Interreg
Balkan-Mediterranean
INNOPLATFORM

EUROPEAN UNION

2017

INNOSCORECARD

InnoScores for Bulgaria/ BalkanMed Region

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Executive Summary

The main aim of the BalkanMed Innoscorecard is twofold: to promote the opportunities of the BalkanMed region and to address its weaknesses when it comes to the innovation potential.

The main objectives of the BalkanMed Innoscorecard are:

- to adjust and introduce methodology and indicators for closely following the innovation potential of the BalkanMed region and nations in the Balkan Mediterranean area:
    - FYR of Macedonia
    - Albania
    - Greece
    - Cyprus
    - Bulgaria
- to map the government stakeholders for each of the innovations indicators;
- to map the government documents which cover measures for each concerned indicator;
- to provide data for comparative analysis of the indicators at national and macro regional level;
- to identify the strengths and the weaknesses in the innovation potential of the BalkanMed region, BM nations and regions; and

to provide an interactive tool for visualising the data.

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Background

Methodology

Innovation within the Innovation Union Plan

Literature and practice provide no agreed definition on what is understood under the term of innovation today. There is no single definition, while the issue is explored on a larger scale and at many levels: organizational, regional, national. Within this large scope of what is considered to be an innovation, measuring and monitoring the concept is equally challenging and complex. For the purpose of the project InnoPlatform, we will use the definition sustained in the Innovation Union plan. As described by the Innovation Union plan (EC 2018), Innovation "broadly means change that speeds up and improves the way we conceive, develop, produce and access new products, industrial processes and services. Changes that create more jobs, improve people's lives and build greener and better societies."

Having in mind these expectations for an innovations driven economy, it is of no surprise that the "Innovation Union is key to achieving the goals of the Europe 2020 Strategy for a smart, sustainable, and inclusive economy. It aims to improve conditions and access to finance for research and innovation in Europe, to ensure that innovative ideas can be turned into products and services that create growth and jobs." (EC 2018).

General overview of the Methodology

The BalkanMed Innoscorecard is developed based on the methodology of the EU Innovation Scoreboard 2017 (EUIS, 2017). Several important drivers reflect the choice of the methodology:

1. Balkan Med countries are EU member countries, or EU applicant countries, it is important to be able to follow their progress when it comes to the innovative potential of their economies against the other EU countries;

2. Compared to other available methodologies as are the methodologies behind the Global Competitiveness Report (2017/2018) and the WIPO Innovation index (2016), EU Innovation Scoreboard (2017) provides a focused methodology which is adjusted to the EU context. This is achieved through the use of selective, yet very significant indicators measuring the innovation potential of EU national economies.

Based on the EU Innovation Scoreboard (2017), the BalkanMed Innoscorecard consists of two specific outputs:

1. National Summary Innovation Indexes for each of the BalkanMed countries with:
   a. Data repository for each indicator, index for each country;
   b. Data repository on all important national and regional documents,
   c. Mapping of government stakeholders; (FYR of Macedonia, Albania, Greece, Bulgaria, Cyprus);
2. Balkan macro-regional Summary Innovation Index – developed for the purpose of the project Innoplatform.

In line with the EU Innovation Scoreboard 2017, both types of Innoscores (National and BalkanMed Score) will be based on four combined factors, i.e. pillars provided in Figure 1.1.

Figure 1. InnoScorecard Indicators
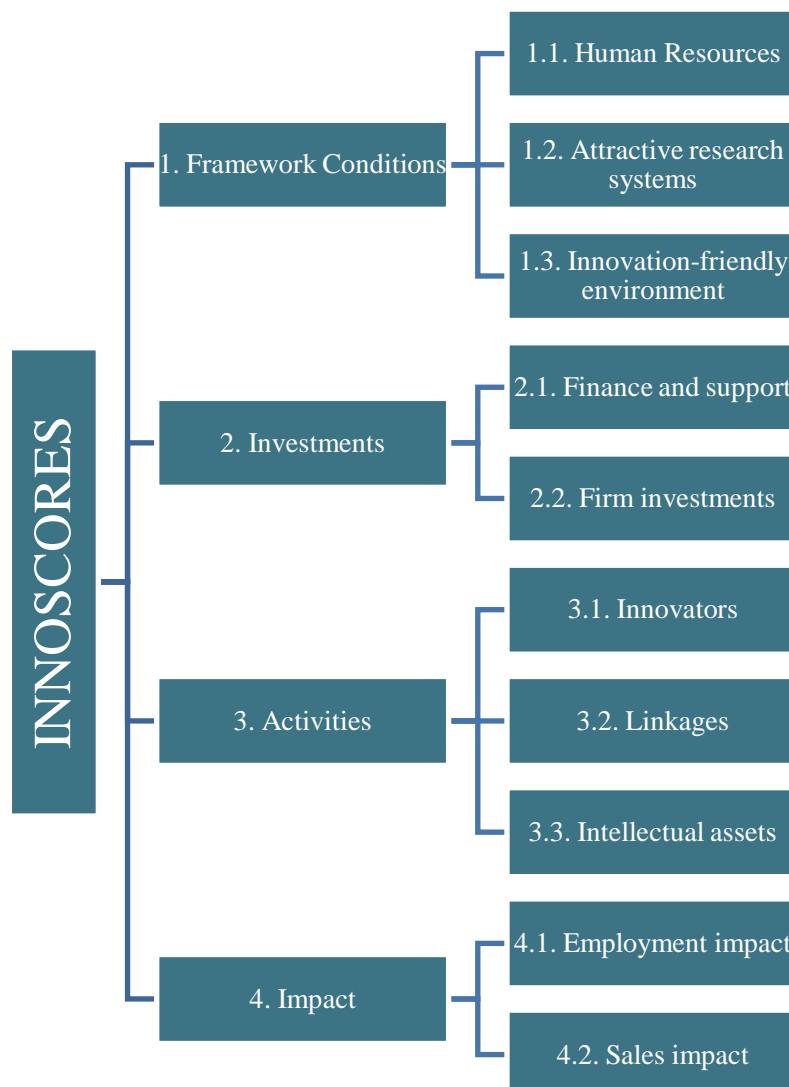
In the further elaboration of this document, each of the indicators is explained through the following key parameters:

- Name of the Indicator:
- Numerator:
- Denominator:
- Interpretation i.e. the basic principle (assumption) for its use:
- Source of data and available years for the concerned country:
- Remark: commentary which explains the numerator or describes certain specifics of the national context
- Results/Analysis based on the data collected witth the excel document under D.3.x.2.
- Government stakeholders:
- Government strategies, programmes, and measures covering the indicator, if any:

NOTE: The analysis of each of the four combined factors/pillars for the particular country is performed within the Deliverable 3.1. i.e. the National Study of the Business Environment and the National Innovation Potential.

National Summary Innovation Indexes

The National Summary Innovation Index is the unweighted average of the re-scaled scores for all indicators where all indicators receive the same weight (1/27 if data are available for all 27 indicators). The EUIS (2017a) national summary innovation indexes need to be used for all BalkanMed countries for which there is a score in the EUIS (2017). A new one for Albania, will be constructed within this project, which fully follows the EUIS methodology (EUIS 2017b), if minimum 75% of the required data is collected.

For each indicator, a reference year is identified for all countries based on data availability for all those countries for which data availability is at least 75%. For most indicators, this reference year will be lagging for one or two years (EUIS, 2017b, p.22). *The same should be noted in the Remark section for each of the indicators of the Innoscores*. If data for a year-in-between are not available, missing values are replaced with the value for the previous year. If data are not available at the beginning of the time series, missing values are replaced with the next available year. If data are missing for all years, no data will be imputed. (EUIS, 2017, p.22).

