2017

INNOSCORECARD

InnoScores

FYR of Macedonia

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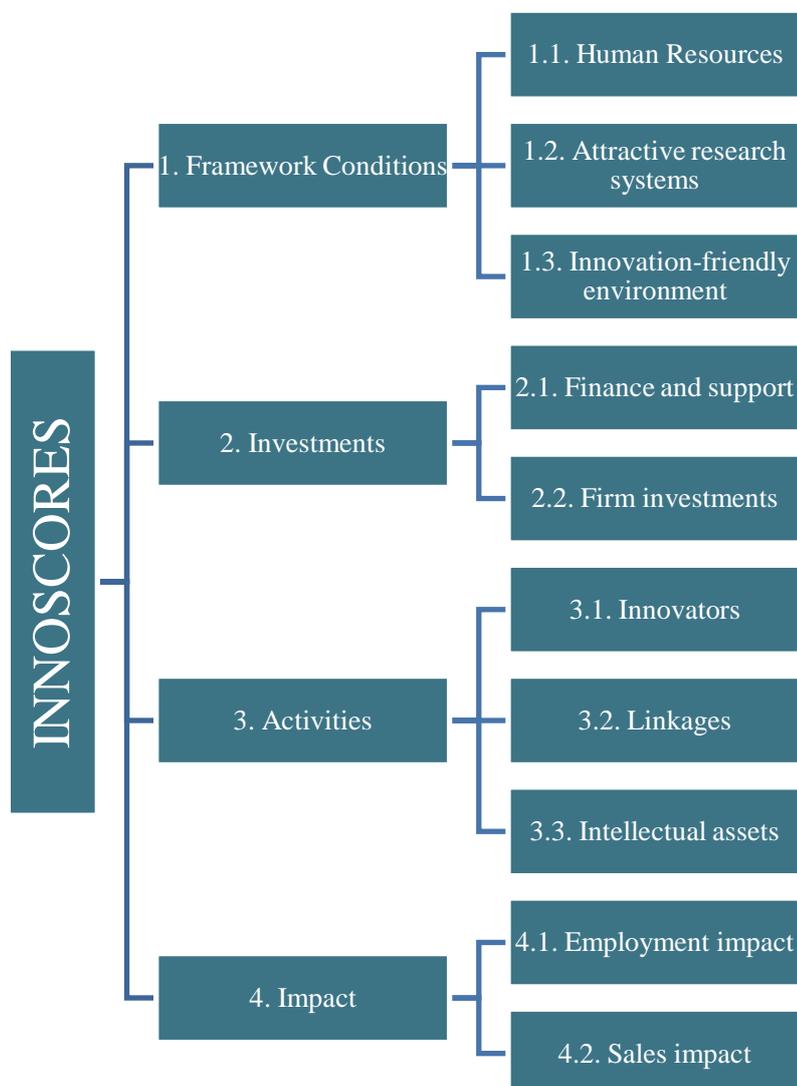
1. Balkan Med countries are EU member countries, or EU applicant countries, it is important to be able to follow their progress when it comes to the innovative potential of their economies against the other EU countries;

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)

There is a 40% growth in absolute numbers of new PhDs in all areas of education, aged 25-34 years, for the period 2010-2016. It marks a period of transition from the old system of education to the new system based on the Bologna Process. As a result there is a growth in the number of completed PhDs, which is a spillover from the old system of studies. The next five years will mark a stabilization period.

Despite growth due to structural changes in the system, the absolute numbers for FYR of Macedonia are very low (numerator). It points to a serious lack of scientific and research work. Serious structural changes in higher education and science in the country are needed in order to achieve better performance on this indicator.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	160	193	161	219	206	246	n/a
Denominator	320,070	321,951	322,851	235,131	326,778	326,318	325,219
EUIS	0.50	0.60	0.50	0.67	0.63	0.63	n/a

Government stakeholders: Ministry of Education and Science; Bureau for Development of Education,

Important documents:

Comprehensive strategy for education 2018-2025 (Draft version)

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. This indicator is not limited only to the natural-scientific and technical bases, since innovation, in many areas, specifically in the service sector, depends on a wide range of disciplines.

