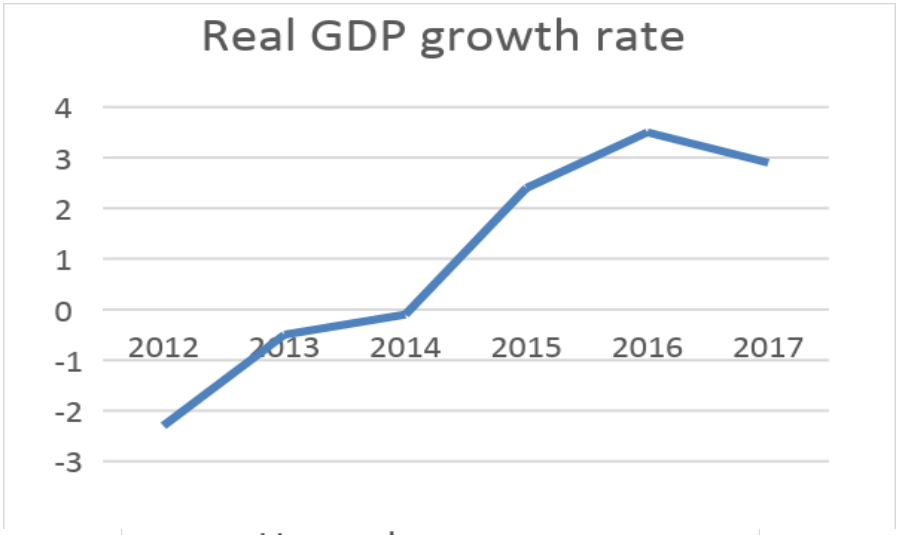


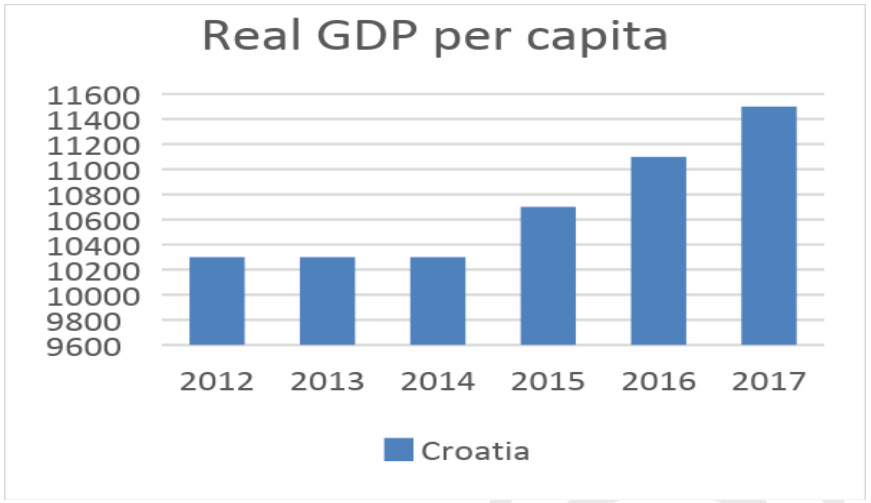
Time required to start a business

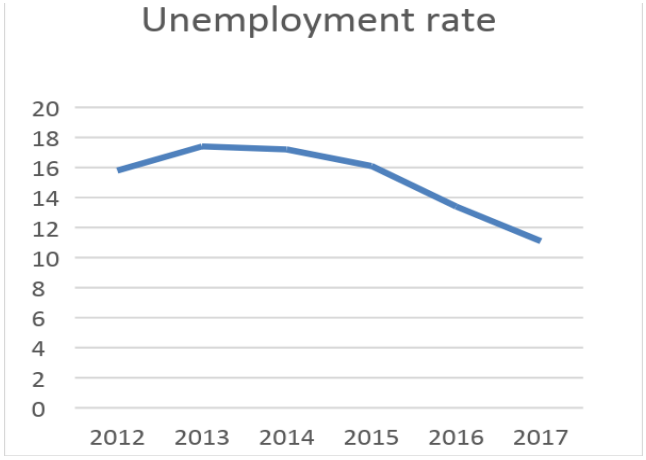


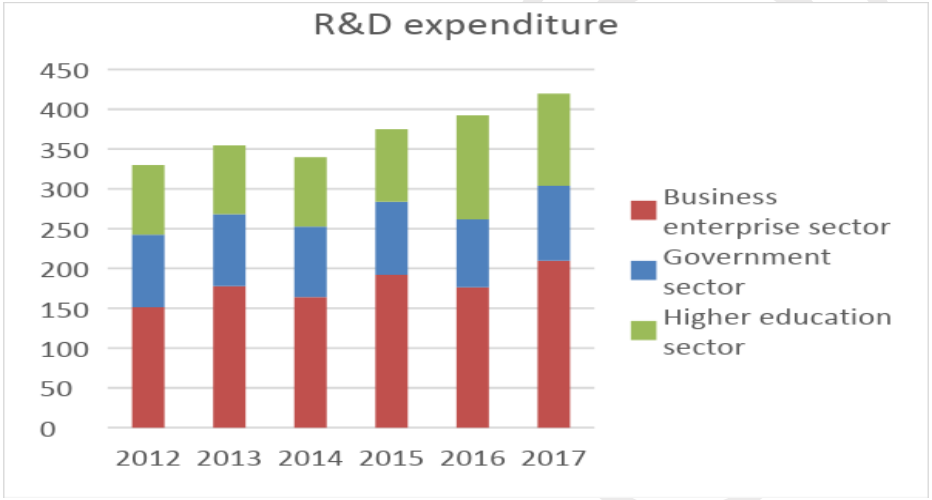
CROATIA

Regional framework









Regional framework

- Innovation as a source of competitive advantage is low
- The latest *Global Competitiveness Report 2018 of the World Economic Forum* places Croatia on the 68th place among 140 economies
- Birth rate of new enterprises relative to the number of active enterprises has been 8.7 in 2016 (European average) - 11 036 new births in 2016
- The structure of the business sector shows that SMEs account for over 99% of enterprises, and that microbusinesses with 0-9 employees have accounted for 91% of enterprises in 2017
- Intellectual assets is one of the least developed innovation dimension in Croatia relative to EU in 2017
- More than 50% of students in Croatia are enrolled in social sciences and humanities studies, while the number of students enrolled in STEM areas is small

Supporting policy tools

- Financing:
  - SMEs – leasing (relevant for 52% of SMEs), bank loans (50%) and credit lines (48%)
  - Start-up companies

- in the beginning - private financing and financial assistance of friends and family
- after they pass the first stage of development - business angels, seed investments

- According to *Croatian Smart Specialization Strategy 2016-2020* analysis, Business support organizations (BSO) in Croatia provide general and low value added support services and advices
- BSO have difficulty in meeting the demand from entrepreneurs for specific and high value added services including quality management, marketing plans, investment and project appraisal and support, support in relation to intellectual property rights, support related to innovation and new product development

Sources of young innovators

4 main national strategies related to the development of the innovations in energy sector:

1. Smart Specialization Strategy (S3) 2016. - 2020.

Goals - guiding capacities in the knowledge and innovation towards areas of highest potential in order to initiate development and transformation of the economy on activities of research, development, and innovation.