Performance scores relative to the EU, and the other BalkanMed countries are then calculated in the following way:

- the SII of the respective country is divided by the SII of the EU multiplied by 100;

- the SII of the respective country is divided by the SII of the BalkanMed region multiplied by 100;

Relative performance scores are calculated for the full period (2010-2017) compared to the performance in 2010 and for the latest year also compared to that of the EU and BM.

BalkanMed Regional Summary Innovation Index

The BalkanMed Regional Summary Innovation index covers data from all five countries involved in the project for the explored period (2010- 201X): Albania, Bulgaria, Cuprys, FYR of Macedonia, and Greece. As the size of the population data might not be adequate for constructing the index based on the methodology used for the EU Composite Innovation Index, the methodology for constructing the BalkanMed Regional Summary Innovation index will be based on the assumption: that the macro region is one political and territorial unit, where each country is a specific region.

1. FRAMEWORK CONDITIONS

1.1 Human resources

Indicator	1.1.1. New doctorate graduates per 1000 population aged 25-34
Numerator	Number of doctorate graduates
Denominator	Population between and including 25 and 34 years
Interpretation	The indicator is a measure of the supply of new second-stage tertiary graduates in all fields of training (ISCED 8). For most countries, ISCED 8 captures PhD graduates.
Source of data and available years for the concerned country	European Innovation Scoreboard 2017 for the indicator; Eurostat for the values of the numerator and denominator; If not available use official national sources for the numerator and denominator. http://ec.europa.eu/eurostat/data/databaseEurostat

Remark (commentary which explains the numerator or describes certain specifics of the national context)

As of 31.12.2016, 6 738 Ph.D. students were enrolled in Bulgaria, of which 51.9% were women. In 2016 in private institutions were trained 3.9% of the Ph.D. students. Out of the total number of the Ph.D. students trained in Bulgaria, the foreign citizens were 503 persons which is 4.4% more in comparison with the previous year. The largest share of foreign students came from Greece - 26.0%, followed by those from Turkey (18.5%), Kazakhstan (9.5%) and the Former Yugoslav Republic of Macedonia (5.6%). Number of newly enrolled Ph.D. students in 2016 was 2 085, of which 1 094 or 52.5% were women. In 2016, a 'Doctor' degree was acquired by 1 464 persons of whom 773, or 52.8%, were women. A considerable difference in the structure of the graduated males and females by fields of education is observed

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	596	638	979	1202	1363	1442	1464
Denominator	1093219	1011162	996091	987115	974889	965354	947398
EUIS	0.60	0.60	1.00	1.21	1.38	1.48	n/a

Government stakeholders: Ministry of Education and Science; ,

Important documents: "Education Republic of Bulgaria 2017

1 FRAMEWORK CONDITIONS

1.1.Human resources

Indicator	1.1.2. Percentage population aged 25-34 having completed tertiary education
Numerator	Number of persons in age class with some form of post-secondary education
Denominator	Population between and including 25 and 34 years
Interpretation	This is a general indicator of the supply of advanced skills. It is not limited to science and technical fields, because the adoption of innovations in many areas, in particular in the service sectors, depends on a wide range of skills. The indicator focuses on a relatively young age cohort of the population, aged 25 to 34, and will therefore easily and quickly reflect changes in educational policies leading to more tertiary graduates.
Source of data and available years for the concerned country	European Innovation Scoreboard 2017 for the indicator; Eurostat for the values of the numerator and denominator; If not available use official national sources for the numerator and denominator. http://ec.europa.eu/eurostat/data/database

Remark (commentary which explains the numerator or describes certain specifics of the national context)

The indicator is focused on the performance of a relatively small segment of the population – recipients of tertiary education.About 34% of the population aged 30-34 in Bulgaria has higher education, according to Eurostat data for 2016.The percentage of graduates in our country is below the EU average (nearly 40%) and our country is the 20th in this indicator. Immediately after us is Germany, followed by Hungary, Czech Republic, Slovakia, Malta, Croatia, Italy. Last is Romania .The share of the EU population aged 30-34 with completed tertiary education has increased from 23.6% (2002) to 39.1% (2016). The trend is more pronounced in women (from 24.5% in 2002 to 43.9% in 2016) than in men (from 22.6% to 34.4%).The Europe 2020 strategy sets the target of at least 40% of 30-34-year-olds in the EU by 2020 to have completed higher education.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	300 635	275 036	270 937	292 186	305 140	306 983	310 747
Denominator	1093219	1011162	996091	987115	974889	965354	947398
EUIS	27,50	27,20	27,20	29,60	31,30	31,80	32,80

Government stakeholders: Ministry of Education

Important documents:

Bulgaria Strategy 2020

1 FRAMEWORK CONDITIONS

1.1. Available Human resources

Indicator	1.1.3. Percentage population aged 25-64 participating in lifelong learning
Numerator	The target population for lifelong learning statistics refers to all persons in private households aged between 25 and 64 years. The information collected relates to all education or training, whether or not relevant to the respondent's current or possible future job. Data are collected through the EU Labour Force Survey. The reference period for the participation in education and training is the four weeks preceding the interview, as is usual in the Labour Force Survey.
Denominator	Total population of the same age group, excluding those who did not answer the question concerning participation in (formal and non-formal) education and training
Interpretation	Lifelong learning encompasses all purposeful learning activity, whether formal, non-formal or informal, undertaken on an ongoing basis with the aim of improving knowledge, skills and competence. The intention or aim to learn is the critical point that distinguishes these activities from non-learning activities, such as cultural or sporting activities.
Source of data and available years for the concerned country	European Innovation Scoreboard 2017 for the indicator; Eurostat for the values of the numerator and denominator; If not available use official national sources for the numerator and denominator. http://ec.europa.eu/eurostat/data/database

Remark (commentary which explains the numerator or describes certain specifics of the national context)

The long Bulgarian transition to democracy and market economy is yet to lead to the establishment of consistent qualifications systems, which would match the new economic processes. Amid conditions of high unemployment, the enterprises experience an ever increasing deficit of workers having the necessary qualifications, which, in parallel with the aging population and slow pace of the reforms in education, is seen as a significant impediment to economic growth and attraction of new investments into Bulgaria. Quick dissemination of moderera technologies served to further swell the gap between supply and demand on the labour market. This reflects on the quality supplied, which makes the need for reforms in the education

and training system an even more urgent one. At the same time, albeit at a slow pace, the national economy is beginning to find its own direction of development and formulate its own demands in regards to the levels of knowledge and key competences.From this perspective, the time is ripe for measures to be taken in regards to the need for new skills through changes in the education and training system, which would ensure building up the mentality for lifelong learning. This Strategy for Lifelong Learning is expected to be perceived as a response to all emerging challenges in regards to the social inclusion and economic growth.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	18 116	18 298	19 627	23 252	24 539	23 474	25 910
Denominat or (millions)	1132 280	1 143 656	1 154 522	1 162 578	1 168 542	1 173 715	1 177 749
EUIS	1,60	1,60	1,70	2,00	2,10	2,00	2,20

Government stakeholders:

Ministry of Education;

Important documents:

Operational Programme "Science and Education for Smart Growth 2014 - 2020"

1 FRAMEWORK CONDITIONS

1.2 Attractive research systems

Indicator	1.2.1. International scientific co-publications per million population
Numerator	Number of scientific publications with at least one co-author based abroad (where abroad is non-EU for the EU28)
Denominator	Total population
Interpretation	International scientific co-publications are a proxy for the quality of scientific research as collaboration increases scientific productivity.
Source of data and available years for the concerned country	Eurostat;

Remark (commentary which explains the numerator or describes certain specifics of the national context).

The first reported ERC publications began to appear in 2007 and since then publications acknowledging ERC funding have gone from contributing less than 0.1% of EU top 1% publications in 2007 (2) to nearly 7% in 2014 (973).

