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DANUBE REGION strategy Knowledge Society

This project is co-financed by the European Union.

The objective of the Programme Document

This study was conducted within the activities of the Priority Area 7 of the European Union Strategy for the Danube Region.

The study was prepared on the basis of publicly available statistics, published information and documents provided by stakeholders. Additionally, we held discussions with the representatives of ministries of the Danube Strategy countries, plus their scientific, academic and business communities. Finally, we used the results of a questionnaire sent to officially nominated contact persons of the Danube Strategy countries and assessed trends and general market conditions.

We hold the sources of information used for the purposes of t his study to be reliable, however, views expressed in this study may be influenced by possible inaccuracies and/or incompleteness of the quoted data sources.

We believe that the approach employed and assumptions made in this analysis are reasonable; however, due to difficulties in gathering information relevant for R&D in each country, some assumptions related to trends and forecasts might have been omitted and therefore, might influence the final interpretation.

The results of the study represent our view as of June 2015 and are based on information available at the time this work was prepared.

This study is intended solely for the use of the Ministry of Education, Science, Research and Sport of the Slovak Republic and its disclosure to third parties is subject to agreement between the Ministry of Education, Science, Research and Sport of the Slovak Republic and EY.

The views and forecasts in the study may not be considered as inducement or recommendation to engage in any financial transactions. EY shall not be held responsible for any potential loss or damage to any party resulting from decisions or actions based on this study.

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List of abbreviations

Abbreviations	Meaning
AT	Austria
BA	Bosnia and Herzegovina
BG	Bulgaria
BW	Baden- Württemberg
BY	Bavaria
CE	Central Europe (programme)
CEI	Central European Initiative
CF	Cohesion Fund
CIA	Common interest association
CZ	Czech Republic
DCCA	Danube Chambers of Commerce Association
DE	Germany
DR	Danube Region
DRRIF	Danube Region Research and Innovation Fund
DRRIFN	Danube Region Research and Innovation Funding Network
DRRISC	Danube Region Research and Innovation Support Centre
DTC	Danube Transfer Centre
DTP	Danube Transnational Programme
EEIG	European Economic Interest Grouping
EGTC	European Grouping of Territorial Cooperation
ENI	European Neighbourhood Initiative
ENP	European Neighbourhood Policy
ENPI	European Neighbourhood and Partnership Instrument
ERA	European Research Area
ERDF	European Regional Development Fund
ERIC	European Research Initiative Consortium
ESF	European Social Fund
EU	European Union
EUSDR	EU Strategy for Danube Region
FTE	Full Time Equivalent
HR	Croatia
HU	Hungary
IO	International organisation
IPA	Instrument for Pre-Accession Assistance
IUS	Innovation Union Scoreboard
JPI	Joint Programming Initiative
JPND	Joint Programme Neurodegenerative Disease Research
JSC	Joint-stock company
LLC	Limited liability company
MD	Republic of Moldova
ME	Montenegro
OECD	Organisation for Economic Co-operation and Development
OP	Operational Programme
PA	Priority Area

PAC	Priority Area Coordinator
R&D	Research and Development (R&D)
R&I	Research and Innovation
RO	Romania
RS	Serbia
SEE	South-East Europe Programme
SI	Slovenia
SK	Slovakia
SME	Small and Medium Enterprises
TFEU	Treaty on the Functioning of the European Union
TNC	Transnational Cooperation
UA	Ukraine
WG	Working Group
WISE	Western Balkans Innovation Strategy Exercise
WP	Work Package

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1. Introduction

The Danube Region Research and Innovation Fund (DRRIF) is a project of the EU Strategy for the Danube Region (EUSDR) - Priority Area 7 (To develop the Knowledge Society: research, education and ICT) and has the primary goal of mobilizing and distributing funds to support the development of R&I activities in the DR countries.

The Danube Strategy's aim is to create synergies and coordinate existing initiatives and policies in the region. The DR countries are:

- EU Member States: Germany (Federal level, Baden-Württemberg and Bavaria), Austria, Hungary, the Czech Republic, Slovakia, Slovenia, Bulgaria, Romania, Croatia
- Acceding countries: Serbia, Bosnia and Herzegovina, Montenegro
- Other countries: Moldova, Ukraine

Based on the assignment from the Ministry of Education, Science, Research and Sport of the Slovak Republic, it was our task to produce a feasibility study for the DRRIF project and complete documentation that provides a clear definition of the project, its management system, structure and activities, in accordance with its purpose and focus.

The DRRIF Programme Document therefore includes these main chapters:

- An absorption capacity analysis, which was performed on the basis of selected indicators, also including SWOT and PESTEL analyses.
- Analysis of possible cooperation with grant and other schemes that operate in the European environment. Cooperation was analysed from both financial and non-financial points of view.
- Analysis of potential thematic areas DRRIF may support. Analysis includes a proposal of five phases to be executed before thematic areas are chosen. As a conclusion of the analysis, examples of thematic areas to be supported by DRRIF are introduced.
- Proposal of alternatives for DRRIF's goals and mission, including its vision, values, strategy and objectives.
- Analysis of potential legal forms taking into account various geographical and procedural possibilities.
- Proposals for three different institutional forms of DRRIF mirror different needs and points of view on means of improvement of the level of R&I in the Danube region.
- Analysis of the potential funding sources takes into account the three different institutional forms and aims to provide the best funding alternatives for each of them.
- Chapter regarding the approach towards the development of DRRIF grant schemes and calls brings a brief overview on crucial phases in this process.
- Chapter dealing with implementation of DRRIF reflects the current opinions and ideas of DR countries and gives an overview of the timeline and the budget necessary for DRRIF implementation.
- The last part provides communication material with the aim of attracting DRRIF stakeholders and relevant third parties – a presentation including brief executive summary and more detailed outcomes of the feasibility study.

It was not, and is not our responsibility to carry out the implementation of DRRIF. As a result, the following were outside our scope: project management, monitoring, audit, evaluation of grant schemes and any other activities related to project implementation.

2. Sources and data availability for the absorption capacity analysis

Our aim, when producing this study and analyses, was to use official data from reports and databases of Eurostat, OECD, World Bank, Scopus and European Commission (e.g., Innovation Union Scoreboard) as much as possible.

Where official data was not available, we used data from our questionnaire completed by official contact persons. (e.g., "Number of scientific publications among top 10% most cited"). However, we avoided doing this in cases where it could have impacted the consistency and methodology of calculation (e.g., "Employment rate in knowledge intensive industries").

We have used mainly the following sources for the SWOT analysis:

- Eurostat Science, technology and innovation database[1]
- Database World Bank R&D[2]
- OECD Science, Technology and Industry Outlook[3]

Our analyses are based on the most recent data available at the time of this study.

For some Innovation Union Scoreboard (IUS) graphs it was not possible to state their year. This is due to the fact that IUS sets the reference year based on the data availability which for a given year has to reach at least 75% of all countries. Therefore, the majority of indicators refer to one or two years prior to the actual year of report and IUS 2014 uses the reference years of 2011 and 2012 for the majority of its indicators.

The majority of the indicators used in the study come from IUS 2014. As for the missing data that is not analysed in IUS 2014 and had to be supplemented, we primarily used data from 2011 and 2012 in order to adhere to data consistency. Due to this we state the EU 27 (not EU 28) average when using the indicators.

[1] Available at:< http://epp.eurostat.ec.europa.eu/portal/page/portal/science_technology_innovation/data/database>
[2] Available at:< http://data.worldbank.org/indicator/BM.GSR.ROYL.CD/countries>
[3] OECD (2012), *OECD Science, Technology and Industry Outlook* 2012, OECD Publishing. Available at: <http://www.oecd.org/sti/oecdsciencetechnologyandindustryoutlook.htm>

3. Absorption capacity analysis of R&I in the DR

3.1 Methodology of absorption capacity analysis of R&I in the DR

The term absorption capacity [4] generally refers to a country's or organisation's ability to receive and effectively use aid. Relating to the R&D area, this refers to a **country's ability to effectively use resources to support R&D and innovations**.

Absorption capacity analysis of the DR countries is the first and foremost step of DRRIF's feasibility study and it should provide answers to **basic questions** such as:

- Is DRRIF's establishment justifiable?
- If yes, to what extent, which thematic areas and what countries and types of projects should it focus on?
- What is the most effective and suitable model of functioning in order to achieve most effective use of resources?

Finding answers to these questions would help us achieve the final goal of **identifying R&I funding activities that no other institution provides and which are necessary for the development of the whole region.**

In order to evaluate and assess the absorption capacity of the DR[5], we prepared multiple complementary analyses. Our approach was based on well-established academic research and similar studies produced by the European Commission that analyse the state of R&I. Furthermore, it was discussed with the Ministry of Education, Science, Research and Sport of the Slovak Republic, members of the DRRIF working group and officially-nominated contact persons.