Since 2010, there is a steady growth in the value of the indicator for FYR of Macedonia. It is a result of the intensified liberalization of the higher education in the country and the opening of many new private and state universities along with the introduction of dispersed studies of the existing state universities. The trend will continue to grow in the next years due to two specific pre-conditions: the compulsory secondary education and the expanding higher education network in the country.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	69,700	80,600	85,100	85,800	91,700	99,700	104,700
Denominator	320,070	321,951	322,851	325,131	326,778	326,318	325,219
EUIS	21.80%	25.10%	26.30%	26.30%	28.10%	30.60%	32.20%

Government stakeholders: Ministry of Education and Science; Bureau for Development of Education

Important documents:

Comprehensive strategy for education 2018-2025 (Draft version)

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)

In general the indicator has a low and declining value. The decline is mainly driven by the decline in the value of the nominator and the fact that the number of people involved in lifelong learning activities in the country is declining. The lifelong learning covered by this indicator includes all forms of activities, formal and informal, which aim to improve knowledge, skills, and competence of the labour force. This type of education has no tradition in FYR of Macedonia, which is why the numbers in the numerator are low. The activity (lifelong learning) holds strong significance for reducing the unemployment levels as well as improving the capacity for innovation at micro/organizational level. This is why the country needs a structured approach towards increasing this indicator.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	39,630	41,172	47,335	43,015	37,393	30,517	34,155
Denominator (millions)	1.132	1.143	1.154	1.162	1.168	1.173	1.177
EUIS	3.50%	3.60%	4.10%	3.70%	3.20%	2.60%	2.90%

Government stakeholders:

Ministry of Education and Science; Bureau for Development of Education; Lifelong Learning Center;

Important documents:

Comprehensive strategy for education 2018-2025 (Draft version)
Strategy for Vocational Education and Training in the context of Lifelong Learning
Strategy for Adult Education 2016-2020

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	Publication data provided by CWTS (Leiden University) as part of a contract to European Commission (DG Research and Innovation); Population data from Eurostat; http://www.stat.gov.mk/

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

The number of international scientific co-publications is an assessment of the quality of scientific research in the country. In the period 2010-2016 there is a steady growth of the number of scientific publication authored, or co-authored by the scientists in the country. Although in absolute numbers the growth is insignificant, in relative terms i.e. per 1 million population, the indicator shows a 50% growth since 2010. The same increases FYR of Macedonia's position on the indicator relative to the other Balkan and EU countries.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	165	178	198	205	251	276	305
Denominator (millions)	2.053	2.057	2.060	2.063	2.066	2.069	2.071
EUIS	80.40	86.50	96.60	99.40	121.50	133.40	147.30

Government stakeholders: Ministry of Education and Science

Important documents:

Strategy for Education 2016-2020
Law on Higher Education . Official Gazette of RM no.35/2008.
Comprehensive strategy for education 2018-2025 (Draft version)

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).

The period 2010-2016 marks a period of growth in the quality of scientific research as indicated by the growth in absolute number of the publications from FYR of Macedonia researchers published in the top 10 most cited journals. The growth has tripled in the same period. However, having in mind the dynamic of the growth, the absolute value of a 4% rate of published scientific research in the top 10 most cited journals is too low for the size of the academic and research community in the country, along with the radically improved public investment in research infrastructure (investments in laboratories and equipment) which occurred in the period 2010-2015.

There are very few independent scientific institutes in the country, i.e. independent from Universities. The small number of affirmed scientific publications and journals reflects a declining investment in research publications. At the same time, the in-country scientists do not show significant capacity, or interest, for participation in international R&D projects. The same can be due to a large bureaucracy in the functioning of the state universities. The intensive and rapid increase of the higher education infrastructure which happened in the analysed period negatively affected the focus on the scientific work, especially in the engineering areas.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	34	57	26	177	236	127	n/a
Denominator	1,400	1,400	1,510	3,620	5,376	3,095	n/a
EUIS	2.40%	4.10%	1.70%	4.90%	4.40%	4.10%	n/a

Government stakeholders: Ministry of Education and Science;

Important documents:

Strategy for Education 2016-2020
Law on Higher Education . Official Gazette of RM no.35/2008.
Innovations Strategy of RM 2012-2020.
Comprehensive strategy for education 2018-2025 (Draft version)

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 share of foreign students at the doctoral studies reflects the mobility of students and the quality of researchers. One can see from the values of the indictor that there is a strong stagnation of this indicator in the FYR of Macedonia, with values below 5% (very small number of 9-13 students).