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	157,78	167,86	174,01	181,48	176,11	179,81	202,41
Denominator (millions)	7 504 868	7 327 224	7 284 552	7 245 677	7 202 198	7 153 784	7 101 859
EUIS	157,78	167,86	174,01	181,48	176,11	179,81	202,41

Government stakeholders: Ministry of Education and Science , Ministry of Finance

Important documents:

Operational Programme "Science and Education for Smart Growth 2014 - 2020"

1 FRAMEWORK CONDITIONS

1.2. Attractive research systems

Indicator	1.2.2. Scientific publications among the top-10% most cited publications worldwide as percentage of total scientific publications of the country
Numerator	Number of scientific publications among the top-10% most cited publications worldwide
Denominator	Total number of scientific publications
Interpretation	The indicator is a measure for the efficiency of the research system, as highly cited publications are assumed to be of higher quality. There could be a bias towards small or English-speaking countries given the coverage of Scopus' publication data.
Source of data and available years for the concerned country	Data provided by CWTS (Leiden University) as part of a contract to the European Commission (DG Research and Innovation); European Innovation Scoreboard 2017; http://www.stat.gov.mk/

Remark (commentary which explains the numerator or describes certain specifics of the national context).

According to the report "Science, Research and Innovation of EU, 2016", the percentage of scientific publications in top 10% of the total number of publications for most of the EU countries grows from year 2000 towards year 2010 and the intensity of research and development funding is also rising (Fig. 3). Contrary to them, the direction for Bulgaria is the opposite – towards reduction of the intensity of funding. Based on data of the European Innovation Scoreboard, 2016, the share of scientific publications from Bulgaria, included in the top 10% of the most cited works has dropped by more than one-third from year 2008 to year 2015, respectively from 6.5% to 3.5%.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	119	110	120	102			
Denominator	2 505	2434	2 679	2 677			
EUIS	4,73	4,51	4,48	3,80	3,75	4.04	

Government stakeholders: Ministry of Education and Science; Ministry of Finance

Important documents:

Operational Programme "Science and Education for Smart Growth 2014 - 2020"

1 FRAMEWORK CONDITIONS

1.3. Attractive research systems

Indicator	1.2.3. Foreign doctorate students as a percentage of all doctorate students
Numerator	Number of doctorate students from foreign countries
Denominator	Total number of doctorate students
Interpretation	The share of foreign doctorate students reflects the mobility of students as an effective way of diffusing knowledge. Attracting high-skilled foreign doctorate students will secure a continuous supply of researchers.
Source of data and available years for the concerned country	European Innovation Scoreboard 2017 for the indicator; Eurostat for the values of the numerator and denominator; If not available use official national sources for the numerator and denominator. http://ec.europa.eu/eurostat/data/database

Remark (commentary which explains the numerator or describes certain specifics of the national context)

The high level of research in the leading scientific institutions and universities in the country, combined with the positive results from the implementation of the Strategy for Higher Education, attracted more Bulgarian and foreign students to study and complete a doctorate in Bulgaria. This will not only to development of new generations of scientists, educators and teachers, but have a positive impact on the preparation of highly qualified specialists for the industry and retaining of qualified personnel in Bulgaria. The contribution of research to industry is associated with innovations and development of new or improved technologies. Whether relevant research were made in Bulgaria or abroad, the availability of highly qualified Bulgarian scientists competent in relevant scientific field, will allow rapid uptake of research results and their practical application in our country. As an additional result the increased state support for research will contribute directly and indirectly to increase the innovation index of the country and to the increase of foreign investments.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	220	201	241	252	340	482	503
Denominator	4095	4703	5371	6055	6617	6750	6738
EUIS	5,84	5,37	4,27	3,98	4,16	5,14	

Government stakeholders: Ministry for Education and Science;

Important documents:

National strategy for development of scientific research in the Republic of Bulgaria 2017 – 2030

National strategy for the development of scientific research 2020

1 FRAMEWORK CONDITIONS

1.3   Innovation-friendly environment

Indicator	1.3.1. Broadband penetration
Numerator	Number of enterprises with a maximum contracted download speed of the fastest fixed internet connection of at least 100 Mb/s
Denominator	Total number of enterprises
Interpretation	Realising Europe's full e-potential depends on creating the conditions for electronic commerce and the Internet to flourish. This indicator captures the relative use of this e-potential by the share of enterprises that have access to fast broadband.
Source of data and available years for the concerned country	Eurostat; E-commerce in Enterprises; European Innovation Scoreboard 2017;

Remark (commentary which explains the numerator or describes certain specifics of the national context)

By all broadband internet indicators – geographic coverage and affordability, home and business subscribers, quality and speed Bulgaria is above the average European level. However, too many users of mobile telephone sets cannot afford smart phones, or data plans and the country lags behind Europe by this indicator One measure of the level of electronisation of key business processes is the summary e-business index of the European Digital Scoreboard.48 It measures what part (without weighing) of 12 e-business technologies is used by non-financial enterprises with 10 or more employees. In some cases this concerns technologies (having a website, whether websites use B2C functionalities, presence in the social media, use of ERP or CRM, sharing information on the supply chain, broadband access to internet with capacity of over 0 mbps), and in other cases it measures certain intensity of use or sophistication of available technologies (most employees use internet in their work, over 20 % of the employees use mobile devices for work purposes, the website has sophisticated functionalities, access to specialised ICT skills, at least 1 % of the revenue is generated from ecommerce). Data about internet access also give grounds to doubt their accuracy –71. % of enterprises use broadband internet according to the Digital Scoreboard. In 2009, Eurostat assessed that over 80 % of companies have internet and almost all newly registered companies have at least e-mail, use the electronic services of the National Revenue Agency and for years only broadband internet has been provided on the market.Back in 2006, national representative surveys (including smaller companies which are more likely to have not been connected to internet) assess connectivity to internet at 70 % to 82 %.49

INNOPLATFORM

Innovations Platform and Tools for increasing the innovation capacity of SMEs in the Balkan Mediterranean Area

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	29 354	29 299	29 843	30 191	30 872	35 411	
Denominator	366 929	366 240	373 036	377 383	385 905	393 460	
EUIS	8,00	8,00	8,00	8,00	8,00	9,00	

Government stakeholders: Ministry of Economy

Important documents:

Innovation BG 2016

Digital Scoreboard 2016

1 FRAMEWORK CONDITIONS

1.3. Innovation-friendly environment

Indicator	1.3.2. Opportunity-driven entrepreneurship (Motivational index)
Definition	This index is calculated as the ratio between the share of persons involved in improvement-driven entrepreneurship and the share of persons involved in necessity-driven entrepreneurship.
Interpretation	Data from GEM distinguish between two types of entrepreneurship: 1) opportunity-driven entrepreneurship and 2) necessity-driven entrepreneurship. The first includes persons involved in TEA (Total Early-Stage Entrepreneurial Activity) who (i) claim to be driven by opportunity as opposed to finding no other option for work; and (ii) who indicate the main driver for being involved in this opportunity is being independent or increasing their income, rather than just maintaining their income; the second includes persons involved in TEA who are involved in entrepreneurship because they had no other option for work. GEM has constructed the Motivational index to measure the relative degree of improvement-driven entrepreneurship.
Source of data and available years for the concerned country	Global Entrepreneurship Monitor (GEM) for the numerator and denominator and ; European Innovation Scoreboard 2017 for the final value.

Remark (commentary which explains the numerator or describes certain specifics of the national context).

The motivational index measures the relative degree of opportunity, or in other words it represents entrepreneurship driven by opportunities. The indicator is based on data collected through the Global Entrepreneurship Monitor survey (GEM). The index covers people who are involved in entrepreneurial activities and who claim to be driven by opportunities. Rather than some other measure of employment, the opportunity driven entrepreneurs claim that the main driving force behind their actions is to be independent, or increase their income, not to maintain the income at the same level.