One of the five thematic priority areas that are defined in S3 Strategy is Energy and sustainable environment

2. Industrial Development Strategy 2014.-2020.

Main goal - Repositioning of the identified strategic activities on the global value chain towards production of the goods with higher added value

3. Innovation Encouragement Strategy from 2014.-2020.

Main objective - to increase the level of competitiveness of the Croatian economy and increase social well-being

4. Energy Development Strategy

Croatia has not developed a new Energy Strategy since 2009.

The energy sector in Croatia

- RDI capacity in industry

★ large and medium companies (Brodarski institut itd. Inteligentna energija)

★ SMEs (Prointegris ltd., Veski ltd., Helb ltd., EnergoControl Zagreb ltd., Solvis ltd. and RITEH ltd)

★ KONČAR - Electrical Engineering Institute Inc. is a leading private research organization

- RDI capacity in academia

★ University of Zagreb, Osijek, Rijeka, Split (with organizations and incubators which are the main sources of young innovators)

SERBIA

Regional framework

- Population – around 7 mil. people
- currently has a candidate country status with the EU
- GDP has grown by 4.4% in 2018.
- Investment in R&D activities have seen a steady rise in Serbia over the last 7 years - R&D investments have grown by almost 60% in that time reaching approx. 349 million EUR in 2017. (*still less than 1% of its GDP annually*)
- most of R&D expenses were in the field of engineering and technology (132,613 million EUR) and natural sciences (88,18 million EUR)
- Unemployment rate has been significantly reduced over the last 4 years (11.8% youth unemployment rate)
- One of the biggest issues that Serbia is currently facing are the negative demographic trends

The National Strategy for the Development of Energy Sector by the year 2025 with projections until 2030

- Main goal: development of sustainable energy use
- the target for year 2018 was to have energy savings of 8% in comparison to year 2008
- It is also important to note that Serbia has much higher Total Primary Energy Intensity compared to the EU countries which means that improvements in energy efficiency should be of outmost importance in the country
- As far as the renewable energy targets go, the main one is the 27% from the renewable sources by year 2020

Supporting policy

- Innovators in Serbia often lack financial resources that are needed to be invested in order for innovative product to be developed and made available to the market
- They also have a problem with quitting their regular jobs in order to become entrepreneurs
- old administrative system with many restrictive regulations
- All issues are well known and recently there have been some initiatives that are making things easier and improving the overall situation

Sources of young innovators

There are several tools that enhance science – education – industry linkages in Serbia

1. Innovation centers that are part of the technical faculties at top universities in Serbia
2. Technology transfer centers that work complementary with innovation centers at universities
3. Innovation Fund (the government's leading instrument in supporting innovative startups and SMEs)
4. Current organizations and initiatives that are providing support to young innovators are: SEE ICT, Science and technology Park, ICT Hub and UNDP

SLOVENIA

Regional framework

Indicator	Value
Inflation rate (HCIP)	1,2 %
GDP Growth (2016)	3,1 %
GDP Growth (Q2 2017)	4,5 %
Current account surplus (Q3 2017)	6,3 % of GDP
Unemployment rate	6,3 % of GDP
Public debt	78,5 % of GDP
Budget deficit	1,9 % of GDP
R&D investments	2,0 % of GDP
Patent applications	513

Regional framework

- Startup ecosystem has developed fast in the last six years. 10 new companies are being registered every year in Slovenia per 1000 people between ages 15 and 64. This is some 30 % more than the EU average
- More than 10 % came from different crowdfunding initiatives, especially Kickstarter where Slovenian projects are among the most successful (per capita) in the world
- Government is supporting startups and its ecosystems, but with relatively minor policy measures and funds (Research and Innovation Strategy (RISS) and Development plan for higher education)
- Gross domestic expenditure on research and development is above the EU average, but the investments of the public sector have been declining since 2012. The most important part of the general R&D policy is the tax breaks for R&D investments worth 50 % of the corporate income tax.
- 'e-VEM' program allows companies to be established in 1 day and with very low costs

Supporting policy tools

1. Slovene Enterprise Fund (national financial institution for financial support to SMEs, start-up and fast-growing companies)
2. SID Bank (has the status of an authorized specialized promotional export and development bank for performing activities defined by the Slovenian Development and Export Banks Act)

• Some other supporting tools are: Energy Agency, LUI, Technology Parks, Tovarna Podjemov, ABC Accelerator

• Most important promotional events are: Start-up Slovenija, "The International, Conference PODIM" ,"Start: up Müsli“,Hekovnik, CorpoHub, GoGlobal, Geek House

Sources of young innovators

• Main source of young innovators and companies (in energy sector) in Slovenia are ABC Accelerator, Tovarna Podjemov, Hekovnik, Ljubljana University Incubator, CorpoHub and Katapult

• Good practice showcases: ETOS Solutions (an innovator in the development of digital interfaces for system integration and the construction of interoperable data networks), ACSM (offers a solution to reduce energy consumption in buildings and to improve waxing and user experience), Energy Capacity Plus (a solution in the field of energy storage)

• Slovene Enterprise Fund: In 2017 and in 2018 Fund approved altogether 80 applications for support where each accounted for 54.000 € grants

Energy strategy

- National Energy Program is a part of Slovenian Development Strategy 2030, which is the new national development framework
- It is based on four pillars: to increase reliability of energy supply, to boost competitiveness of the economy, to promote environmentally sustainable solutions and to secure social cohesiveness
- Slovenia plans to reduce the energy dependency of Slovenia to around 45% up to 2030
- National Energy Program addresses also the electricity generation in Slovenia and emphasizes the following general objectives:

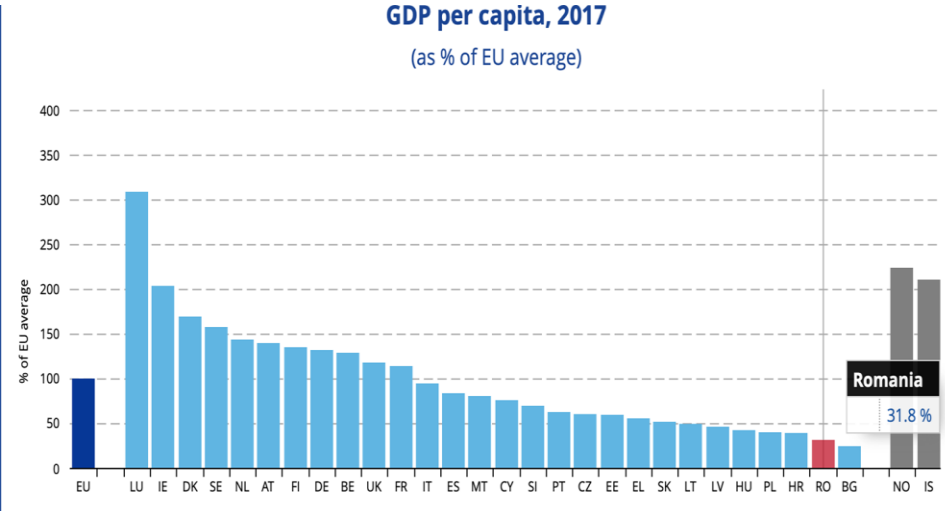
1. competitive generation of electricity in Slovenia and reduction of negative environmental impacts – transition into low-carbon economy,
2. autonomy of power system in emergency conditions and integration of power system with neighboring markets,
3. increase in the share of RES in electricity production to contribute to the objective (25%) on the national level,
4. appropriate security of supply, power quality, power system stability and reliability reduction of dependence on imports and diversification of energy-supply resources to at least present or better level

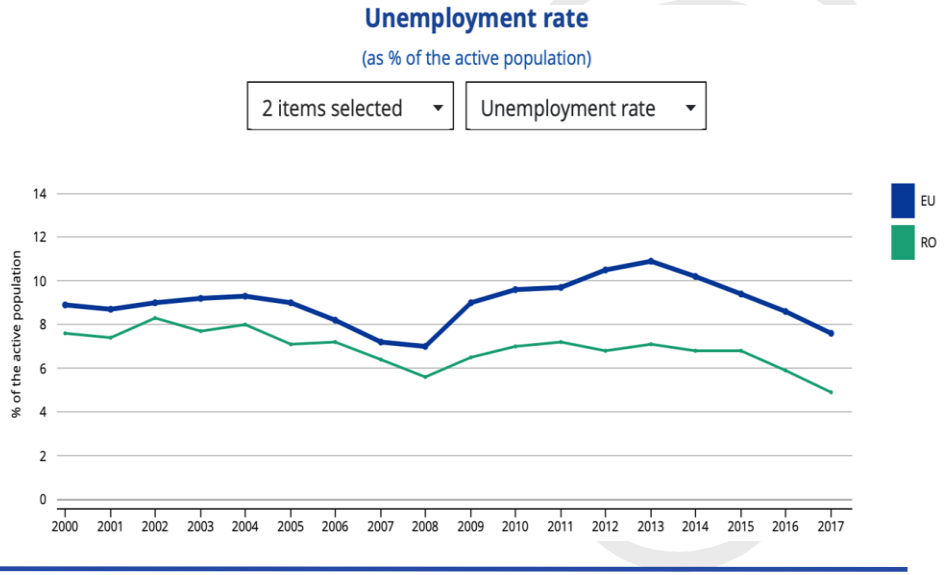
Interreg
Danube Transnational Programme
Danube Energy+

ROMANIA

Regional framework

- GDP – 187 billion euros
- GDP per capita – 9 600 euros
- Unemployment – 4,9%



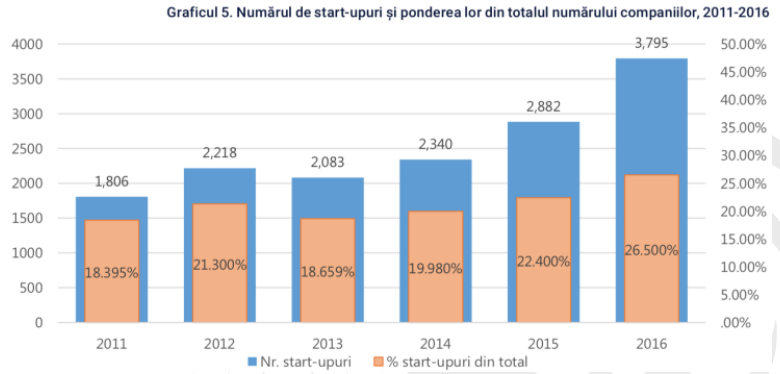


Regional framework

- 'Modest Innovators' by the European Innovation Scoreboard index

- The blue box contains the total number of startups in Romania, while the other contains the percentage that startups of the total number of companies in Romania

- Tertiary education – 26% (EU- 40%)
  - R&D investment – low
  - 5 patents/million inhabitants (EU 110)



- The main body for creating a connection between players in the industry, science & education institutions - Romanian Office for Science and Technology to the European Union
- Energy strategy (2018.-2030.) - is centred around growth in the energy sector in a sustainable way

Supporting policy tools

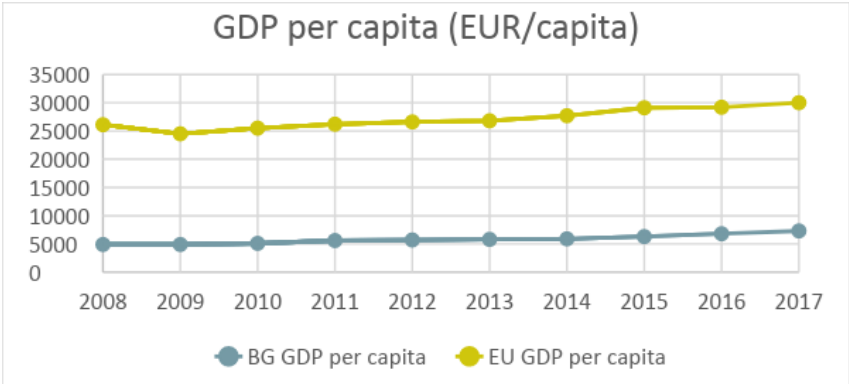
- National strategy - Smart Specialization Strategy
- Regional strategy - North-West Region Smart Specialization