- **Quantitative analysis and benchmarking** using analysis of indicators of R&I support, activity and results – section 3.2.
- **Analysis of strengths, weaknesses, opportunities and threats** – section 3.3.
- **PESTEL analysis** of political, economic, social, technical, environmental and legal aspects of the DR as a whole – section 3.4.
- **Analysis of the Danube Region countries participation in selected programmes** – section 3.5.
- All analysed areas of the individual countries were supplemented with **inputs from consultations and questionnaires** obtained from designated contact persons of the DR countries.

Our main goal, when selecting approaches and indicators, was to analyse the most important areas and dimensions:

- R&I area; both private and public sector
- R&D in general and by individual thematic areas of science and research
- The DR as a whole, its countries and also existing clusters
- Qualitative and quantitative aspects – R&D activity and financial indicators

[4] The terms absorption capacity and capability are interchangeable.
[5] For the purpose of this study, the terms "Danube Region" and "Danube Region countries" are considered the same as "countries of the Danube Strategy" – i.e. countries which participate in EU Strategy for the Danube Region.

3.2 Quantitative analysis and benchmarking

If we want to evaluate the state of the DR, we firstly have to understand the R&D level in its individual countries and then compare the results with leaders in R&I.

In order to do so, we selected indicators which, in our opinion, provide relevant information about the state of DR countries and compared them to those of R&I leaders. This comparison presented us with an overview of the current state of R&I in the DR and indicated areas for improvement and its potential.

3.2.1 Methodology

We based the quantitative analysis and benchmarking on **official data** available from publications of the European Commission[6], World Bank database [7] and OECD[8]. For some countries and indicators, we **supplemented** the officially-published data with information from our completed questionnaire, which we obtained from contact persons of these countries[9].

Our aim was to analyse the indicators that are indicative of the most basic research prerequisites (support for R&D, human capital, publications), activities of companies (co-publications, patents) and even final results of R&I (income from patents, employment rate). We used the same logic as in the Innovation Union Scoreboard 2014 (IUS) study to divide them into three categories (prerequisites, activities of companies and outcomes).

The primary aim of the analyses and comparisons was to identify countries and R&I areas with the highest and lowest absorption capacities and at the same time discover the weak spots of R&I that DRRIF could (or should) focus on.

We used only the most crucial indicators of all those analysed [10] in the IUS 2014 in order to produce the absorption capacity analysis (for complete results of this study please refer to section 3.2.11).

When selecting the indicators, we took into account their availability for non-EU countries of the DR. The following three groups of indicators were analysed:

Prerequisites – the main external factors critical for the R&I level:

- **R&D support in the DR countries**
- **Human capital in R&D**
- **Most-cited and international scientific publications**

The goal of this indicator analysis was to identify the level and differences in R&D support, compare key human capital indicators and the quality and extent of publications.

Activities of companies – innovation activities at the company level:

- **Number of public-private co-publications**
- **R&D expenditure in the business sector**
- **Number of patents registered**

The goal of this indicator analysis was to determine the extent of private sector participation on R&I and its collaboration in this area with the public sector for each country of the DR. By comparing this group of indicators and the previous group of prerequisites, we discovered the share of public and private sector R&D expenditure.

Outcomes – impact of companies' innovation activities on:

- **Employment rate in knowledge intensive activities**
- **Innovation in SMEs**
- **Licence and patent revenues from abroad as % of GDP**

The goal of this indicator analysis was to evaluate the impact and benefits of R&I activities. By comparing the level of prerequisites, activities of companies and the outcomes of companies' innovation activities, we

[6] Innovation union scoreboard 2014, Intra-European Cooperation of the ERA Countries compared to International Collaboration
[7] Researchers in R&D, source: World Bank R&D Database: http://data.worldbank.org/indicator/BM.GSR.ROYL.CD/countries
[8] OECD (2013), *OECD Science, Technology and Industry Scoreboard 2013*, OECD Publishing, available at: <http://www.oecd-ilibrary.org/science-and-technology/oecd-science-technology-and-industry-scoreboard-2013_sti_scoreboard-2013-en>
[9] Ukraine, Moldova, Montenegro, Bosnia and Herzegovina, Bavaria a Baden-Württemberg – German states, participating in EUSDR.
[10] Due to the fact that IUS sets the reference year based on the data availability which for a given year has to reach at least 75% of all countries. Therefore, the majority of indicators refer to one or two years prior to the actual year of report and IUS 2014 uses the reference years of 2011 and 2012 for the majority of its indicators.
The majority of the indicators used in the study come from IUS 2014. As for the missing data that is not analysed in IUS 2014 and had to be supplemented, we used primarily data from 2011 and 2012 in order to adhere to data consistency.

investigated the effective use of the prerequisites. We have used the following colour scheme for graphs in the next section:

- EUSDR countries
- R&D leaders
- EU 27 average
- DR average

Due to the limited data availability for some countries of the DR the “DR average” is calculated as an arithmetical average of countries for which the data was available. Due to this, the DR average used in this analysis and for the majority of indicators is not the average of all 14 DR countries. When calculating the average, data for Germany as a whole was used rather than that specific to Baden-Württemberg and Bavaria.

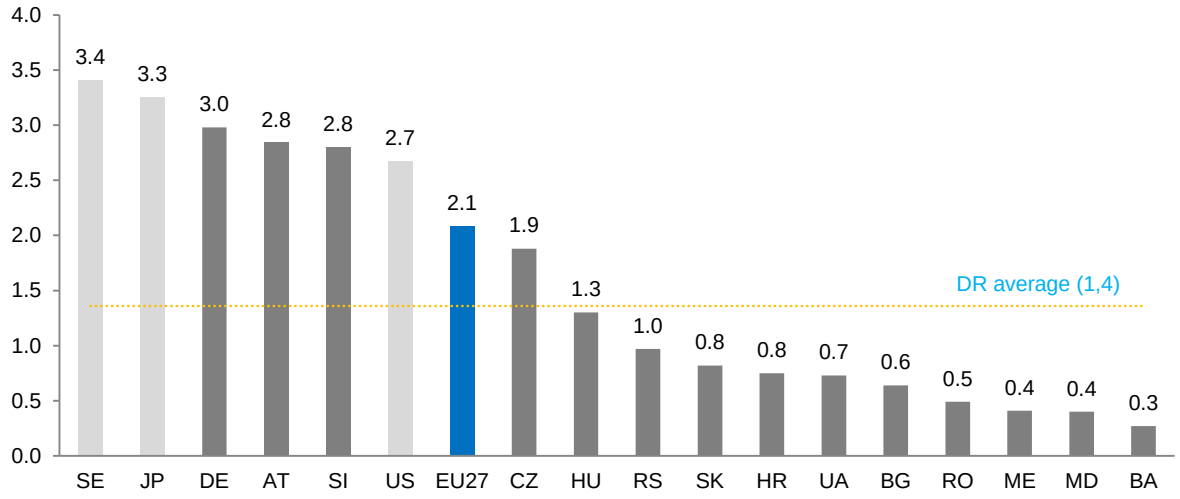
3.2.2 R&D support in the DR countries

One of the most crucial indicators of R&D support in an analysed country is the share of GDP represented by gross domestic R&D expenditure (GERD). The progression of this indicator is considered to predict a country's wealth and competitiveness, its shift towards the knowledge economy and resulting improvements in production technologies and growth stimulation.

The DR as a whole is characterized by GERD below the EU 27 average by 0.7 of a percentage point.

At the same time, there are significant differences in R&D support between leading countries and those lagging behind. **In some cases, there is even a 10-fold difference.**

Graph 1: Gross domestic R&D expenditure (% GDP) for the year 2012[11] – GERD*



Source: Eurostat, Erawatch[12]
* Gross domestic R&D expenditure (GERD) comprise: business enterprise expenditure on R&D (BERD), higher education expenditure on R&D (HERD), government intermural expenditure on R&D (GOVERD) and non-profit expenditure on R&D (PNPRD). GERD by sectors can be found in Appendix 1
** GERD (2011) Bavaria = 3,1 %; GERD (2011) Baden-Württemberg = 5,1 %

Germany and Austria, which are the DR's most economically-developed countries, have the highest expenditure on R&D. GERD in Germany (3% of GDP) and Austria (2.8% of GDP) is even higher than that of the USA, which is considered to be one of the R&D leaders. On the other hand, countries like Moldova, Montenegro and Bosnia and Herzegovina have the lowest GERD.