On this basis, the motivational index of entrepreneurial activity in Bulgaria (the ratio of improvement-driven to necessity-driven entrepreneurs) is one of the lowest in Europe (0.9), along with the index in Macedonia (0.5) and Croatia (1.0). Leaders in

the European ranking are Switzerland (6.5), Norway (6.0), Sweden (5.7) and Luxembourg (5.6), with the average level at 2.8.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
EUIS	0,87	0,87	0,87	0,87	0,87	0,87	0,99

Government stakeholders: Ministry of Economy; Ministry for Education and Science;

Important documents:

2. INVESTMENTS

2.1 Finance and support

Indicator	2.1.1. R&D expenditure in the public sector (percentage of GDP)
Numerator	All R&D expenditures in the government sector (GOVERD) and the higher education sector (HERD) (in mill Euro)
Denominator	Gross Domestic Product (in mill Euro)
Interpretation	R&D expenditure represents one of the major drivers of economic growth in a knowledge-based economy. As such, trends in the R&D expenditure indicator provide key indications of the future competitiveness and wealth of the EU. Research and development spending is essential for making the transition to a knowledge-based economy as well as for improving production technologies and stimulating growth.
Source of data and available years for the concerned country	European Innovation Scoreboard 2017 for the indicator; Eurostat for the values of the numerator and denominator; If not available use official national sources for the numerator and denominator. http://ec.europa.eu/eurostat/data/database

Remark (commentary which explains the numerator or describes certain specifics of the national context)

For a sixth year in a row the share of public expenses for R&D decreased. This is a period when external finance played a leading role in the country. The decline on

2009 is almost triple, reaching the present level of 20.43 %. The public research units BAS, the Agricultural Academy, and other research centres at ministries) spent almost fully the public funds for their fundamental and applied research (82. 4 % in regards to sources of finance), including purely institutional finance, direct public procurement, and through the National Science Fund. Only 15 % of their budgets originated from external sources (research institutes in the country are not eligible beneficiaries under operational programmes and the National Innovation Fund; they may implement only projects commissioned by business and financing from European and other research projects is still not decisive for them).

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	27 445,22	18 955,01	13 159,33	11 475, 71	13 567, 50	19 581, 60	16 441, 97
Denominator	84 505	86 885	89 467	88 741	92 242	97 716	99 736
EUIS	32, 5	21,8	14,7	12,9	14,7	20,0	16,5

Government stakeholders: Ministry of Economy; Ministry of Finance; Ministry of Education and Science,

Important documents:

Higher education development strategy in the Republic of Bulgaria for the period 2014-2020.

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2 INVESTMENTS

2.1.Finance and support

Indicator	2.1.2. Venture capital (percentage of GDP)
Numerator	Venture capital investment is defined as private equity being raised for investment in companies. Management buyouts, management buy-ins, and venture purchase of quoted shares are excluded. Venture capital includes early-stage (seed + start-up) and expansion and replacement capital.
Denominator	Gross Domestic Product
Interpretation	The amount of venture capital is a proxy for the relative dynamism of new business creation. In particular for enterprises using or developing new (risky) technologies, venture capital is often the only available means of

	financing their (expanding) business.
Source of data and available years for the concerned country	Venture capital data from Invest Europe as the numerator; GDP data from Eurostat as the denominator; European Innovation Scoreboard 2017 for the value of the indicator; http://ec.europa.eu/eurostat/data/database

Remark (commentary which explains the numerator or describes certain specifics of the national context).

The share of business spending for R&D in GDP increased by some 272 % for the period; High-tech sector the share of employed persons in knowledgeintensive sectors of the economy grew by over 1 % in the period (despite this, 26th place for 2015); the share of export of medium high-tech and high-tech products in total export of products rose by over 28 % for the period (despite this, 27th place for 2015); the share of knowledge-intensive services in total export of services rose by over 24 % for the period (despite this, 25th place for 2015); relatively good positions in respect of the share of employed persons in fast growing innovative firms, complemented by growth of over 11 % for the period;

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	133,33	71,84	70,34	13,12	9,89	14,68	N/A
Denominator	84 505	86 885	89 467	88 741	92 242	97 716	99 736
EUIS	0,16	0,08	0,08	0,01	0,01	0,02	

Government stakeholders: Ministry of Economy; Ministry of Finance

Important documents:

2 INVESTMENTS

2.2   Firm investments

Indicator	2.2.1. R&D expenditure in the business sector (percentage of GDP)
Numerator	All R&D expenditures in the business sector (BERD) (in mill Euro)
Denominator	Gross Domestic Product (in mill Euro)
Interpretation	The indicator captures the formal creation of new knowledge within firms. It is particularly important in the science-based sectors (pharmaceuticals, chemicals and some areas of electronics) where most new knowledge is created in or near R&D laboratories.
Source of data and available years for the concerned country	European Innovation Scoreboard 2017 for the indicator; Eurostat for the values of the numerator and denominator; If not available use official national sources for the numerator and denominator. http://ec.europa.eu/eurostat/data/database

Remark (commentary which explains the numerator or describes certain specifics of the national context):

The intensity of the research and innovation of companies depends on their size. Although the number of large companies in Bulgaria employing over 500 persons is only 555, their budget for R&D almost equals the budget of the other groups of companies. Also, they have the highest growth in investment – for 2015 the increase is nearly 8 times compared with the previous year. The major part of business sector expenditure for R&D is focused in two main fields of science: technical sciences (54 %) and medical sciences (41 %).Rank 19 in EU 2015

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	236,61	243,28	331,03	346,09	479,66	684,01	N/A
Denominator	84 505	86 885	89 467	88 741	92 242	97 716	99 736
EUIS	0,28	0,28	0,37	0,39	0,52	0,70	N/A

Government stakeholders: Ministry of Economy; Ministry of Finance

Important documents:

2 INVESTMENTS

2.2.Firm investments

Indicator	2.2.2. Non-R&D innovation expenditures (percentage of turnover)
Numerator	Sum of total innovation expenditure for enterprises, excluding intramural and extramural R&D expenditures (in mill Euro)
Denominator	Total turnover for all enterprises (in mill Euro)
Interpretation	This indicator measures non-R&D innovation expenditure as a percentage of total turnover. Several of the components of innovation expenditure, such as investment in equipment and machinery and the acquisition of patents and licenses, measure the diffusion of new production technology and ideas.
Source of data and available years for the concerned country	European Innovation Scoreboard 2017 for the indicator; Eurostat for the values of the numerator and denominator; If not available use official national sources for the numerator and denominator. http://www.stat.gov.mk/

Remark (commentary which explains the numerator or describes certain specifics of the national context)

The indicator for non-R&D innovation expenditures, as a percentage of the total turnover, measures the investment in equipment and machinery, the purchase of patents and licenses. It actually measures the diffusion of new production technologies and ideas, i.e. the technology transfer. For a developing country this indicator is more important compared to the public and private R&D expenditure as a percentage of GDP. For Bulgaria, the value of this indicator is 0.74%, which ranks the country at the low 15 th place in the EU.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	890,64	289,39	304,25	534,43	553,59	902,32	N/A
Denominator	93 687	103 339	108 644	110 000	113 944	121 306	N/A
EUIS	0,95	0,28	0,28	0,49	0,49	0,74	N/A

Government stakeholders: Ministry of Economy; Ministry of Finance;

Important documents:

Innovation Strategy of the Republic of Bulgaria 2014-2020

2 INVESTMENTS

2.2. Firm investments

Indicator	2.2.3. Enterprises providing training to develop or upgrade ICT skills of their personnel
Numerator	Number of enterprises that provided any type of training to develop ICT related skills of their personnel
Denominator	Total number of enterprises
Interpretation	ICT skills are particularly important for innovation in an increasingly digital economy. The share of enterprises providing training in that respect is a proxy for the overall skills development of employees.
Source of data and available years for the concerned country	Eurostat; Community Survey of ICT Usage; E-commerce in Enterprises; European Innovation Scoreboard 2017; Use of official national sources;

Remark (commentary which explains the numerator or describes certain specifics of the national context).