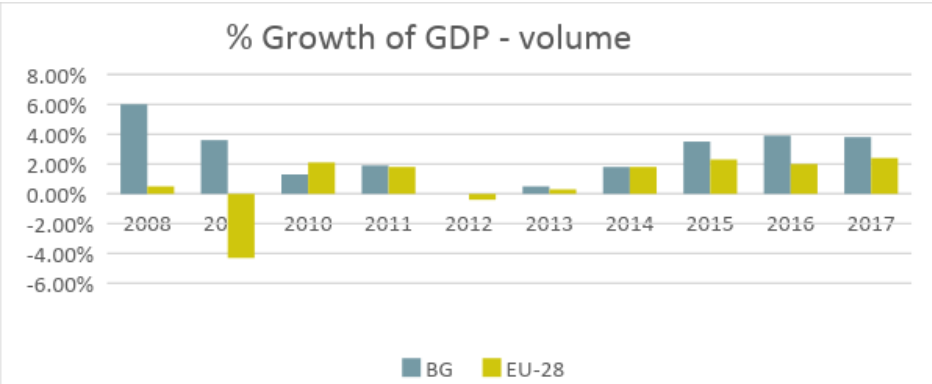
Sources of young innovators

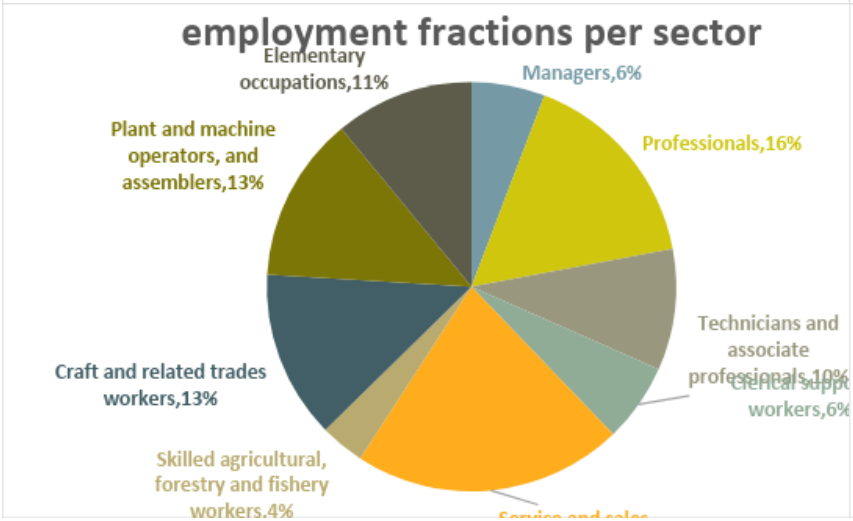
- Universities and programmes and research institutes (National Institute on Energy (ICEMERG), Ploiesti University for Petrol & Gases, Medias University for Petrol & Gases, Babes Bolyiai University ,Technical University of Cluj Napoca)
- Companies in the energy sector in Romania (OMV Petrom, Rompetrol,Lukoil,E-ON Romania)
- State Owned Enterprises (Nuclearelectric, Hidroelectrica, Romgaz, Transelectrica)