Germany has the highest GERD among DR countries, which is 10 times higher than Bosnia and Herzegovina's, representing the lowest.

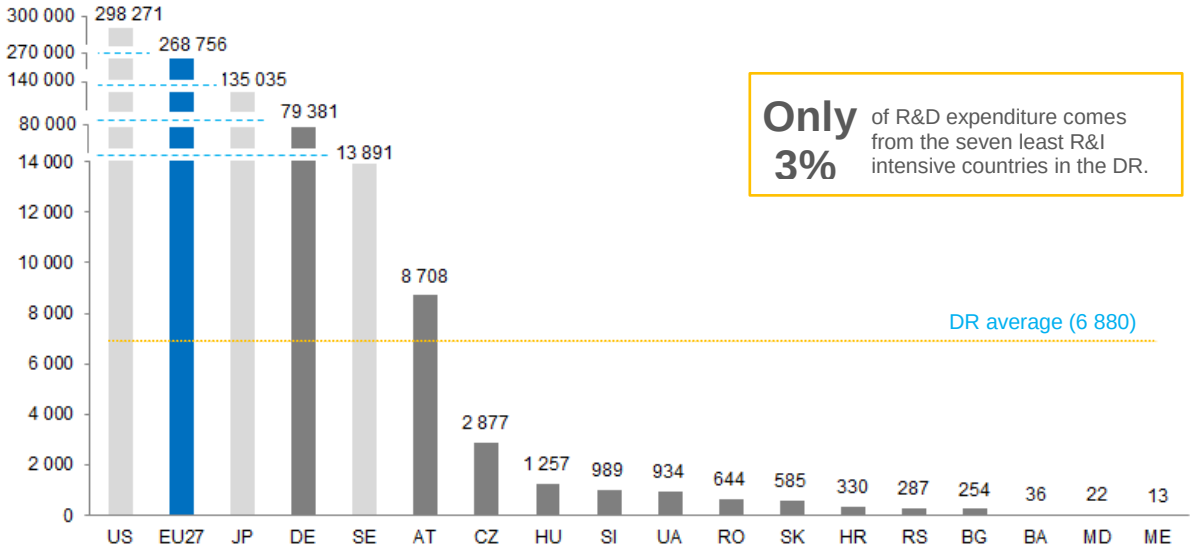
Apart from Germany and Austria, the Czech Republic and Slovenia also have GERD above the DR average.

These statistics indicate that the countries have various motivations when it comes to R&D. As the OECD Science, Technology and Industry Outlook 2012[13] suggests, the countries on the right side of the graph should invest mainly in infrastructure and the quality of the education system and qualification of workers in the education and R&D sectors. These areas should be integrated and benefit from the potential synergies. Countries that are in the initial stages of R&D development should create R&D infrastructure and **focus on priority areas of the country's development and those which are the cause of its economic and environmental problems.** Conversely, countries on the left side of the graph should concentrate on effective R&D management and overall optimisation with emphasis on added value and returns from investment. Moreover, these differences in R&D motivation and goals were further confirmed by the SWOT analysis of each country, discussions and questionnaires answered by the official contact persons.

In countries with GERD below the DR average, DRRIF could focus on marketing and lobbying tasks. One of the goals could be consistent marketing support of R&D in those countries. The differences in R&D are even more substantial when expressed in absolute terms.

[11] Due to unavailable data, we have used data from the following years: US, UA, ME, BW and BY – 2011, JP – 2010
[12] Data for MD, BA, ME and UA come from Erawatch, remaining data are from Eurostat.
[13] OECD (2012), *OECD Science, Technology and Industry Outlook* 2012, OECD Publishing, available at: <http://www.oecd.org/sti/oecdsciencetechnologyandindustryoutlook.htm>

Graph 2: Gross domestic R&D expenditure in absolute terms for 2012[14] (million EUR) – GERD*



Source: Eurostat, Erawatch[15]
* Gross domestic R&D expenditure (GERD) comprise: business enterprise expenditure on R&D (BERD), higher education expenditure on R&D (HERD), government intermural expenditure on R&D (GOVERD) and non-profit expenditure on R&D (PNPRD).
** GERD (2011) Bavaria = 14 382 mil. EUR %; GERD (2011) Baden-Württemberg = 19 448 mil.

The data on gross domestic R&D expenditure suggests that the aggregate R&D support in the DR countries is almost 51 billion EUR, of which 67% comes from Baden-Württemberg and Bavaria. Therefore, the remaining 13 countries have only a 33% share of the region's GERD. This statistic presents an important finding – **one of the DR countries clearly has a significantly dominant position in R&D**.

The goal of the European Commission for the Danube Strategy is to invest 3% of GDP in R&D by 2020. This means the region's GERD (only Bavaria and Baden-Württemberg's expenditure from whole Germany is included) should reach approximately 205 billion EUR in 2020 - a 154 billion increase compared to the current situation. A greater rate of coordination and cooperation among countries and proper functioning (or establishment) of institutions, which ensure coordination, would help to more effectively use these resources (effectiveness is a basic presumption of absorption capacity).

A large number of the DR countries has substantially underfinanced R&D and a brief comparison with the leading countries shows the need for additional financing – which has been declared in strategic documents. Both of these facts imply there is a need for additional R&D resources in the DR countries.

A quick look at the current utilisation of available EU Structural Funds shows noteworthy deficiencies in the 2007 to 2013 programme period[16]. The average utilisation of all the available EU Structural Funds by the EU Member States of the DR was merely 36.3% in January 2013. Therefore, better utilisation and removal of bottlenecks is a prerequisite for successful development of R&D.

Conclusions

- Better coordination among countries and proper functioning (or establishment) of institutions, which ensure coordination, will help to more effectively use R&D expenditure.
- The significantly dominant position of the upstream countries needs to be taken into consideration when considering joint funding and cooperation mechanisms.

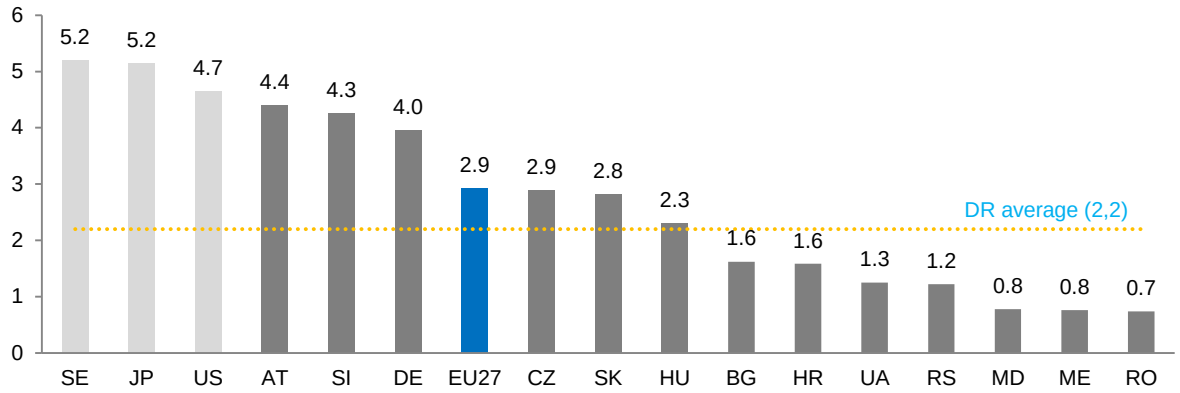
[14] Due to unavailable data, we have used data from the following years: US, UA, ME, BW and BY – 2011, JP – 2010
[15] Data for MD, BA, ME and UA come from Erawatch, remaining data are from Eurostat.
[16] The statistic includes all operational programmes and not only those solely focused on R&D and innovations

3.2.3 Human capital in R&D

From the long-term perspective, the quality of the human capital in R&D is the most critical prerequisite for growth in this area. In this part of the analysis, we evaluated the current situation – the number of researchers and the predisposition for future growth – regarding the number of doctorate graduates in R&D in the DR.

Among the DR countries, the highest share of researchers working in R&D (per 1000 population) is in Austria, Slovenia and Germany with values above the EU average. Lately this indicator could have been significantly affected by "brain drain", which was identified as a considerable phenomenon both by the DR delegates and the SWOT analyses. The average number of researchers in the DR is less than half of those countries with a high level of R&D.

Graph 3: Number of researchers* in R&D (per 1000 population) in 2011



Source: World Bank[17], EY questionnaire sent to officially-nominated contact persons
Due to unavailable relevant data, the graph and the DR average does not include the following countries: Bosnia and Herzegovina (BA), Baden-Württemberg (BW) and Bavaria (BY)
* Researchers in R&D are professionals engaged in the conception or creation of new knowledge, products, processes, methods, or systems and in the management of the projects concerned. Postgraduate PhD students (ISCED97 level 6) engaged in R&D are included.