The low number of total foreign PhD students in the country is a result of several interconnected factors that reduce the attractiveness of the country for the foreign researchers: (1) the instability in the structure of the PhD studies which were characteristic for the period (transition to the Bologna system), (2) the poor scientific work and few projects. Majority of PhD students come from Kosovo.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	n/a	n/a	n/a	9	13	13	n/a
Denominator	n/a	n/a	n/a	226	131	293	n/a
EUIS	7%	7%	3.90%	4%	9.90%	4.40%	n/a

Government stakeholders: Ministry for Education and Science;

Important documents:

Strategy for Education 2016-2020
Law on Higher Education . Official Gazette of RM no.35/2008.
Innovations Strategy of RM 2012-2020.
Comprehensive strategy for education 2018-2025 (Draft version)

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; Community Survey of ICT Usage; E-commerce in Enterprises; European Innovation Scoreboard 2017; http://www.stat.gov.mk/

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

The total e-potential depends on the creation of e-commerce conditions and the penetration of Internet. The broadband penetration indicator assesses the relative use of this e-potential, indicating the proportion of enterprises that have access to high-speed broadband.

In the FYR of Macedonia, in recent years, there has been a growth of broadband penetration from 6% to 11% among the enterprises, which ranks the country on the 21st place in the EU. The relative growth in the FYR of Macedonia in the past years is about 30%, which counts the country in countries with above average growth in the EU.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	5,285	5,118	5,210	4,990	4,946	5,611	7,867
Denominator	75,497	73,118	74,424	71,290	70,659	70,139	71,519
EUIS	7%	7%	7%	7%	7%	8%	11%

Government stakeholders: Ministry of Information Society and Administration; Agency for Electronic Communications.

Important documents:

National strategy for development of the information society and Action plan;
National strategy for the development of electronic communications with information technologies;
National strategy for next generation broadband with Action plan;

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.

Despite being the first nation in the world when it comes to necessity entrepreneurship, the growth in the motivation of entrepreneurs due to opportunity in the period 2010-2016 indicates change in the context (better laws, improved access to finances and

entrepreneurial education and awareness) and emergence of a more dynamic start-up scene which favours the emergence of the opportunity entrepreneurs.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
EUIS	0.30	0.40	0.50	0.50	0.50	0.40	0.60

Government stakeholders: Ministry of Economy; Ministry for Education and Science; Agency for Promotion of Entrepreneurship of the Republic of Macedonia

Important documents:

Entrepreneurial Learning Strategy of the Republic of Macedonia 2014-2020;
Innovation Strategy of the Republic of Macedonia 2012-2020;
Competitiveness Strategy and Action plan of the Republic of Macedonia 2016-2020.

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)

The very low public R&D investments as a percentage of GDP (0.19%) rank the country on the last 36th place in the EU. It is a result of interplay of factors: passive research community and fewer research projects, low awareness in the decision making level of government for the concept of the knowledge-economy. What is more important, there is a negative perception among the general public for the spillover effects of this investment in the economy, due to the poor collaboration of the research institutions with the business sector.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	13.5	14.33	14.40	15.48	16.26	17.23	n/a
Denominator	7,108.3	7,544.2	7,584.8	8,149.6	8,562	9,072.3	9,722.8
EUIS	0.19%	0.19%	0.19%	0.19%	0.19%	0.19%	n/a

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

Important documents:

Innovation Strategy of the Republic of Macedonia 2012-2020;
Competitiveness Strategy and Action plan of the Republic of Macedonia 2016-2020.
Comprehensive strategy for education 2018-2025 (Draft version)
Law on Innovation Activity. Official Gazette of RM no. 79/2013.

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 amount of venture capital is an indicator for the dynamics of the creation of new businesses. There are no data for FYR of Macedonia in this area. In general this capital is very low if not non-existent in the country, with the emergence of few regional funds which came into the country in recent years Southwestern Venture Capital.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
EUIS	-	-	-	-	-	-	-

Government stakeholders: Ministry of Economy; Ministry of Finance

Important documents:

Innovation Strategy of the Republic of Macedonia 2012-2020;
Competitiveness Strategy and Action plan of the Republic of Macedonia 2016-2020.

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):

Private R&D expenditures rank of the FYR of Macedonia is on the last, 36th place in the EU.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	2.13	2.26	2.27	2.44	2.56	2.72	n/a
Denominator	7,108.3	7,544.2	7,584.8	8,149.6	8,562	9,072.3	9,722.8
EUIS	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	n/a

Government stakeholders: Ministry of Economy; Ministry of Finance

Important documents:

Innovation Strategy of the Republic of Macedonia 2012-2020;
Competitiveness Strategy and Action plan of the Republic of Macedonia 2016-2020.