The information and communication technologies (ICT) sector and related sectors have generated steady growth over the years. Revenues of the IT sector (NACE 62 and 6) grew by 70 %, compared to a total growth by 50 % of all revenues for the whole economy. The development of e-business in Bulgaria is closely related to the overall development of the Bulgarian ICT sector. There are a number of interactions between the two areas: recently, development of technologies – particularly cloud technologies – have enabled SMEs to address the challenges of managing ICT infrastructure, platforms and services without specialised ICT staff. SoftUni was created to address the need of sufficient number of highly qualified professionals for the IT industry in Bulgaria, whose share grows annually by 10-12 % and accounts for some 2 % of GDP in 2015 (BGN 1.6 billion). While the sector needs 40,000 qualified professionals, Bulgaria has only about 17,000.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	51 370	51 274	52 225	56 607	30 872	31 477	N/A
Denominator	366 929	366 240	373 036	377 383	385 905	393460	N/A
EUIS	14	14	14	15	8	8	N/A

Government stakeholders: Ministry of Education and Science

Important documents:

National Strategy Lifelong Learning for the period 2014-2020
https://www.mon.bg/upload/6561/strategy_LLL_2014_2020.pd

3. INNOVATION ACTIVITIES

3.1 Innovators

Indicator	3.1.1. SMEs introducing product or process innovations (percentage of SMEs)
Numerator	Number of SMEs who introduced at least one new product or a new process to one of their markets
Denominator	Total number of SMEs
Interpretation	Technological innovation, as measured by the introduction of new products (goods or services) and processes, is a key ingredient to innovation in manufacturing activities. Higher shares of technological innovators should reflect a higher level of innovation activities.
Source of data and available years for the concerned country	Eurostat (Community Innovation Survey) for the numerator and the denominator; European Innovation Scoreboard 2017 for the value of the score; http://www.stat.gov.mk/

Remark (commentary which explains the numerator or describes certain specifics of the national context).

The segment of SMEs that are introducing product or process innovations in terms of the total number of SMEs is traditionally accepted as the most important type of indicator for innovation in the industry. The indicator covers the activity of SMEs which have a number of employees between 10 and 249, and belong to the NACE sectors of innovators as identified by CIS. There are 393 721 SMEs in all NACE sectors in Bulgaria which have between 10-249 employees. But only 55 297 of them belong to the NACE sectors of innovators in 2015. European Investment Fund (EIF) and the Bulgarian Development Bank (BDB) signed the first agreement in November for the purpose to provide funding within the infrastructure and innovation window. It is expected agreement to lead to investments of € 420 million. The EIB has provided a loan of 150 EUR million for BDB for lending, directly or through partner banks, to SMEs companies with average market capitalization in Bulgaria. Also, a Memorandum of Understanding on Establishment has recently been signed

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	75 858	54 759	55 630	51 107	51 992	55 297	
Denominator	366 177	365 484	371 299	376 637	383 153	393 721	
Actual value of the Denominator							
EUIS	20,72	14,98	14,98	13,57	14,94		

Government stakeholders: Ministry of Economy; Ministry of Finance

Important documents:

3 INNOVATION ACTIVITIES

3.1. Innovators

Indicator	3.1.2. SMEs introducing marketing or organisational innovations (percentage of SMEs)
Numerator	Number of SMEs who introduced at least one new marketing innovation or organisational innovation to one of their markets
Denominator	Total number of SMEs
Interpretation	The Community Innovation Survey mainly asks firms about their technological innovation. Many firms, in particular in the services sectors, innovate through other non-technological forms of innovation. Examples of these are marketing and organisational innovations. This indicator captures the extent to which SMEs innovate through non-technological innovation.
Source of data and available years for the concerned country	Eurostat (Community Innovation Survey); European Innovation Scoreboard 2017 for the value of the score;

Remark (commentary which explains the numerator or describes certain specifics of the national context)

The segment of SMEs that are introducing marketing innovation, or organisational innovation in terms of the total number of SMEs is traditionally accepted as the one of the most important type of indicators for innovation activity in the country. The indicator covers the activity of SMEs which have a number of employees between 10

and 249, and belong to the NACE sectors of innovators as identified by CIS. There are 393 721 SMEs in all NACE sectors in Bulgaria which have between 10-249 employees. But only of 63 535 the NACE sectors of innovators (number in 2015).

The actual value of the denominator, i.e. number of SMEs which belong to the CIS NACE sectors of innovators indicates a slow, but steady growth, which needs to be noted. Clearly the weakest performance by marketing and organisation innovation – 17.6 % compared to 6.2 % on average for EU-28;

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	63 535	60 541	60 541	66 385	67 533	58 074	
Denominator	366 177	365 484	371 299	376 637	383 153	393 721	366 177
Actual value of the Denominator							
EUIS	17,35	16,31	16,31	17,63	17,63	14,75	

Government stakeholders: Ministry of Economy; Ministry of Finance

Important documents:

3. INNOVATION ACTIVITIES

3.1. Innovators

Indicator	3.1.3. SMEs innovating in-house (percentage of SMEs)
Numerator	Number of SMEs with in-house innovation activities. Innovative enterprises are defined as enterprises which have introduced new products or processes either in-house or in combination with other firms.
Denominator	Total number of SMEs
Interpretation	This indicator measures the degree to which SMEs, that have introduced any new or significantly improved products or production processes, have innovated in-house. The indicator is limited to SMEs, because almost all large firms innovate

	and because countries with an industrial structure weighted towards larger firms tend to do better.
Source of data and available years for the concerned country	Eurostat (Community Innovation Survey) for the numerator and the denominator; European Innovation Scoreboard 2017 for the value of the score

Remark (commentary which explains the numerator or describes certain specifics of the national context).

The segment of SMEs that are introducing any new or significantly improved products or production processes in-house. The indicator is limited to SMEs, because almost all large firms innovate and because countries with an industrial structure weighted towards larger firms tend to do better. The indicator covers the activity of SMEs which have a number of employees between 10 and 249, and belong to the NACE sectors of innovators as identified by CIS. There are 6540 SMEs in all NACE sectors in FYR of Macedonia which have between 10-249 employees. More than half of them or 3943 belong to the NACE sectors of innovators (number in 2015).

The percentage of SMEs innovating in-house in Bulgaria is 11.19 %, which ranks it on the 32 st place. But that small percentage is caused by the reason there are too many SMEs

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	62 589	45 048	45 765	43 709	44 466	44 043	
Denominator	366 177	365 484	371 299	376 637	383 153	393 721	366 177
Actual value of the Denominator							
EUIS	17,09	12,33	12,33	11,61	11,61	11,19	

Government stakeholders: Ministry of Economy; Ministry of Finance

Important documents:

3. INNOVATION ACTIVITIES

3.2   Linkages

Indicator	3.2.1. Innovative SMEs collaborating with others (percentage of SMEs)
Numerator	Number of SMEs with innovation co-operation activities, i.e. those firms that had any co-operation agreements on innovation activities with other enterprises or institutions in the three years of the survey period
Denominator	Total number of SMEs
Interpretation	This indicator measures the degree to which SMEs are involved in innovation co-operation. Complex innovations, in particular in ICT, often depend on the ability to draw on diverse sources of information and knowledge, or to collaborate in the development of an innovation. This indicator measures the flow of knowledge between public research institutions and firms, and between firms and other firms. The indicator is limited to SMEs, because almost all large firms are involved in innovation co-operation.
Source of data and available years for the concerned country	Eurostat for the numerator and the denominator; European Innovation Scoreboard 2017 for the value of the score;

Remark (commentary which explains the numerator or describes certain specifics of the national context).