The lower number of researchers per 1000 population indicates a smaller scientific and research community participating in R&D. Just to illustrate, Slovenia and Austria's community, in relative terms, is two and a half times larger than that of Bulgaria and Croatia, and six times larger than that of Moldova, Montenegro and Romania.

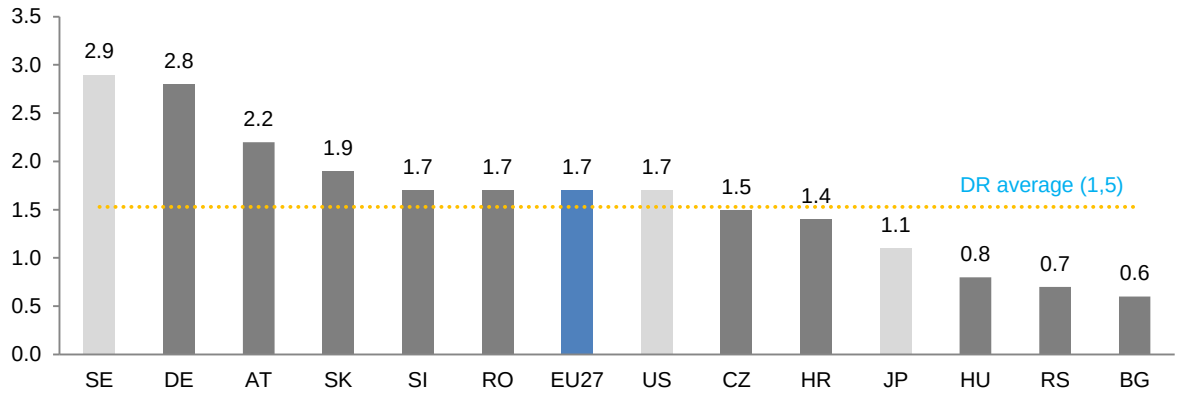
The OECD Science, Technology and Industry Outlook 2012[18] suggests that improving skills, education, technologies, engineering and mathematical abilities affect innovations more than modernization and improving tangible and intangible assets used in R&D. If DRRIF is to support the development of R&D in the DR, it will be key to focus on the advancement of the human capital in those countries that are below the EU 27 average, for example through improving the mobility of doctorate graduates and scientists within the region, or by creating scholarship programmes.

There are multiple human capital strategies possible in R&D and they should all be considered when setting DRRIF's goals. For example, even people abroad should be informed about the calls so they can return to their domestic countries and participate in R&D, and additionally, educate R&D staff and support its development of excellent science. Furthermore, the communication regarding possible funding options should be more thorough in countries with a low R&D intensity and less-experienced R&D staff.

When creating quality R&D teams, it is important to increase the rate of competitive (grant) funding and consider the necessity of institutional funding (this form of funding should be used only in those R&D areas, which are a country's priority but currently are not as attractive as other areas).

[17] World Bank R&D database, available at:<http://data.worldbank.org/indicator/BM.GSR.ROYL.CD/countries>
[18] OECD (2012), *OECD Science, Technology and Industry Outlook* 2012, OECD Publishing, available at:< http://www.oecd.org/sti/oecdsciencetechnologyandindustryoutlook.htm>

Graph 4: New doctorate graduates per 1000 population aged 25-34[19]



Source: Innovation Union Scoreboard 2014
Bavaria (BY) = 2,7
Due to unavailable relevant data, the graph and the DR average does not include the following countries: Bosnia and Herzegovina (BA), Baden-Württemberg (BW), Montenegro (ME), Moldova (MD) and Ukraine (UA).
Indicator "New doctorate graduates (ISCED 6) per 1 000 population aged 25 – 34" is a measure of the supply of new second-stage tertiary graduates in all fields of training in the given year.

The number and quality of doctorate graduates and R&D staff is the basic prerequisite of R&D. However, the indicator does not take the quality of the doctorate graduates into consideration and neither does it consider their utilisation and contribution to R&D. Particularly in less R&I intensive countries, there is a higher number of postgraduate students without utilisation which is correlated to high youth unemployment rates. The average number of doctorate graduates in the DR is slightly below the EU 27 average. Out of all DR countries, Germany has the best results at one end and Bulgaria has the worst at the other.

Conclusions

- An essential prerequisite for R&D growth in the DR is the better utilisation of human capital, particularly in countries with low R&D intensity.
- In order to discover potential synergies of cooperation and to achieve competitive advantage, it is important to know the human capital capacity in each thematic area of R&D in the DR countries.
- We recommend that one of DRRIF's goals should be the promotion and increase of young scientist participation in R&D projects (e.g., part of each project should include the participation of students).

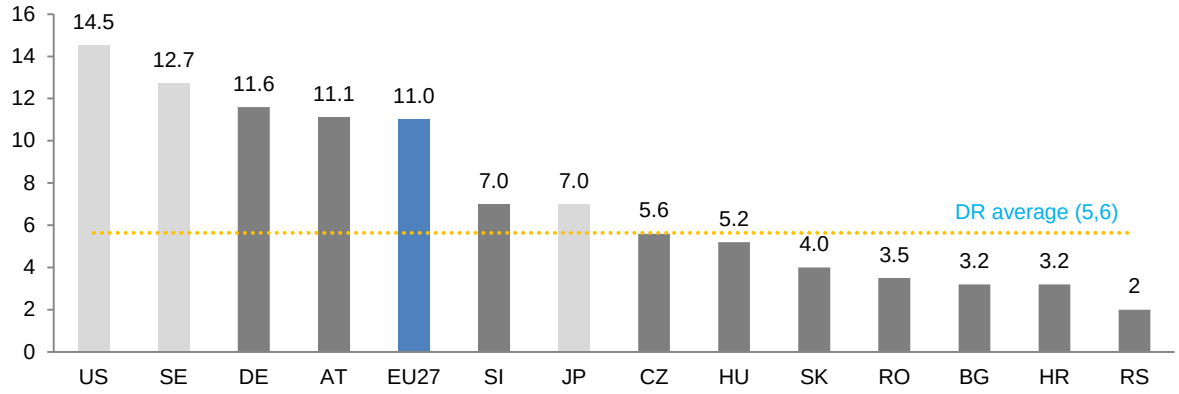
[19] Indicator "New doctorate graduates (ISCED 6) per 1 000 population aged 25 – 34" is a measure of the supply of new second-stage tertiary graduates in all fields of training in the given year.

3.2.4 Most cited and international publications

One of the most commonly-used indicators of R&D effectiveness is the "Scientific publications among the top-10% most-cited publications worldwide as % of total scientific publications of the country", since more cited publications are often considered to be higher quality.

Among the DR countries, Germany and Austria have the highest number of the most-cited publications and their quality is comparable to that of R&D leaders, slightly above the EU average. Additionally, the scientific publications of Slovenia are also above the DR average. On the other hand, Romania, Bulgaria and Croatia have the least amount of scientific publications among the top 10%. The substantial difference in cited publications between Germany, Austria and the rest of the EUSDR should be noted (twice or even three times as many).

Graph 5: Scientific publications among the top 10% most-cited publications worldwide as % of total scientific publications of the country



Source: Innovation Union Scoreboard 2014
Due to unavailable relevant data, the graph and the DR average does not include the following countries: Bosnia and Herzegovina (BA), Baden-Württemberg (BW), Bavaria (BY), Montenegro (ME), Moldova (MD) and Ukraine (UA).

One of the Danube Strategy's objectives is also the support of international R&D and cooperation. The matrix below shows an overview of pairwise collaboration affinity on scientific publications. A quick look reveals that cooperation of Germany with other countries is rather less intensive, which is also the case for Romania. However, the results of other countries are very positive as they are better than expected. Only Germany and Romania had a lower rate of cooperation.