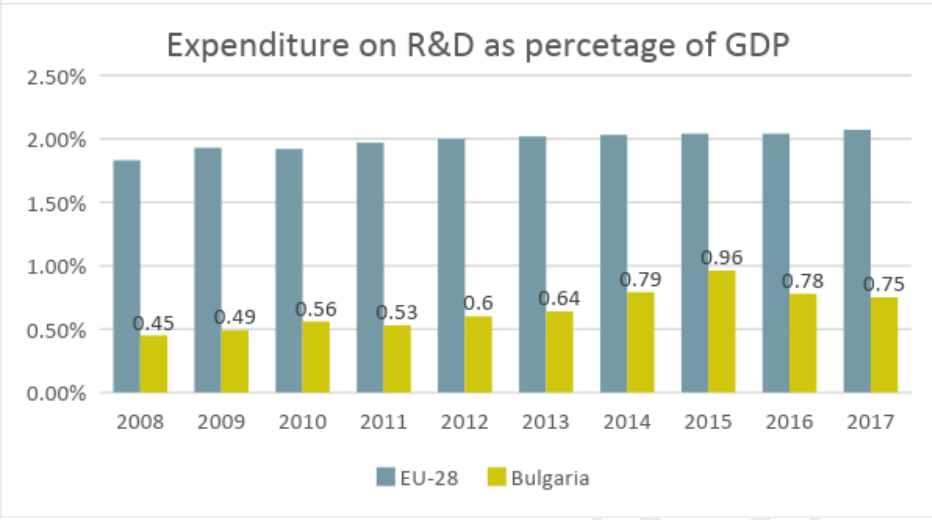
BULGARIA

Regional framework





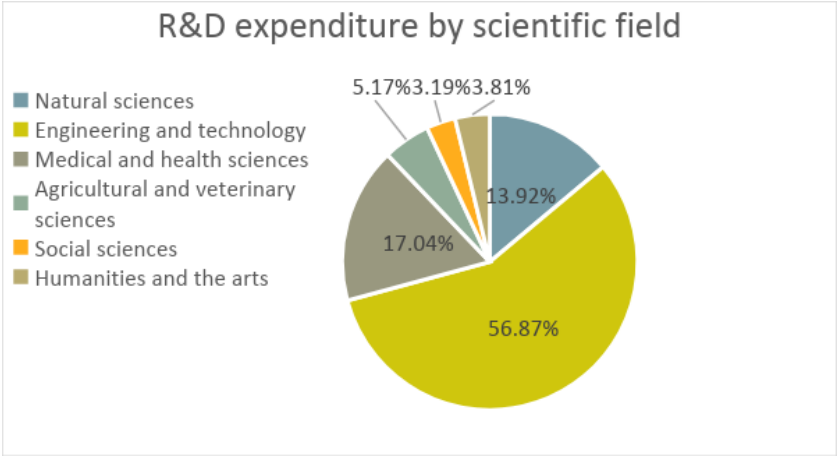


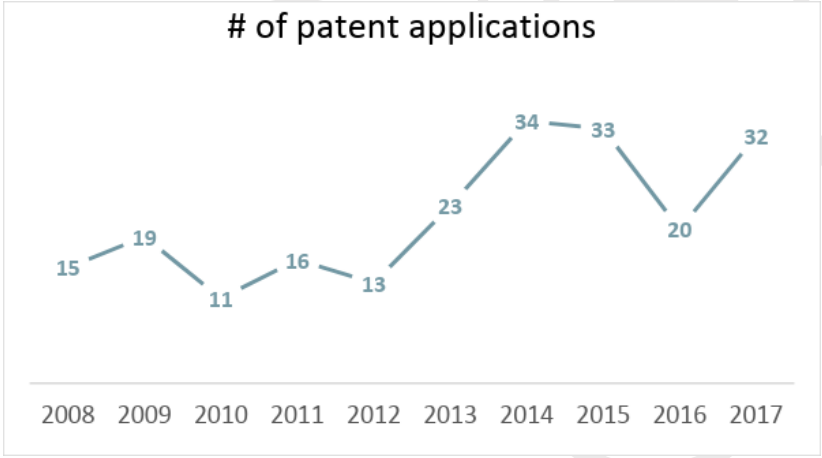


Regional framework

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
# enterprises born in Bulgaria	15,033	15,554	11,650	11,392	13,677	12,589	12,796	13,381	12,291	No data

- 45 % of Bulgarian SMEs are in the retail sector
- tertiary education – 32,8%
- The total expenditure on R&D in Bulgaria has more than doubled from 2008 to 2017





National Energy Strategy

The main goals of the Energy Strategy of Bulgaria up to 2020 are:

1) to reduce greenhouse gas emissions by 20% compared to 1990
2) to increase energy efficiency by 20%
3) 20% of the total energy mix to be from renewable source and 10% of the transport sector

Supporting policy tools

1. National programs - National Innovation Fund (NIF), The National Science and Research Fund The National Science Fund (NSF), National Trust EcoFund (NTEF), Operational Program "Human Resource Development" Innovation, Smart Specialization Strategy of Bulgaria (IS3), The Investment Climate Program, a continuation of the National Green Investment Scheme
2. International programs - sofia Tech Park, JEREMIE ,Norway and EEA Grants, Operational programme “Innovations and Competitiveness” 2014-2020 (OPIC), Operational Programme under the SME Initiative, European Institute for Innovation and Technology (EIT), Joint Operational Programme Black Sea Basin 2014-2020, Bulgarian-Swiss Cooperation Program
3. Incubators - The National Business Development Network (NBDN), Business center and Incubator – Targovishte, Business incubators: Razgrad, Burgas, Smolyan, Vidin, Montana, Dimitrovgrad, Kazanlak, Kardzhali, Vratsa, Regional business Center for Small and Medium Enterprises Support - Pernik

Sources of young innovators

- Several university programs
- Cleantech Bulgaria , Junior Achievement, Start It Smart, Chivas Venture, National Youth, Guarantee of Bulgaria, Co-working initiatives, “fab-labs“, Endeavour BG

Successful ventures in energy efficiency as good practice showcase:

★ Rocket Heater Gamera,

★ ElJoy,

★ Diesel Express Tester

CZECH REPUBLIC

Regional framework

- GDP per capita is 46% of the EU average and 81.1% of the national average
- The Pardubice Region – region with high proportion of the manufacturing industry and a high export rate
- 1758 startups
  - 85% - have been registered in the last five years
  - 60% - offer new services or innovative products
  - 34% - has at least one patent
- 51 business incubators

<u>Key players and stakeholders of regional ecosystem</u>

- The Business Incubator Pardubice, Regional Development Agency of the Pardubice Region, The Regional Economic Chamber of the Pardubice Region, The Regional Office of the Business and Investment Support Agency, University of Pardubice, Regional Authority of the Pardubice Region

Supporting policy tools

- University of Pardubice (seven faculties)

Sources of young innovators

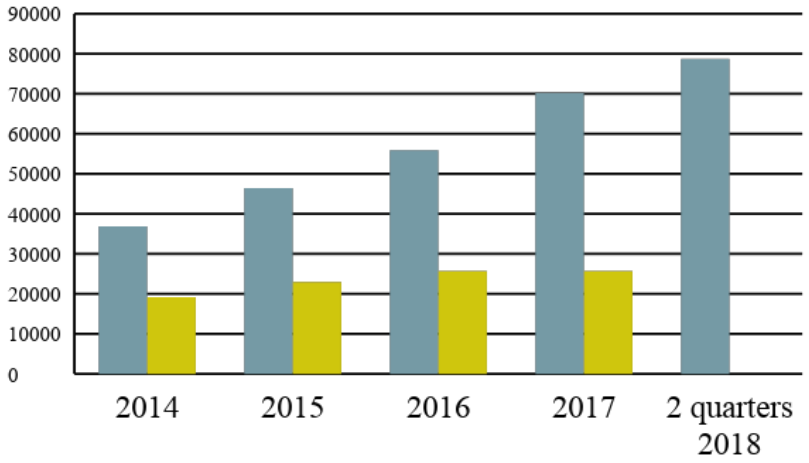
Successful ventures in energy efficiency as good practice showcase

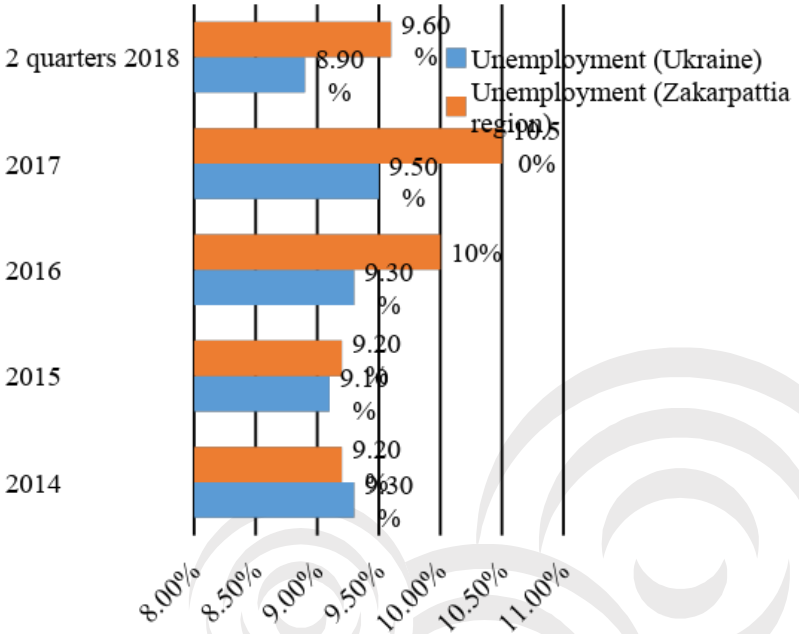
1. EV Battery
2. PinFlow batteries
3. Multiferm
4. HE3DA