The segment of SMEs that are are involved in innovation co-operation. The indicator covers the activity of SMEs which have a number of employees between 10 and 249, and belong to the NACE sectors of innovators as identified by CIS. There are 6540 SMEs in all NACE sectors in FYR of Macedonia which have between 10-249 employees. More than half of them or 3943 belong to the NACE sectors of innovators (number in 2015).

The actual value of the denominator, i.e. number of SMEs which belong to the CIS NACE sectors of innovators indicates 33th place in EU

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	12 827	12 189	12 383	8 718	8 869	12 228	
Denominator	366 177	365 484	371 299	376 637	383 153	393 721	366 177
Actual value of the Denominator							

Government stakeholders: Ministry of Economy; Ministry of Finance

Important documents:

3. INNOVATION ACTIVITIES

3.2. Linkages

Indicator	**3.2.2. Public-private co-publications per million population**
Numerator	Number of public-private co-authored research publications. The definition of the "private sector" excludes the private medical and health sector. Publications are assigned to the country/countries in which the business companies or other private sector organisations are located.
Denominator	Total population
Interpretation	This indicator captures public-private research linkages and active collaboration activities between business sector researchers and public sector researchers resulting in academic publications.
Source of data and available years for the concerned country	Publication data provided by CWTS (Leiden University) as part of a contract to European Commission (DG Research and Innovation); Population data from Eurostat; European Innovation Scoreboard 2017; http://www.stat.gov.mk/

Remark (commentary which explains the numerator or describes certain specifics of the national context).

The indicator for public-private co-publications per million population defines the public-private connections and active co-operation between the business sector and the public sector which resulted with publication. The low value of the nominator

describes a poor collaboration between the academic and research institutions with the private sector. 33th place by the indicator of joint public-private publications per 1 million persons and a fall from previous years

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	22,25	32,81	21,87	14,92	16,90	7,95	
Denominator (millions)	7 504 868	7 327 224	7 284 552	7 245 677	7 202 198	7 153 784	
EUIS	2,96	4,48	3,00	2,06	2,35	1,11	

Government stakeholders: Ministry of Education and Science

Important documents:

Higher education development strategy in the Republic of Bulgaria for the period 2014-2020

3. INNOVATION ACTIVITIES

3.2. Linkages

Indicator	3.2.3. Private co-funding of public R&D expenditures (percentage of GDP)
Numerator	All R&D expenditures in the government sector (GOVERD) and the higher education sector (HERD) financed by the business sector
Denominator	Gross Domestic Product
Interpretation	This indicator measures public-private co-operation. University and government R&D financed by the business sector are expected to explicitly serve the more short-term research needs of the business sector.
Source of data and available years for the concerned country	Eurostat; European Innovation Scoreboard 2017; http://ec.europa.eu/eurostat/data/database

Remark (commentary which explains the numerator or describes certain specifics of the national context).

The indicator of private co-funding of public R&D expenditures measures the co-operation between the public and the private sector. Business in Bulgaria invested approximately BGN 621 million in research and innovation projects in 2015 – an increase by 45 % from the previous year**,** and 10 times more than the pre-accession 2006. Foreign finance (5 % share in the last year of the review period) plays the biggest role in the raising of internal private investment (46 % co-financing from companies). The higher education sector also doubled its own funds for scientific research compared with the previous year**.**Nevertheless, its share in total R&D finance in the country stood negligibly low – 0.08 % , Bulgaria ranks 28 th place

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	7646	8258,4	4194.7	8402,3	4276,2	4528,6	
Denominator (millions)	38230,5	41292	41947,2	42011,5	42 762,2	45 286,5	
EUIS	0,02	0,02	0,01	0,02	0,01	0,01	

Government stakeholders: Ministry of Economy; Ministry of Finance; Ministry of Education and Science

Important documents:

3. INNOVATION ACTIVITIES

3.3   Intellectual assets

Indicator	3.3.1. PCT patent applications per billion GDP (in PPS)
Numerator	Number of patent applications filed under the PCT, at international phase, designating the European Patent Office (EPO). Patent counts are based on the priority date, the inventor's country of residence and fractional counts.
Denominator	Gross Domestic Product in Purchasing Power Standard (in billion)
Interpretation	The capacity of firms to develop new products will determine their competitive advantage. One indicator of the rate of new product innovation is the number of patents. This indicator measures the number of PCT patent applications.
Source of data and available years for the concerned country	Patent data from the OECD; Population data from Eurostat; European Innovation Scoreboard 2017; http://ec.europa.eu/eurostat/data/database

Remark (commentary which explains the numerator or describes certain specifics of the national context).

The number of patent applications submitted to EPO by Bulgarian patent applicants has been growing after 2007 to reach 6.55 applications per 1 million persons in 2014. Despite the upward trend, however, Bulgaria remains at one of the last places in EU-28 by this indicator (before Croatia and Romania), far below the average EU level of 111.59 applications and far behind the European innovation leaders which annually submit from 250 to 50 patent applications per 1 million.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	28	30	47	57	48	63	
Denominator	84,50	86,88	89,47	88,74	92,24	97,71	
EUIS	0,33	0,35	0,53	0,64	0,53	0,65	

Government stakeholders: Ministry of Economy, State Office of Industrial Property;

Important documents:

3. INNOVATION ACTIVITIES

3.3. Intellectual assets

Indicator	3.3.2. Trademark applications per billion GDP (in PPS)
Numerator	Number of trademark applications applied for at European Union Intellectual Property Office (EUIPO) plus number of trademark applications applied for at World Intellectual Property Office (WIPO) ("yearly Madrid applications by origin")
Denominator	Gross Domestic Product in Purchasing Power Standard (in billion)
Interpretation	Trademarks are an important innovation indicator, especially for the service sector. The Community trademark gives its proprietor a uniform right applicable in all Member States of the European Union through a single procedure which simplifies trademark policies at European level. It fulfils the three essential functions of a trademark: it identifies the origin of goods and services, guarantees consistent quality through evidence of the company's commitment vis-à-vis the consumer, and it is a form of communication, a basis for publicity and advertising.
Source of data and available years for the concerned country	Trademark data from European Union Intellectual Property Office (EUIPO) and World Intellectual Property Office (WIPO); Population data from Eurostat; European Innovation Scoreboard 2017; http://ec.europa.eu/eurostat/data/database

Remark (commentary which explains the numerator or describes certain specifics of the national context).