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 FYR of Macedonia, the value of this indicator is 0.9%, which ranks the country at the low 10th place in the EU. The value of the indicator reflects (1) the intensity of FDIs in the period 2010-2016, when several larger technological companies opened factories in the country and (2) the poor start of the country in this regard due to the rebuilding of the industry, after the challenging privatization.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	117.7	135.2	138.6	142.3	148.14	157.3	n/a
Denominator	13,079	15,028	15,405	15,815	16,460	17,480	18,003
EUIS	0.90%	0.90%	0.90%	0.90%	0.90%	0.90%	n/a

Government stakeholders: Ministry of Economy; Ministry of Finance;

Important documents:

Innovation Strategy of the Republic of Macedonia 2012-2020;
Competitiveness Strategy and Action plan of the Republic of Macedonia 2016-2020.

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; http://www.stat.gov.mk/

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

The use of Information technology in the enterprises is particularly important for the innovations in an increasingly growing digital economy. Bearing this in mind, the share of companies providing ICT training for their employees provides an indicator for the existence of a proactive business community and its search for competitiveness in the knowledge-based areas. In the FYR of Macedonia, on average, about 14% to 17% of the companies provide training, which ranks the country at 23-24 place in EU terms. It is impossible from the trend to determine whether the trend is upward.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	10,570	10,236	10,419	9,980	8,479	11,924	n/a
Denominator	75,497	73,118	74,424	71,290	70,659	70,139	71,519
EUIS	14%	14%	14%	14%	12%	17%	n/a

Government stakeholders: Lifelong Learning Center; Ministry of Information Society and Administration;

Important documents:
Strategy for Vocational Education and Training in the context of Lifelong Learning
National strategy for development of the information society and Action plan;

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 6540 SMEs in all NACE sectors in the FYR of Macedonia which have between 10-249 employees. More than half of them or 3943 belong to the NACE sectors of innovators in 2016.

The indicator provides the findings from two CIS surveys in the country: 2010-2012 and 2012-2014. As a result the values of the nominator and denominator are fixed for three years on the value of the last year of these three year surveys i.e. 2012 and 2014, as provided in the results table.

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.

In general, the values of the indicator although low in absolute values are high in relative terms, i.e. more than 39% of the SMEs belonging to NACE sectors of

innovators have introduced a new product, or a new process in their companies during the surveyed period. It ranks FYR of Macedonia at the 12 position in the EU.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	1443	1443	1443	1,448	1,481	1,481	n/a
Denominator	3,682	3,682	3,682	3,779	3,779	3,779	3,779
Actual value of the Denominator	3,167	3,454	3,682	3,694	3,779	3,853	3,943
EUIS	39.2%	39.2	39.20	39.20%	39.20%	39.20%	n/a

Government stakeholders: Ministry of Economy; Ministry of Finance

Important documents:

Innovation Strategy of the Republic of Macedonia 2012-2020;
Competitiveness Strategy and Action plan of the Republic of Macedonia 2016-2020.

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; 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 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 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 2016).

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.

30% of the SMEs in the NACE innovator categories have introduced marketing innovation, or organisational innovation in the covered period.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	1,134	1,134	1,134	1,164	1,164	1,164	1,164
Denominator	3,682	3,682	3,682	3,779	3,779	3,779	3,779
Actual value of the Denominator	3,167	3,454	3,682	3,694	3,779	3,853	3,943
EUIS	30.80%	30.80%	30.80%	30.80%	30.80%	30.80%	30.80%

Government stakeholders: Ministry of Economy; Ministry of Finance

Important documents:

Innovation Strategy of the Republic of Macedonia 2012-2020;
Competitiveness Strategy and Action plan of the Republic of Macedonia 2016-2020.

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; 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 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 2016).

The percentage of SMEs innovating in-house in FYR of Macedonia is 11.3%, which ranks it on the 31st place.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	416	416	416	427	427	427	427
Denominator	3,682	3,682	3,682	3,779	3,779	3,779	3,779

Actual value of the Denominator	3,167	3,454	3,682	3,694	3,779	3,853	3,943
EUIS	30.80%	30.80%	30.80%	30.80%	30.80%	30.80%	30.80%

Government stakeholders: Ministry of Economy; Ministry of Finance

Important documents:

Innovation Strategy of the Republic of Macedonia 2012-2020;
Competitiveness Strategy and Action plan of the Republic of Macedonia 2016-2020.