UKRAINE

Regional framework

- the most important region – Zakarpattia





- investments in R&D (2017.) - 1300,3 million UAH
- Zakarpattia region ranked first in the energy efficiency rating of Ukraine Energy Index 2013 with a total energy efficiency of 64.3%

Supporting policy tools

- The regional energy efficiency policy is considered by the operational objective of the Strategy for the development of the region up to 2020, by the objectives of the Strategy for replacement of natural gas in boiler houses of budgetary institutions for alternative fuels and electricity for 2015-2020, by the Target Energy Efficiency and Energy Conservation Programme for 2016-2020

Source of young innovators

International projects are the main source of support for young innovators

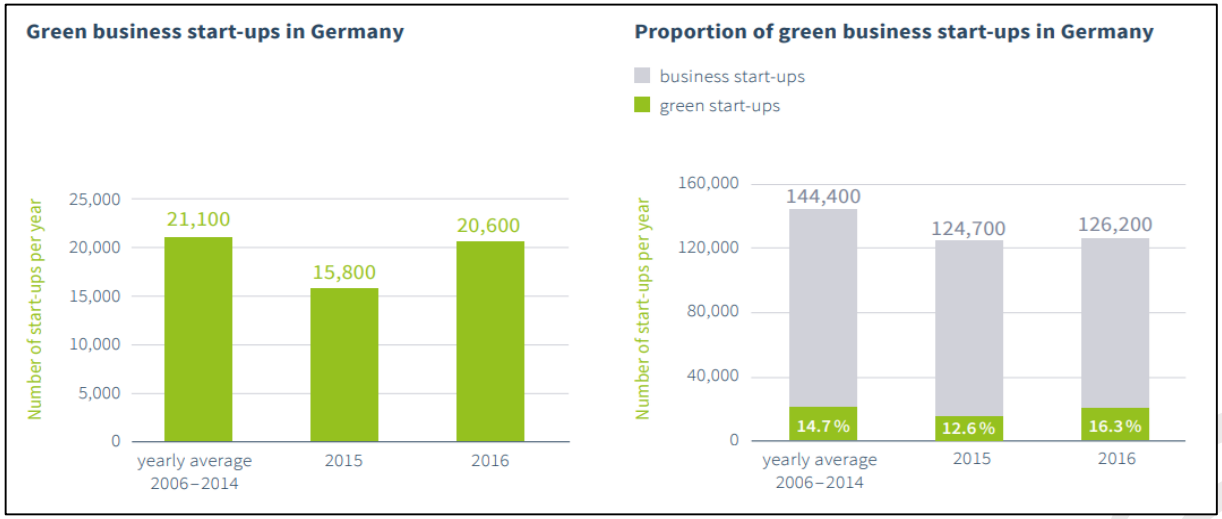
- UNDP / EU Project “Community Based Approach to Local Development”
- EU Project “The Agreement of Mayors of the East”: 2016 - 2020.
- EU4Energy: Networking Local Civil Society Organizations on Energy Efficiency (CLEEN): 2015-2018.
- The project “Bioenergy of the Carpathians”

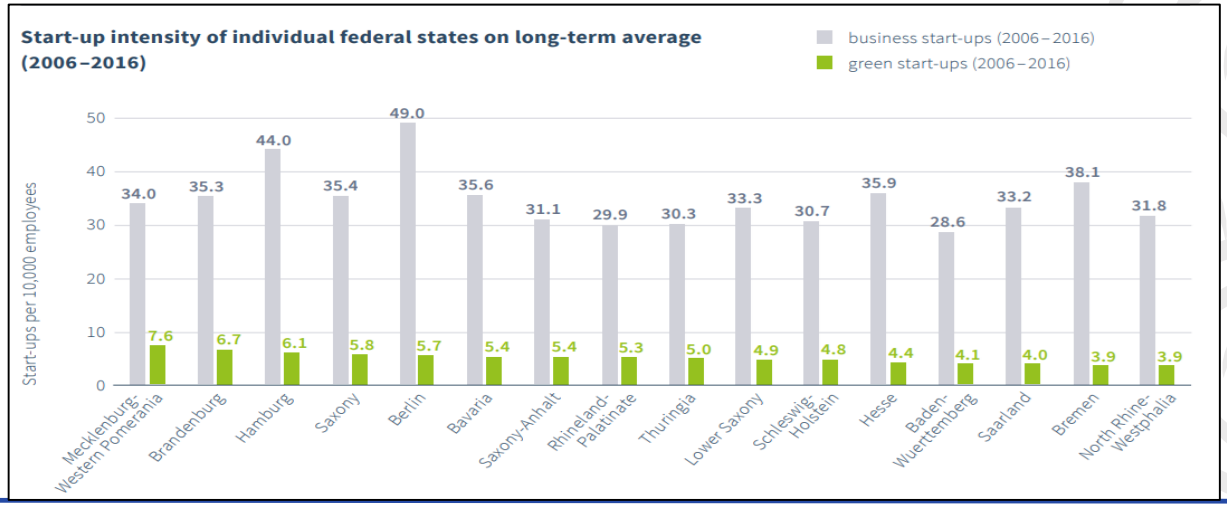
GERMANY

Regional framework

- The largest country within the EU in terms of population (81.2 million inhabitants in 2016) and GDP (€3,263b in 2017)
- GDP per capita (€39,500 in 2017)
- Unemployment rate in 2017 - 3.8%
- Gross R&D expenditures (GERD) reached 2.94% of GDP in 2016
    - 60% of all business R&D expenditures - motor vehicles and parts, electrical equipment, computer, electronic and optical products, machinery and equipment
- 5th most competitive economy
- Germany has decided to switch its entire energy supply to renewables and to become increasingly energy efficient - The Energiewende