Much better are the positions of the country in regard to trademarks and industrial design – fields in which Bulgaria has clear advantages over the other member states and has made significant progress over recent years and ranked Bulgaria at 12nd for 2015 and 13th place for 2016 and being around top 15 for the last 6 years

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	616	633	741	780	871	971	960
Denominator	84,59	86,88	89,47	88,74	92,24	92,71	101,34
EUIS	7,29	7,29	8,29	8,79	9,45	9,94	9,48

Government stakeholders: Ministry of Economy, State Office of Industrial Property;

Important documents:

3 INNOVATION ACTIVITIES

3.3. Intellectual assets

Indicator	3.3.3. Design applications per billion GDP (in PPS)
Numerator	Number of individual designs applied for at European Union Intellectual Property Office (EUIPO)
Denominator	Gross Domestic Product in Purchasing Power Standard (in billion)
Interpretation	A design is the outward appearance of a product or part of it resulting from the lines, contours, colours, shape, texture, materials and/or its ornamentation. A product can be any industrial or handicraft item including packaging, graphic symbols and typographic typefaces but excluding computer programmes. It also includes products that are composed of multiple components, which may be disassembled and reassembled. Community design protection is directly enforceable in each Member State and it provides both the option of an unregistered and a registered Community design right for one area encompassing all Member States.
Source of data and available years for the concerned country	Design data from European Union Intellectual Property Office (EUIPO); Population data from Eurostat; European Innovation Scoreboard 2017; http://ec.europa.eu/eurostat/data/database

Remark (commentary which explains the numerator or describes certain specifics of the national context):

Much better are the positions of the country in regard to industrial design – fields in which Bulgaria has clear advantages over the other member states and has made significant progress over recent years.Intellectual property with low technological intensity considerably grew for the this period (nearly 7 times) and is above the average for EU-28 ranking **3th place** for 2014,2015 and **5th place** for 2016.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	144,19	161,55	280,58	629,44	959,85	950,37	711,56
Denominator	84,59	86,88	89,47	88,74	92,24	92,71	101,34
EUIS	1,71	1,86	3,14	7,09	10,41	9,73	7,02

Government stakeholders: Ministry of Economy; State Office of Industrial Property;

Important documents:

4. IMPACT

4.1 Employment impact

Indicator	4.1.1. Employment in knowledge-intensive activities (percentage of total employment)
Numerator	Number of employed persons in knowledge-intensive activities in business industries. Knowledge-intensive activities are defined, based on EU Labour Force Survey data, as all NACE Rev.2 industries at 2-digit level where at least 33% of employment has a tertiary education degree (ISCED 5-8).
Denominator	Gross Domestic Product in Purchasing Power Standard (in million)
Interpretation	Knowledge-intensive activities provide services directly to consumers, such as telecommunications, and provide inputs to the innovative activities of other firms in all sectors of the economy.
Source of data and available years for the concerned country	European Innovation Scoreboard 2017 for the indicator; Eurostat for the values of the numerator and denominator; If not available use official national sources for the numerator and denominator. http://ec.europa.eu/eurostat/data/database

Remark (commentary which explains the numerator or describes certain specifics of the national context):

Although the share of the employed in the high-tech sector in Bulgaria (high-tech activities and knowledge-intensive services) in total employment had been changing in the period 2008 – 2015, the annual rate remains positive and moves within the range of 1 and 2 %. This growth, however, is not high enough to make up for the lagging behind other EU member states in the framework of which Bulgarian exceeds only Romania by this indicator

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	7182	7472	8052	8377	9316	10162	
Denominator	84 505	86 885	89 467	88 741	92 242	97 716	
EUIS	8,50	8,60	9,00	9,44	10,10	10,40	

Government stakeholders: Ministry of Economy; Ministry of Finance; Ministry of Labour and Social Policy;

Important documents:

4 IMPACT

4.1. Employment impact

Indicator	4.1.2. Employment in fast-growing enterprises (percentage of total employment)
Numerator	Number of employees in high-growth enterprises in 50% 'most innovative' industries, defined as:
	B06 (Extraction of crude petroleum and natural gas)
	B09 (Mining support service activities)
	C11 (Manufacture of beverages)
	C12 (Manufacture of tobacco products)
	C19 (Manufacture of coke and refined petroleum product)
	C20 (Manufacture of chemicals and chemical products)
	C21 (Manufacture of basic pharmaceutical products and pharmaceutical preparations)
	C26 (Manufacture of computer, electronic and optical products)
	C27 (Manufacture of electrical equipment)
	C28 (Manufacture of machinery and equipment not elsewhere classified)
	C29 (Manufacture of motor vehicles, trailers and semi-trailers)
	C30 (Manufacture of other transport equipment)
	C32 (Other manufacturing)
	D35 (Electricity, gas, steam and air conditioning supply)
	E39 (Remediation activities and other waste management services)
	G46 (Wholesale trade, except of motor vehicles and motorcycle)
	H51 (Air transport)
	J58 (Publishing activities)
	J59 (Motion picture, video and television programme production, sound recording and music publishing activities)
	J60 (Programming and broadcasting activities)
	J61 (Telecommunications)
	J62 (Computer programming, consultancy and related activities)
	J63 (Information service activities)
	K64 (Financial service activities, except insurance and

	pension funding) K65 (Insurance, reinsurance and pension funding, except compulsory social security) K66 (Activities auxiliary to financial services and insurance activities) L68 (Real estate activities) M69 (Legal and accounting activities) M70 (Activities of head offices; management consultancy activities) M71 (Architectural and engineering activities; technical testing and analysis) M72 (Scientific research and development) M73 (Advertising and market research) M74 (Other professional, scientific and technical activities) M75 (Veterinary activities) N79 (Travel agency, tour operator and other reservation service and related activities)
Denominator Interpretation	Total employment for enterprises with 10 or more employees This indicator provides an indication of the dynamism of fast-growing firms in innovative sectors as compared to all fast-growing business activities. It captures the capacity of a country to rapidly transform its economy to respond to new needs and to take advantage of emerging demand.
Source of data and available years for the concerned country	European Innovation Scoreboard 2017;

Remark (commentary which explains the numerator or describes certain specifics of the national context):

Relatively good positions in respect of the share of employed persons in fast growing innovative firms, complemented by growth of over 11 % for the period; ranking **7th** and **6th** place for 2015 and 2016

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	1831	1820	1789	1784	1810	1814	
Denominator	29 782	29 609	29102	29011	28917	29555	
EUIS	6,15	6,15	6,15	6,15	6,26	6,14	

Government stakeholders: Ministry of Economy, Ministry of Finance; Ministry of Labour and Social Policy;

Important documents:

4 IMPACT

4.2 Sales impact

Indicator	4.2.1. Exports of medium and high technology products as a share of total product exports
Numerator	Value of medium and high tech exports, in national currency and current prices, including exports of the following SITC Rev.3 products: 266, 267, 512, 513, 525, 533, 54, 553, 554, 562, 57, 58, 591, 593, 597, 598, 629, 653, 671, 672, 679, 71, 72, 731, 733, 737, 74, 751, 752, 759, 76, 77, 78, 79, 812, 87, 88 and 891
Denominator	Value of total product exports
Interpretation	The indicator measures the technological competitiveness of the EU, i.e. the ability to commercialise the results of research and development (R&D) and innovation in international markets. It also reflects product specialisation by country. Creating, exploiting and commercialising new technologies are vital for the competitiveness of a country in the modern economy. Medium and high technology products are key drivers for economic growth, productivity and welfare, and are generally a source of high value added and well-paid employment.
Source of data and available years for the concerned country	Eurostat (ComExt) for Member States; UN ComTrade for non-EU countries; European Innovation Scoreboard 2017; https://comtrade.un.org/data/

Remark (commentary which explains the numerator or describes certain specifics of the national context):

The indicator for exports of medium and high technology products measures the technological competitiveness i.e. the ability of companies to commercialize the results of the R&D and innovations on the international markets. This indicators also points towards the specialization for certain products in the country.

The share of export of medium high-tech and high-tech products in total export of products rose by over 28 % for the period (despite this, 32nd place for 2015) It is "comforting" that – despite a slowdown in growth – Bulgaria is not at the last place, mainly due to the serious lagging behind of Romania. Unlike countries such as Poland, Latvia and Lithuania, which have managed to gradually become moderate innovators from modest innovators, next to last within the EU is the highest achievement for Bulgaria.