Matrix 1: Pairwise collaboration affinity [20] between ERA countries in 2008 – 2011

	AT	BG	CZ	DE	HR	HU	RO	SI	SK
Austria		2,1	2,9	3,8	3,0	3,5	2,1	3,8	3,9
Bulgaria	2,8		4,2	2,6	5,7	6,0	6,9	2,4	5,5
Czech Republic	2,4	2,5		1,5	2,6	2,8	1,8	3,0	13,3
Germany	2,8	1,3	1,3		1,0	1,2	1,1	0,9	1,0
Croatia	2,5	3,7	2,7	1,1		4,0	1,9	13,2	2,5
Hungary	3,4	4,0	3,3	2,0	4,3		6,5	3,2	4,6
Romania	1,3	3,2	1,4	0,9	1,4	4,2		1,8	2,4
Slovenia	4,2	1,9	4,1	1,5	16,7	3,8	3,2		6,3
Slovakia	4,5	4,5	19,0	1,8	3,2	5,7	4,5	6,4	

Source: Intra-European Cooperation of the ERA Countries, Computed by Science-Metrix using Scopus 2008-2011[21], selected data from Appendix 2, processed by EY
Due to unavailable relevant data, the graph and the DR average does not include the following countries: Bosnia and Herzegovina (BA), Baden-Württemberg (BW), Bavaria (BY), Montenegro (ME), Moldova (MD), Serbia (RS) and Ukraine (UA).
The matrix expresses pairwise collaboration affinity of two given countries on scientific publications. Decreases are in red, whereas increases are in green.
* The matrix includes the DR countries that are in European Research Area (ERA)
** The DR average = 3,78 (calculated by EY)

[20] The matrix is asymmetric; the numbers in each cell give the affinity of the country in the corresponding column towards collaborating with the country in the corresponding row for 2008–2011. Empty cells either reflect the fact that the indicator is not applicable (i.e., the diagonal of the matrix) or that the data could not be computed because there were not enough publications/co-publications. The scale-adjusted collaboration affinity measures whether a given country (country A) collaborates more (i.e., score above 1) or less (i.e., score below 1) than expected with another country (country B) by calculating the ratio of its observed number of co-publications with country B (based on full counting) over the expected number given the size of the scientific production of country B (i.e., its number of published papers obtained using full counting). This indicator is therefore asymmetric.

Based on the matrix below, we can conclude that the pairwise collaboration affinity on publications is much higher than the ERA member countries median. The DR average (3.78) is significantly greater than the ERA median (1.71). Yet again, a lower affinity of Germany with the Czech Republic, Croatia, Romania and Slovenia and vice-versa can be noted. However, Romania's affinity is high with almost all countries except for Austria, Czech Republic, Germany and Croatia.

Matrix 2: Pairwise collaboration affinity compared to ERA median in 2008 – 2011

	AT	BG	CZ	DE	HR	HU	RO	SI	SK
Austria		2,1	2,9	3,8	3,0	3,5	2,1	3,8	3,9
Bulgaria	2,8		4,2	2,6	5,7	6,0	6,9	2,4	5,5
Czech Republic	2,4	2,5		1,5	2,6	2,8	1,8	3,0	13,3
Germany	2,8	1,3	1,3		1,0	1,2	1,1	0,9	1,0
Croatia	2,5	3,7	2,7	1,1		4,0	1,9	13,2	2,5
Hungary	3,4	4,0	3,3	2,0	4,3		6,5	3,2	4,6
Romania	1,3	3,2	1,4	0,9	1,4	4,2		1,8	2,4
Slovenia	4,2	1,9	4,1	1,5	16,7	3,8	3,2		6,3
Slovakia	4,5	4,5	19,0	1,8	3,2	5,7	4,5	6,4	

Source: Computed by Science-Metrix using Scopus 2008 – 2011, selected data from Appendix 2, processed by EY
Due to unavailable relevant data, the graph and the DR average does not include the following countries: Bosnia and Herzegovina (BA), Baden-Württemberg (BW), Bavaria (BY), Montenegro (ME), Moldova (MD), Serbia (RS) and Ukraine (UA).
The matrix expresses pairwise collaboration affinity of two given countries in comparison with ERA median (MED = 1,71). Red colour indicates that the values are below median and green colour that the values are above. The DR median (for countries that are in ERA) is MED = 3,02, and the DR average is AVRG = 3,78 (calculated by EY)

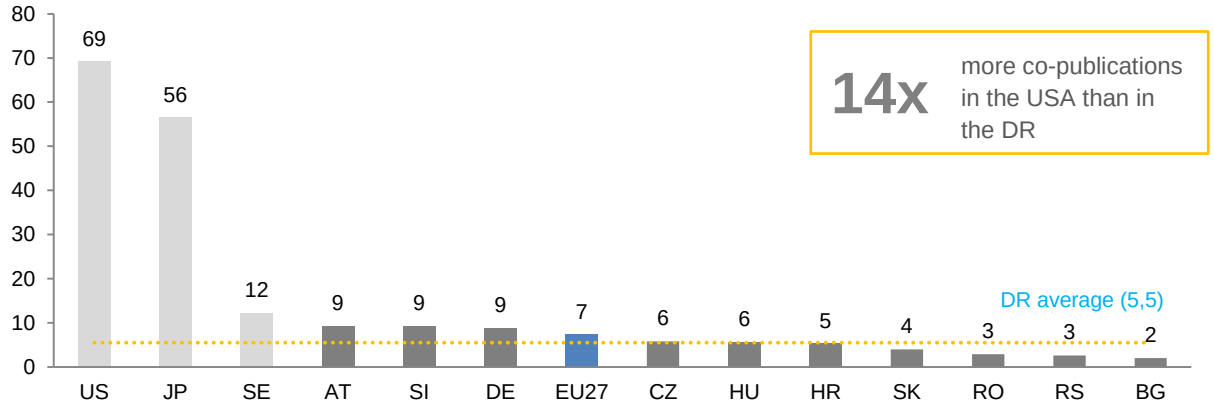
Conclusions

- Pairwise cooperation in the DR is in general quite intensive compared to that of ERA countries.
- To increase the use of the R&D potential in the Danube Region, it is important to improve cooperation mechanisms of scientists from upstream countries with scientists from downstream countries.
- It is important to assess the causes of different levels of cooperation in the Danube countries (e.g., country size, language barriers, innovation capabilities, or other).

3.2.5 Public-private co-publication in the DR

This indicator measures the active cooperation of private and public sectors, which results in academic publications and reveals to what degree public and private sectors are connected.

Graph 6: Private-public co-publications (per million population)



Source: Innovation Union Scoreboard 2014
Baden-Württemberg (BW) = 0,53 and Bavaria (BY) = 0,56
Due to unavailable relevant data, the graph and the DR average does not include the following countries: Bosnia and Herzegovina (BA), Montenegro (ME), Moldova (MD) and Ukraine (UA).

Austria, Slovenia and Germany all have the same level of private-public co-publications and the private-public cooperation in these countries is above the EU average. On the other hand, Bulgaria has the lowest number of co-publications out of all DR countries.

Compared to global R&D leaders, the DR countries seem slightly closed off to public-private co-publications. In the majority of the DR countries, the involvement of the private sector in R&D is much lower, which was also confirmed by the SWOT analyses of the countries and our questionnaire.

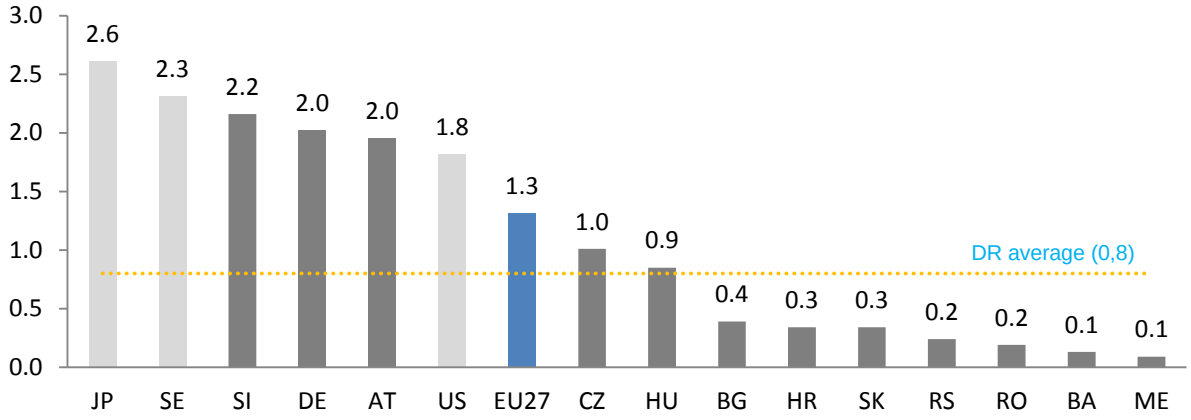
Conclusions

- Based on the analysis of this indicator, we can conclude that the whole DR, compared to R&D leaders like the USA and Japan, lags behind in public-private R&D cooperation and public-private R&D cooperation needs the attention of all the DR countries.
- DRRIF could connect the academic sector with the business sector through joint projects and events or even include them in its administrative bodies.

3.2.6 R&D expenditure in the business sector

Another analysed indicator displays the knowledge creation in business, which is crucial, mainly for R&I-oriented sectors such as the pharmaceutical or chemical industries, where most knowledge originates in a laboratory environment.