Regional framework





Regional framework

Baden-Württemberg

- In 2016, 462,103 SMEs
- R&D expenditures reaching €22.7b in 2015
- 132,1 patent applications / 100,000 inhabitants in 2016
- strong higher education landscape
- leading region since 2008

Bavaria

- is the second largest host of companies in Germany
- 99.6% of the total number of SMEs (616,884 in 2016)
- R&D expenditures reaching €17.3b in 2015
- 36.7 patent applications/100,000 inhabitants
- there are several clusters and research networks with an international reputation located in the region

Supporting policy tools

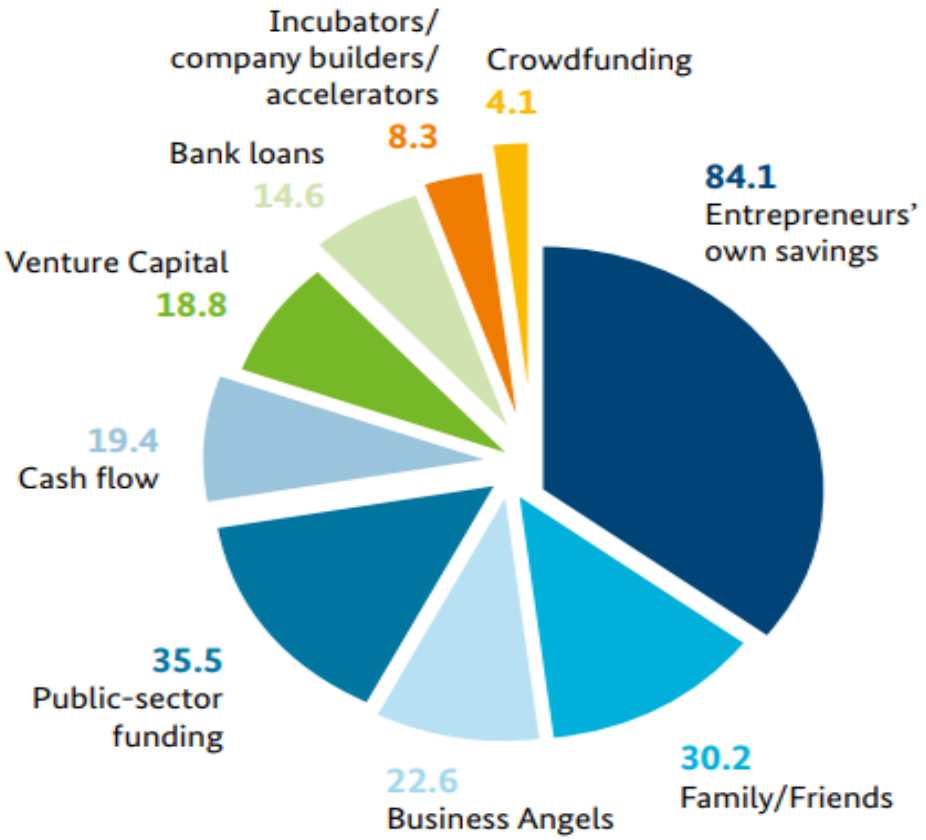
• the most important institutions for financing start-ups - German states (Länder) and their promotional banks such as KfW banking group, Chambers of Industry and Commerce, Chambers of skilled crafts, Local and private investors and developers such as business angels and venture capital firms, Entrepreneur networks

• Pre-seed stage: Financing for start-ups-to-be - The Federal Ministry for Economic Affairs and Energy therefore provides grants to start-ups in this stage of their development and also supports them with business expertise

• Seed stage: Finance the launch of the company - The Federal Ministry for Economic Affairs and Energy and the ERP Special Fund support innovative start-ups at this stage of their development by giving them access to private equity, low-interest loans (in some cases complete with a guarantee), and expertise

• Growth stage - Apart from private investors and medium-sized private equity firms, venture capital funds receiving government funding also often invest in young companies. These funds often also provide helpful expertise and access to a wide-reaching network

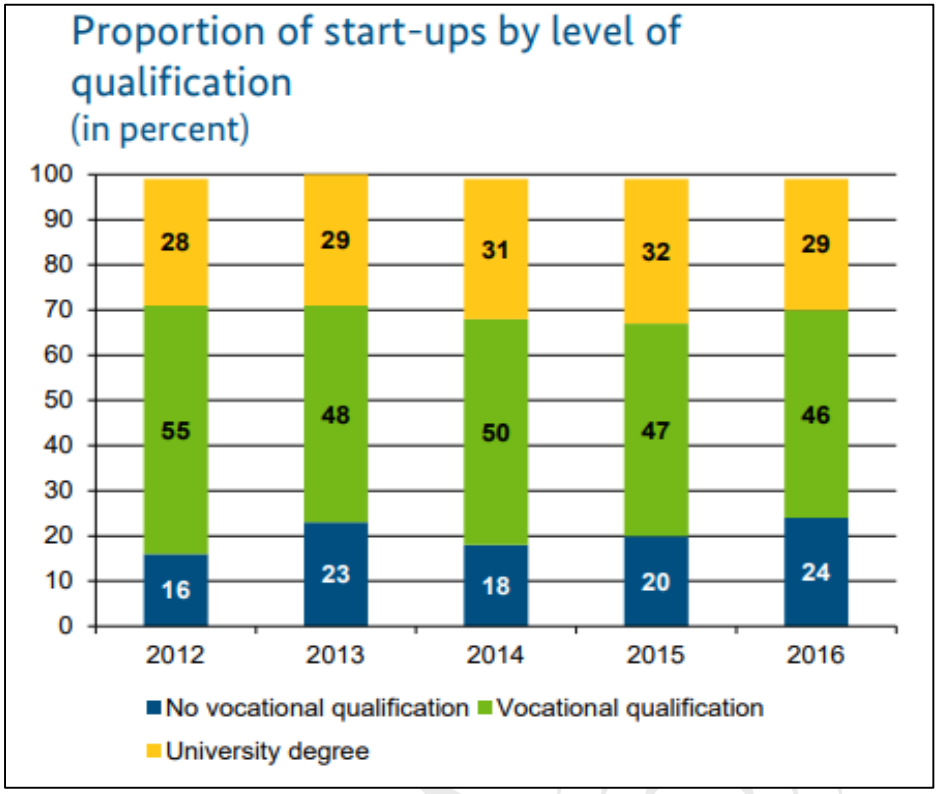
Where start-ups get their financing from
(in %/multiple answers possible)