Results/Analysis:

INNOPLATFORM
Innovations Platform and Tools for increasing the innovation capacity of SMEs in the Balkan Mediterranean Area

Year	2010	2011	2012	2013	2014	2015	2016
Nominator (millions EUR)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Denominator (millions EUR)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
EUIS	25,94	25,94	25,67	26,77	29,06	31,04	N/A

Government stakeholders: Ministry of Economy, Ministry of Finance;

Important documents:

4. IMPACT

4.2. Sales impact

Indicator	4.2.2. Knowledge-intensive services exports as percentage of total services exports
Numerator	Exports of knowledge-intensive services is defined as the sum of credits in EBOPS 2010 (Extended Balance of Payments Services Classification) items: SC1 (Sea transport) SC2 (Air transport) SC3A (Space transport) SF (Insurance and pension services) SG (Financial services) SH (Charges for the use of intellectual property) SI (Telecommunications, computer, and information services) SJ (Other business services) SK1 (Audio-visual and related services)
Denominator	Total value of services exports
Interpretation	The indicator measures the competitiveness of the knowledge-intensive services sector. Competitiveness-enhancing measures and innovation strategies can be mutually reinforcing for the growth of employment, export shares, and turnover at the firm level. The indicator reflects the ability of an economy, notably resulting from innovation, to export services with high levels of value added, and successfully take part in knowledge-intensive global value chains.
Source of data and available years for the concerned country	Calculations by European Commission (Joint Research Centre); European Innovation Scoreboard 2017; https://comtrade.un.org/data/

Remark (commentary which explains the numerator or describes certain specifics of the national context):

Despite the fact that the indicator shows a declining values, the numerator indicates growth in absolute value. The trend of growing exports of knowledge-intensive services reflects the growth and improved quality of services in the telecommunications sector, the computer technologies and the services in area of the information technology. The share of knowledge-intensive services in total export of services rose by over 24 % for the period

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator (millions EUR)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Denominator (millions EUR)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
EUIS	26,88	30,18	32,47	31,93	37,16	41,38	

Government stakeholders: Ministry of Economy, Ministry of Finance

Important documents:

4. IMPACT

4.2. Sales impact

Indicator	4.2.3. Sales of new-to-market and new-to-firm innovations as percentage of turnover
Numerator	Sum of total turnover of new or significantly improved products, either new-to-the-firm or new-to-the-market, for all enterprises (in mill Euro)
Denominator	Total turnover for all enterprises (in mill Euro)
Interpretation	This indicator measures the turnover of new or significantly improved products and includes both products which are only new to the firm and products which are also new to the market. The indicator thus captures both the creation of state-of-the-art technologies (new-to-market products) and the diffusion of these technologies (new-to-firm products).
Source of data and available years for the concerned country	European Innovation Scoreboard 2017 for the indicator; Eurostat for the values of the numerator and denominator; If not available use official national sources for the numerator and denominator. www.nsi.bg

Remark (commentary which explains the numerator or describes certain specifics of the national context):

The sales of new-to-market and new-to-firm innovations measure the turnover of new or significantly improved products. This indicator measures the creation of new state-of-the-art technologies (new for market products) and diffusion of these technologies (new for the firm products). The indicator has a constant value in the period which is ranging the country on the 33th place in EU.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	13 305	7 830	8 232	4 645	4 811	5 818	
Denominator	9 3687	103 339	108 644	110 000	113 944	121 306	
EUIS	14,20	7,58	7,58	4,22	4,22	4,80	

Government stakeholders: Ministry of Economy, Ministry of Finance

Important documents:

5. Conclusions – National Summative Innovation Score

Summary Innovation Index for Bulgaria (RELATIVE TO EU IN 2010)

Year	2010	2011	2012	2013	2014	2015	2016
SII	47.4	49.7 5	40.4	45.2	45.2	46.0	47.5

For the Modest Innovators, performance declined between 2010 and 2016, leading to a widening of the performance gap to the Moderate Innovators. For Bulgaria, performance in 2016 is almost the same as in 2010, where a strong decline in 2012 has almost been matched with performance increases in all other years. For Romania, performance has declined strongly by 14.1 percentage points but, after four years of declining performance, performance increased again in 2016.

Bulgaria is currently in the group of modest innovators and its aim is in 2020 to find a place in the upper group, that of moderate innovators. For this purpose, the average values and growth rate of "moderate innovators" in the period 2006-2013 were calculated for all innovation areas Furthermore, the necessary growth rates of the indices of the innovation areas to achieve the target in 2020 are calculated. Of course, the process is dynamic, and these rates have to be considered as minimum.

The quantitative analysis has been made using multiple indicators and related data over the past five years for each economic activity in terms of internal factors (number of enterprises, employed persons, volume of production/services provided, turnover, added value - as share of the added value generated in the industry and services, and as share of the production/services, labour productivity, investment in fixed assets) and in terms of external factors (export, import, trade balance, realized competitive advantages – production and export specialisation). The sum total of the assessment of internal and external factors gives the overall assessment of the quantitative factor. In turn, economic activities are grouped in terms of their technological intensity in high-, medium high-, medium low- and low-tech activities in the field of industry, and in knowledge-intensive market services, knowledge-intensive high tech services, other knowledge-intensive services, low knowledge-intensive market services and other low knowledge-intensive services. The qualitative analysis has been made using the indicators and related data over the past five years for each economic activity such as: state support to offices and centres for technology transfer, projects funded by the National Innovation Fund (session 1-6), support to projects under OP CBI 2007-2013, number of companies holding patents, number of companies holding trademarks. Together, these indicators measure the attitude of the state and the business activity in terms of the qualitative development of economic activities and services. Subject of this analysis is the reconciliation of the results of the quantitative and qualitative analysis. The aim is to identify economic activities and services for which quantitative evaluation is supplemented by a qualitative one and vice versa. This is interpreted as a strength that forms the capacity and future

potential for accelerated technological innovation and development. Thus, 21 economic activities and services have been identified which are considered a starting point for identifying technology areas for smart specialisation. The logic of identification is to locate the intersection point between the group of economic activities and services and the areas of science, where government and businesses expenditures for research and development are concentrated. Thus, seven technology areas have been identified: Mechatronics and clean technologies, ICT, Bio-technology, Nanotechnology, Creative Industries, Pharmaceuticals, and Food Industry. In view of the existing and expected market trends these technology areas have been summarised in four thematic areas (Mechatronics and clean technologies, Information and IC Technology, Industry for healthy life and bio-technology, new technologies in creative and recreational industries), which clearly reflect the existing potential and future opportunities for smart specialisation of the country.

The values relation EU in 2010 and 2017 for every sub-index are provided in Figure1

1. Innovation Index, 2.Index of the research system 3. Index for funding and support
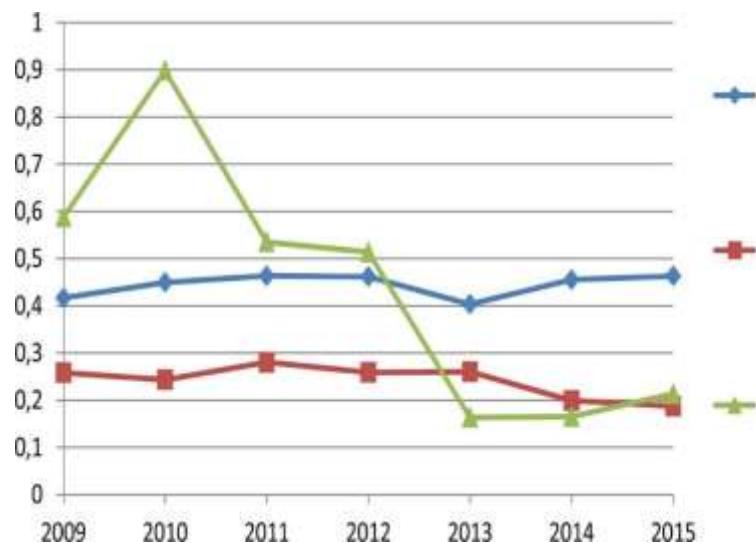
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