Graph 7: Business sector expenditure on R&D (% GDP)



Source: Eurostat
Baden-Württemberg (BW) = 4,07 and Bavaria (BY) = 2,4, data for 2011
Due to unavailable relevant data, the graph and the DR average does not include the following countries: Moldova (MD) and Ukraine (UA).

In parallel with gross domestic R&D expenditure (GERD), the share of business sector expenditure on R&D is the highest in Slovenia, Austria and Germany. However, one slight difference in this comparison shows that the business sector in Slovenia[22] spends more on R&D, in terms of GDP share, than that of Germany and Austria, thus reversing the corresponding ranking for GERD.

Nonetheless, the majority of the DR countries lag behind the EU average and there are large differences in business expenditure on R&D which further confirms the diversity among the countries of the Danube Strategy.

We believe that the EUSDR implementation could profit from the increased involvement of the private sector, be it in general awareness activities, participation in events or the development of joint projects.

Conclusions

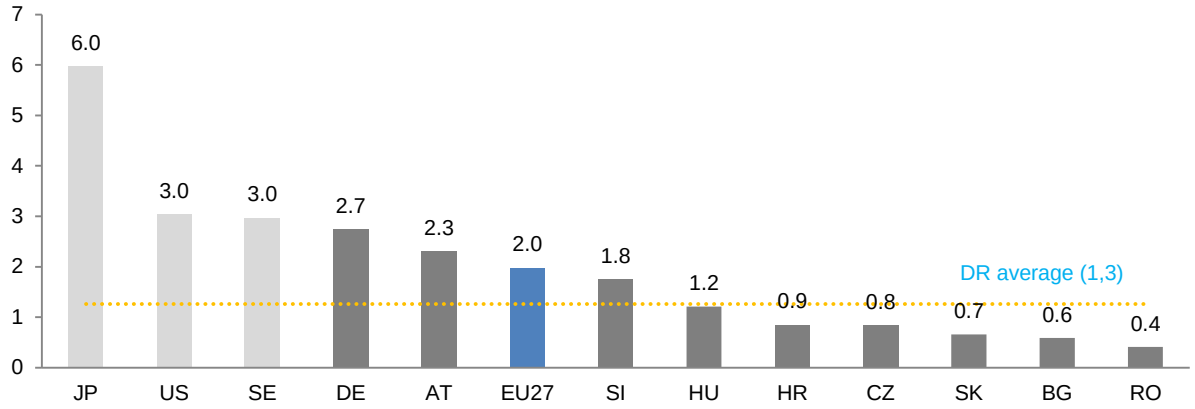
- There is room for improvement in terms of business sector representative involvement in the Danube Strategy.
- The business sector spends its resources mainly on development and innovation. If DRRIF managed to obtain funding from the business sector, this would probably be linked to application-oriented topics and instruments.
- Repayable funding is underused and could be utilised better.
- According to macro-economic theories, the increase of public R&D expenditure translates into an increase in business expenditure on R&D. Therefore, increased public spending by currently less R&I-intensive countries could also trigger responding business sector investments.

[22] The R&D expenditure in the business sector in Slovenia has increased by almost three-fold from 2005 (0,86% GDP) to 2012 (2,2% GDP)

3.2.7 Registered patents in the DR countries

This section analyses patents in the DR, since the ability to develop new products and procedures is crucial for a company's competitive advantage. One of the indicators is the number of patent applications submitted within the Patent Cooperation Treaty[23] (PCT) to the European Patent Office (EPT). To compare the cooperation of two countries, we used official patent data from the EPT.

Graph 8: PCT patent applications per billion GDP



Source: Innovation Union Scoreboard 2014
Due to unavailable relevant data, the graph and the DR average does not include the following countries: Bosnia and Herzegovina (BA), Montenegro (ME), Moldova (MD), Serbia (RS), Ukraine (UA), Baden-Württemberg (BW) and Bavaria (BY).

The graph shows the number of patent applications within the PCT per billion GDP. The patents are assigned, based on the applicant's residence. A company's ability to develop new products is pivotal to its competitive advantage and the number of patent applications is also a prerequisite for its ability to innovate.

Among the DR countries, Germany and Austria both score above the EU average in terms of patents. However, the average of the DR as a whole is far below the EU's and there is a seven-fold difference between the most (Germany) and the least (Romania) dominant countries. Although, the data for five countries was not available, it can be safely assumed that the number of patent applications is below the EU 27 average, since this was also identified in the questionnaire and during discussions with the official contact persons.

Matrix 3: Pairwise patent co-applicants registered by EPO [24] from 2009 to 2011

(327) Austria	**AT**										
(10) Bulgaria	1	**BG**									
(57) Czech Republic	3	0	**CZ**								
(1189) Germany	263	5	27	**DE**							
(9) Croatia	1	0	0	2	**HR**						
(85) Hungary	5	0	2	37	2	**HU**					
(15) Romania	1	0	0	7	0	1	**RO**				
(28) Slovenia	3	2	1	7	2	2	0	**SI**			
(21) Slovakia	3	0	5	10	0	1	0	0	**SK**		
(259) Sweden	11	0	2	103	0	16	0	7	0	**SE**	
(291) Japan	4	0	1	102	0	2	1	0	0	13	**JP**
(977) USA	32	2	16	625	2	17	6	4	2	106	167

Source: Eurostat, Average of years 2009 – 2011, calculated and processed by EY
Due to unavailable relevant data, the graph and the DR average does not include the following countries: Bosnia and Herzegovina (BA), Montenegro (ME), Moldova (MD), Serbia (RS) and Ukraine (UA).

[23] Patent cooperation treaty: http://www.wipo.int/pct/en/
[24] EPO – European Patent Office

The matrix above shows the intensity of country pairwise cooperation on patents. There is intensive cooperation between Germany and Austria, which are also the patent leaders in the DR. If we ignore countries with a significantly low number of registered patents which skew the results, the cooperation of the Czech Republic and Germany, Hungary and Germany, Slovakia and Germany is quite intensive. Nevertheless, the Czech Republic, Bulgaria, Croatia, Romania, Slovenia and Slovakia did not cooperate with multiple DR countries at all during the examined time period.

According to the International Patent Classification (IPC), the highest number of patents registered for the years 2006 to 2010 was in the areas of "Performing operation, transportation", which is dominated by patents from the automobile industry, and "Mechanical engineering, lighting, heating, weapons and blasting", which is dominated by mechanical engineering patents. Surprisingly, a closer examination of the categories showed that the DR countries have registered most patents in "Human necessities", specifically medical and veterinary sciences, and "Physics"[25], namely measuring and testing. A more detailed overview can be found in Appendix 3.

Conclusions

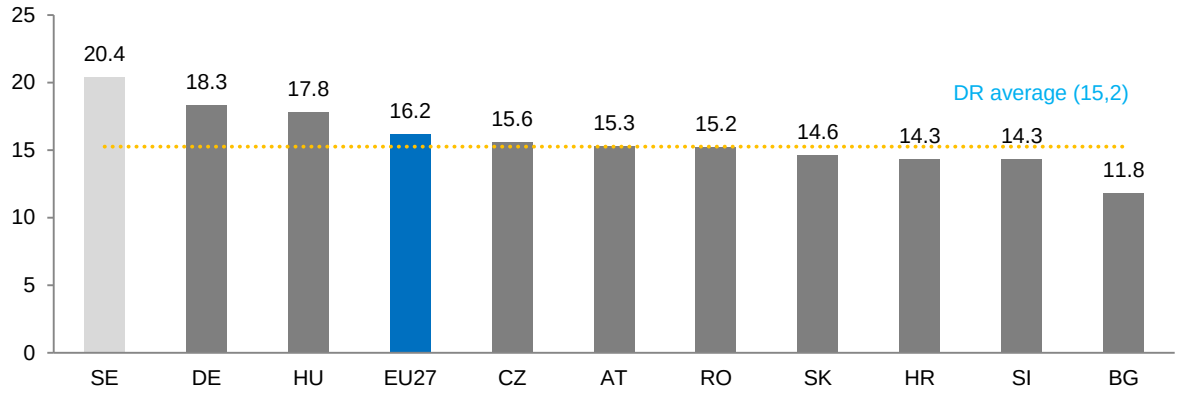
- There is significant room for improvement in the patents area as both the aggregate number of patents and co-patents could be increased.
- However, we assume that DRRIF's activities for improvement in this area are limited. (e.g., cooperation within the EUREKA scheme might help towards improving patent statistics).