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 (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 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 2016).

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.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	353	353	353	363	363	363	363
Denominator	3,682	3,682	3,682	3,779	3,779	3,779	3,779
Actual value of the Denominator	3,167	3,454	3,682	3,694	3,779	3,853	3,943

Government stakeholders: Ministry of Economy; Ministry of Finance

Important documents:

Innovation Strategy of the Republic of Macedonia 2012-2020;
Competitiveness Strategy and Action plan of the Republic of Macedonia 2016-2020.

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. The low value of the indicator is a result of the low values of the nominator. It can indicate two specific moments, either there is a very low to non-existent cooperation between the research institutions and the private sector, the research done has low research quality and does not meet the conditions for publications, or both.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	1	3	1	4	2	2	n/a
Denominator (millions)	2.053	2.057	2.060	2.062	2.066	2.069	2.071
EUIS	0.50	1.50	0.50	1.90	1.00	1.00	n/a

Government stakeholders: Ministry of Education and Science

Important documents:

Comprehensive strategy for education 2018-2025 (Draft version)

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. There is no data for FYR of Macedonia, while the EU average is 0.05% of the EU GDP. In general there is no or very poor cooperation between the private and public entities when it comes to this type of a research collaboration. At the same time there are no specific policies with a potential to change the current situation.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
EUIS	n/a	n/a	n/a	n/a	n/a	n/a	n/a

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

Important documents:

Innovation Strategy of the Republic of Macedonia 2012-2020;
Competitiveness Strategy and Action plan of the Republic of Macedonia 2016-2020.
Comprehensive strategy for education 2018-2025 (Draft version)

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 capacity of companies to develop new products strongly affects their competitive advantage. One of the estimates of this feature is the number of patent applications. The nominator provides the number of the patent applications registered every year in FYR of Macedonia. These are coincidental numbers without any meaning. However the data speaks about the need for a strategy to patent innovations at EU level.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	3		2	1	6	2	n/a
Denominator	17.86	18.15	18.55	19.29	20.59	21.77	22.61
EUIS	0.17	-	0.11	0.03	0.28	0.08	n/a

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

Important documents:

Strategy for Industrial Policy of the Republic of Macedonia 2009-2020
Indirectly in the Innovation Strategy of the Republic of Macedonia 2012-2020;

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).

In the service sector, the trademark has a substantial significance. It provides the origin of the manufactured service, guarantees the consistency of the quality based on the commitment of the company's buyers and it is a certain form of communication i.e. is the basis for publicity and advertising. Despite low values at EU level, the FYR of Macedonia has a positive trend in this area. In the near future the many subventions of agriculture products and their origin will significantly increase the number of trademarks.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	29	31	35	39	38	31	n/a

Denominator	17.86	18.15	18.55	19.29	20.59	21.77	22.61
EUIS	1.65	1.69	1.90	2.04	1.83	1.42	n/a

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

Important documents:

Strategy for Industrial Policy of the Republic of Macedonia 2009-2020
Indirectly in the Innovation Strategy of the Republic of Macedonia 2012-2020;

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):

The design is the outer appearance of the product. The concept by itself is still in the initial stages of adoption in the country. The education process is not adequately covering the concept, nor are the buyers sophisticated to recognise it and search for it practice. Tradition, culture and beliefs are as well not developed well enough to provide a good context for the concept. If there is an adequate strategy in this part of the Innovation potential of the country, the potential for advancement is imminent.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	1	-	1	1	-	-	1
Denominator	17.86	18.15	18.55	19.29	20.59	21.77	22.61
EUIS	0.03	-	0.03	0.03	-	-	0.04

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

Important documents:

Strategy for Industrial Policy of the Republic of Macedonia 2009-2020
Indirectly in the Innovation Strategy of the Republic of Macedonia 2012-2020;

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):

In the group of services based on knowledge-intensive activities, the services are directly delivered to the users (telecommunications for example), which are the inputs of innovative activities of other companies in all sectors of the economy. The value of the nominator and the trend from 2010 implies a slow increasing trend of employment in the knowledge-based sectors. The absolute numbers however are still low.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	1286	1270	1150	1215	1297	1415	n/a
Denominator	17,862	18,151	18,555	19,293	20,599	21,779	22,612
EUIS	7.20%	7%	6.20%	6.30%	6.30%	6.50%	n/a

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

Important documents:

National Employment Strategy of the Republic of Macedonia 2016-2020

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	Total employment for enterprises with 10 or more employees
Interpretation	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	Calculations by European Commission (Joint Research Centre); European Innovation Scoreboard 2017; http://www.stat.gov.mk/

Remark (commentary which explains the numerator or describes certain specifics of the national context): For FYR of Macedonia and others) there is no data.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
EUIS	n/a	n/a	n/a	n/a	n/a	n/a	n/a

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 export of medium and high technology products in the FYR of Macedonia is with a value of about 60% over the EU averages. This high position of FYR of Macedonia in the ranking in recent years, is mainly due to the high-tech FDIs and this trend is expected to continue.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator (millions EUR)	2,853	3,813	3,418	3,659	4,226	3,822	n/a
Denominator (millions EUR)	7,353	9,276	7,495	7,037	7,546	6,717	n/a
EUIS	38.80%	41.10%	45.60%	52%	56%	56.90%	n/a

Government stakeholders: Ministry of Economy, Ministry of Finance; Agency for Foreign Investments and Export Promotion of the Republic of Macedonia;

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 indicator is in in decline due to the overall growth of total exports in the past 6 years mainly driven by the FDIs.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator (millions EUR)	745	934	884	977	1,117	1,013	n/a
Denominator (millions EUR)	1,931	2,420	2,291	2,531	2,947	2,759	n/a
EUIS	38.60%	38.60%	38.60%	38.60%	37.90%	36.70%	n/a

Government stakeholders: Ministry of Economy, Ministry of Finance; Agency for Foreign Investments and Export Promotion of the Republic of Macedonia;

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. http://www.stat.gov.mk/

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 19th place in EU. The nominator and denominator grow together in the same period, indicating increased economic activity and effective commercialisation of innovations by the SMEs in the country.

Results/Analysis:

Year	2010	2011	2012	2013	2014	2015	2016
Nominator	1,295	1,488	1,525	1,565	1,646	1,730	n/a
Denominator	13,079	15,028	15,405	15,815	16,460	17,480	n/a
EUIS	9.90%	9.90%	9.90%	9.90%	9.90%	9.90%	n/a

Government stakeholders: Ministry of Economy, Ministry of Finance

Important documents:

5. Conclusions – National Summative Innovation Score
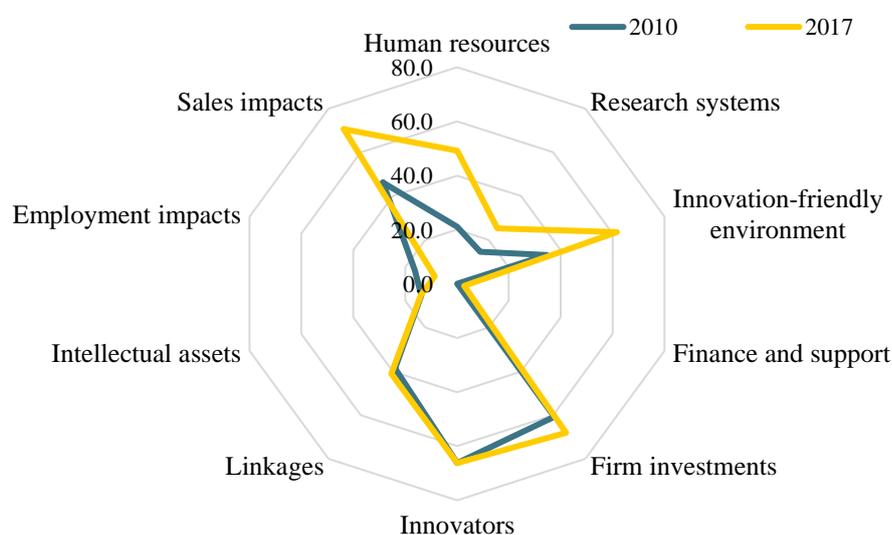
Summary Innovation Index for FYR of Macedonia

Year	2010	2011	2012	2013	2014	2015	2016
SII	33.8	36.6	38.2	36.8	40.5	42.1	44.2

FYR of Macedonia is ranked as the modest innovator in EU terms, which means that the country is among the last ranked countries in innovative potential on the continent. Despite the low categorization, the country has made a notable improvement from 2010 to 2016 as indicated by the National Summative Innovation Score.

The values relation EU in 2010 and 2017 for every sub-index are provided in Figure 1.

Figure 1. FYR of Macedonia values relative to EU 2010-2017

6. **References and Bibliography**

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