Sources of young innovators

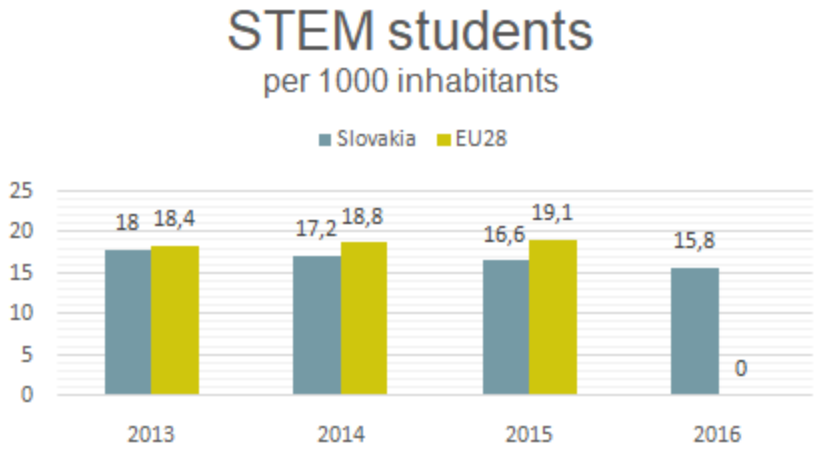
- The largest proportion of people (46%) setting up in business do so because they want to realize a business idea. Another important motive (for 25%) is a lack of alternative sources of income.

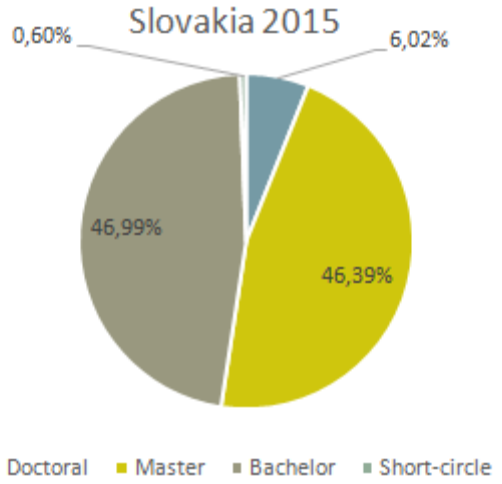
- EXIST Entrepreneurial Networks as sources of Young Innovators

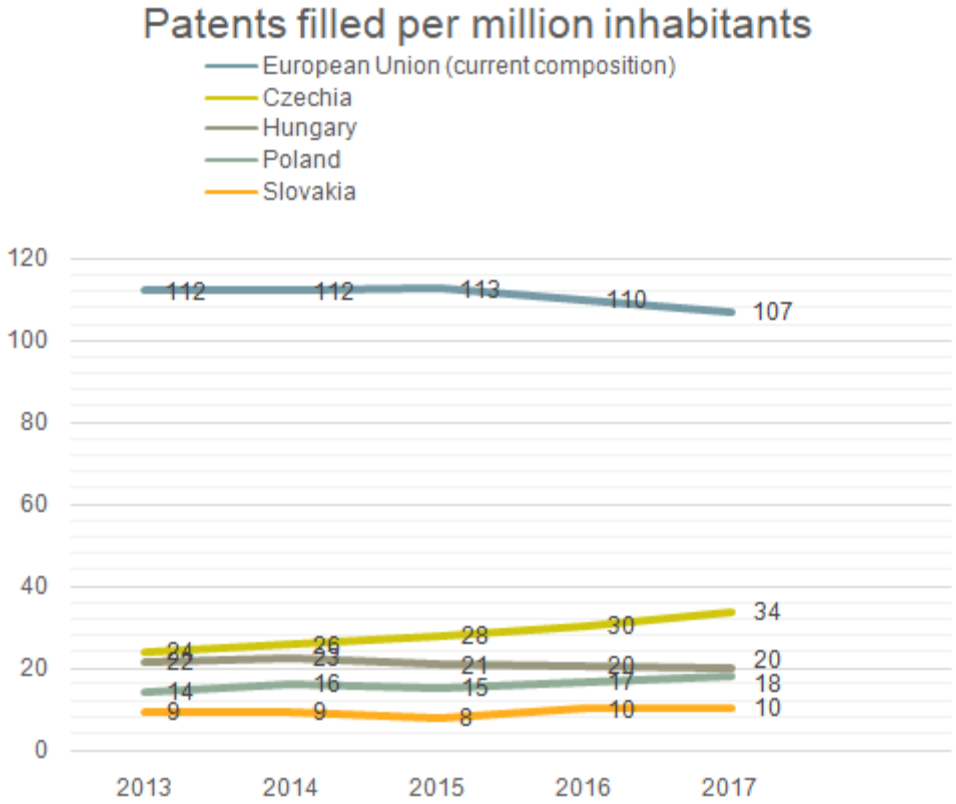


SLOVAKIA

Regional framework







Regional framework

1. **Industry-science-education linkages**

- Tech transfer centers exist, but are only at the beginning of their road and establishment
- Overall 20% of R&D fundings originates abroad, dominated by EU funds

2. **Access to early-stage finance for companies**

- 15% use business angels
- 9% use scientific grants
- 11% crowdfunded
- VCs are being developed

3. **Main Obstacles in Development of Innovative SMEs**

- Difficult and bureaucracy-heavy process of getting public funding, requiring too many efforts from the part of start-ups
- Difficulty in supporting the IP protection process - the system is focusing on universities and research organisations, but does not provide funding for IP protection to individual entrepreneurs

Supporting policy tools

- National program “Increasing the innovation performance of the Slovak economy”, carried out by Slovak Innovation and Energy Agency (inovujme.sk) organises round-tables to connect businesses with research and universities
- Slovak Business Agency manages National Entrepreneurship Centers, offering support services (marketing, consulting) to start-ups
- Centers for technological transfer guide through the IP protection processes and help commercialize ideas
- Incubators attached to the main technical universities
    - InQb, Technicom, Incubator UNIZA
    - Other support incubators or workspaces such as Eastcubator in Kosice

Sources of young innovators

Technical tradition in the country is well developed. Young innovators come mostly from universities (students, PhD candidates, researchers) and to a lesser extent from the startup community or from energy-related corporates.

- Slovak Technical University in Bratislava and Trnava
- University of Zilina
- Technical University Kosice