[25] Detailed overview can be found in Appendix 3. It comprises data from: Bulgaria, Czech Republic, Germany, Baden-Württemberg, Bavaria, Hungary, Austria, Romania, Slovenia and Slovakia. Due to unavailable relevant data, the graph and the DR average does not include the following countries: Bosnia and Herzegovina, Montenegro, Croatia, Moldova, Serbia, Moldova, Ukraine.

3.2.8 Employment rate in innovative and knowledge-intensive industries

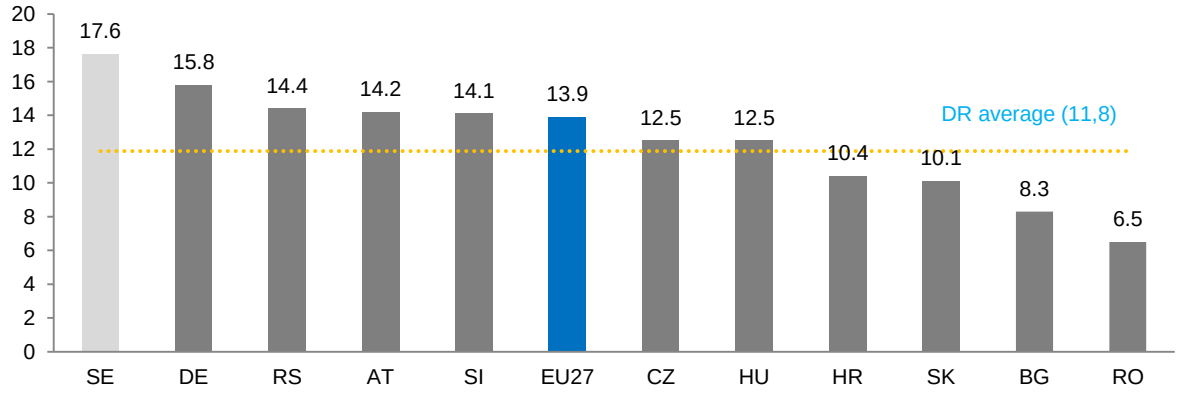
The first indicator shows the share of employees in fast-growing companies in innovative sectors (as classified by Eurostat). The second indicator displays the share of employees in knowledge-intensive industries[26], which provide services directly to consumers and inputs to the innovative activities of other companies.

Graph 9: Employment rate in fast-growing enterprises in innovative sectors [27] (% total employment rate)



Source: Innovation Union Scoreboard 2014
Due to unavailable relevant data, the graph and the DR average does not include the following countries: Bosnia and Herzegovina (BA), Montenegro (ME), Moldova (MD), Serbia (RS), Ukraine (UA), Baden-Württemberg (BW) and Bavaria (BY)

Graph 10: Employment rate in knowledge-intensive industries



Source: Innovation Union Scoreboard 2014
Due to unavailable relevant data, the graph and the DR average does not include the following countries: Bosnia and Herzegovina (BA), Montenegro (ME), Moldova (MD), , Ukraine (UA), Baden-Württemberg (BW) and Bavaria (BY)

The average DR employment rate in these industries is approaching the EU 27 average. For four countries of the DR, the employment rate in knowledge-intensive industries is even above the EU 27 average.

Conclusions

- Both indicators demonstrate sufficiently-educated human capital in the whole DR.
- Some DR countries are above the EU 27 average or are approaching it, thanks to the activities of international companies which provide know-how.
- We consider it important that similar measures to those in the knowledge-intensive business sector (people mobility, foreign investments, and political support) need to be put in place in order to further develop the human capital.

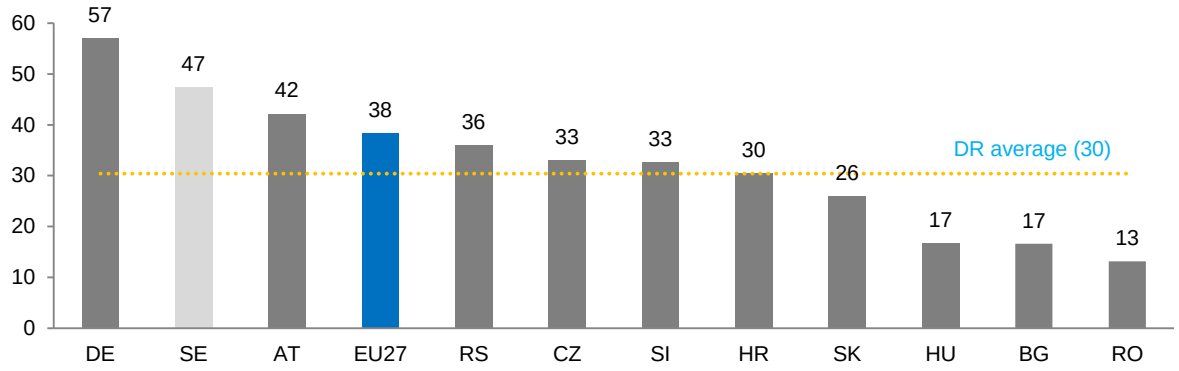
[26] Knowledge-intensive sectors are defined, by Eurostat, as industries, where at least 33% of employment has higher education degree (ISCED5 or ISCED6).
[27] The sum of sectoral results for the employment in fast-growing enterprises by economic sector miltiplied by the innovation coefficients of the sectors. Fast-growing enterprises are defined as firms with average annualised growth in employees of more than 10% a year, over a three-yer period, and with 10 or more employees at the beginning of the observation period.

3.2.9 Innovations in SMEs

Small and medium enterprises (SME) are a key source of innovations. The Community Innovation Survey monitors the share of SMEs introducing product or process innovations and the share of SMEs implementing marketing or organisational innovation. As a result, a higher share of innovations should translate into a higher level of existing innovation activities.

Technological innovations, which are measured in the implementation of new products (goods or services) and processes, are crucial for innovation in the production activity.

Graph 11: SMEs [28] introducing product and process innovations (% of SMEs)

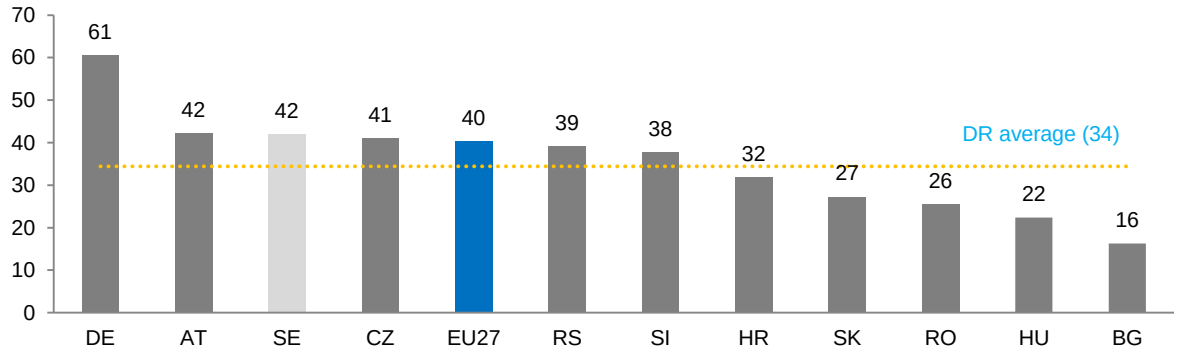


Source: Innovation Union Scoreboard 2014
Due to unavailable relevant data, the graph and the DR average does not include the following countries: Bosnia and Herzegovina (BA), Montenegro (ME), Moldova (MD), Ukraine (UA), Baden-Württemberg (BW) and Bavaria (BY).
*Number of SMEs who introduced a new product or a new process to one of their markets.

The countries with the highest number of technological innovators are Germany and Austria, followed by Serbia, the Czech Republic and Slovenia.

Many businesses, especially in the services sector, introduce non-technical **innovations** in areas such as **marketing or organisation.**

Graph 12: SMEs introducing marketing and organisational innovations (% of SMEs)



Source: Innovation Union Scoreboard 2014
Due to unavailable relevant data, the graph and the DR average does not include the following countries: Bosnia and Herzegovina (BA), Montenegro (ME), Moldova (MD), Ukraine (UA), Baden-Württemberg (BW) and Bavaria (BY).
*Number of SMEs who introduced a new marketing innovation or organisational innovation to one of their markets.

The ranking of countries in non-technical innovations is almost identical to the technical innovations ranking, yet with a slightly higher number of SMEs implementing marketing or organisational innovations.

Conclusions

- SMEs of five DR countries already innovate more than, or close to the EU 27 average. However, there is an almost two-fold difference between the most and least innovating countries.
- We recommend that the DRRIF promotes the innovative activities of SMEs and supports their establishment. (e.g., via cooperation within the EUREKA programme)

[28] SME – small and medium size enterprises

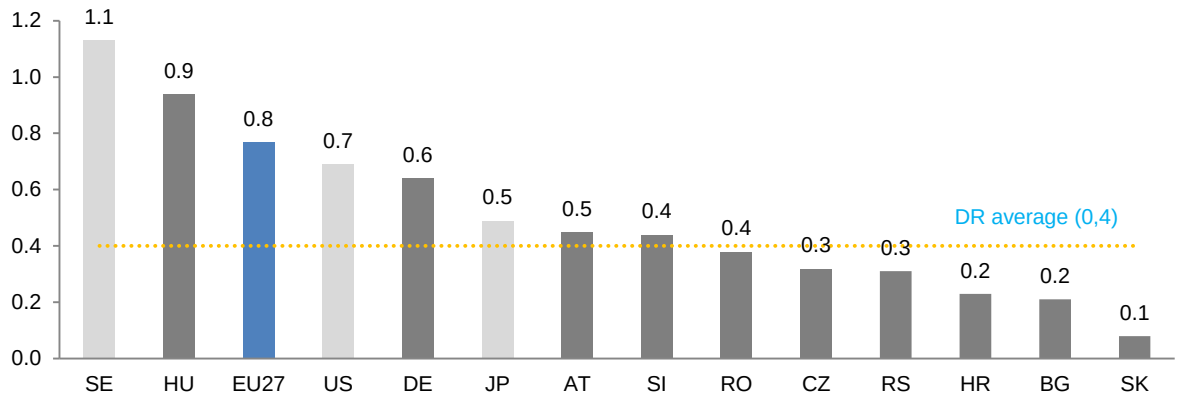
3.2.10 Licence and patent revenues from abroad as % of GDP

Trade in technology comprises four main categories:

- Transfer of techniques (through patents and licences, disclosure of know-how)
- Transfer (sale, licensing, franchising) of designs, trademarks and patterns
- Services with a technical content, including technical and engineering studies as well as technical assistance
- Industrial R&D

The comparison of licence and patent revenues from abroad indicates the competitiveness of each country's patents and licences in the global market.

Graph 13: Licence and patent revenues from abroad (% of GDP)



Source: Innovation Union Scoreboard 2014
Due to unavailable relevant data, the graph and the DR average does not include the following countries: Bosnia and Herzegovina (BA), Montenegro (ME), Moldova (MD), Ukraine (UA), Baden-Württemberg (BW) and Bavaria (BY).

Licence and patent revenues from abroad in the DR are roughly half those of the EU. Croatia, Bulgaria and Slovakia's incomes are among the lowest in the DR; however, Hungary's share of GDP is the highest in the DR.

Conclusions

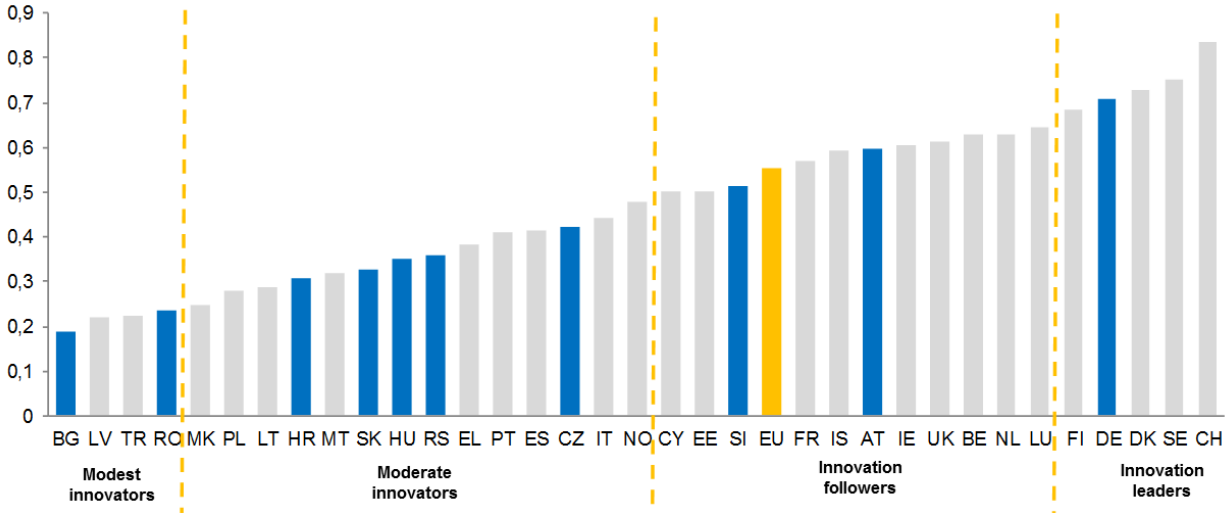
- The majority of the DR countries' licence and patent revenue from abroad is below the EU 27 average. This is a result of overall low patent intensity as well as little commercialization of R&D results.
- However, we assume that DRRIF's activities for improvement in this area are limited.

3.2.11 Overview of R&D results in the EU for the year 2014

The Innovation Union Scoreboard 2014[29], published by the European Commission, which studies the rate of innovation in each country of the EU and compares it to global R&D and innovation leaders, divides the EU Member States and candidate countries of the DR into four categories:

- Innovation leaders with R&D performance above the EU average: **Germany**
- Innovation followers with R&D performance above or close to the EU average: **Austria, Slovenia**
- Moderate innovators with R&D performance below the EU average: **Serbia, Slovakia, Czech Republic, Hungary, Croatia**
- Modest innovators with R&D performance below the EU average: **Romania, Bulgaria**

Graph 14: Overall innovation index – Innovation Union Scoreboard 2014



Source: Innovation Union Scoreboard 2014, processed by EY into a graph
Due to unavailable relevant data, the graph and the DR average does not include the following countries: Bosnia and Herzegovina (BA), Montenegro (ME), Moldova (MD), Ukraine (UA), Baden-Württemberg (BW) and Bavaria (BY).

Differences among the DR countries are significant. In terms of innovation, Germany is one of the strongest countries in the EU, followed by Austria which is also above the EU average. Although below the EU average, Slovenia has the highest indicator among the formerly-communist DR countries. The remaining countries are classified as moderate innovators, except for Bulgaria, which has the worst results and is in the modest innovators group.

Even the IUS points out substantial differences among countries, the need for convergence and its development: "Last year's edition showed the impact of the crisis that resulted in disturbances of the innovation convergence process between the Member States. This year's edition shows that there are again positive signs in Member States as the innovation performance improves and the catching up process of less innovative countries resumes."

The significant differences between the countries also result in different R&D and innovation needs. The innovation leaders and followers usually have fairly developed R&D and innovation infrastructure that provides an attractive environment for the scientists. On the other hand, countries that have low R&D levels often face "brain drain" as a result of their underdeveloped R&D infrastructure.

The results of the IUS show that in at least half of the DR countries there is still a lot of room for improvement. Nevertheless, it also suggests that improvement is certainly possible (see Slovenia[30]) and there are DR countries with world-class R&D, which could share their best practices and know-how with the remaining countries.

[29] Innovation Union Scoreboard 2014: http://ec.europa.eu/enterprise/policies/innovation/files/ius/ius-2014_en.pdf
[30] Gross domestic R&D expenditure (GERD) has increased significantly in Slovenia since 2007, when they were at 1,45% GDP, and reached 2,8% GDP in 2012.

The data also suggests that due to the diversity of capacities, needs and experiences, flexible approaches have to be developed that take appropriate account of these pre-conditions. Variable-geometry will be key in this respect, meaning that countries can decide which activities are beneficial for them and in which they therefore want to participate and invest. In this context different clusters of countries may be strategically formed to ensure critical mass and joint interests. These clusters could, for example, be based on geographical proximity (e.g., Western Balkan Countries with a lot of cooperation experience and similar concerns), thematic focus (research needs with view to floods, chemical contamination, danger through landmines etc.) or type of instrument (capacity building, SME support, research networks etc.).

Since the IUS included only the EU Member States, we gathered data of the selected key indicators in the remaining DR countries ourselves.

Our analysis did not include such a vast number of indicators and neither did it analyse their trends. Our goal was rather to assign them to categories and provide an additional perspective.

- Innovation leaders (above the EU average): **Germany**
- Innovation followers (above or close to the EU average): **Austria, Slovenia**
- Moderate innovators (below the EU average): **Czech Republic**, **Croatia, Hungary, Slovakia, Serbia**
- Modest innovators (below the EU average): **Bosnia and Herzegovina, Bulgaria, Montenegro, Moldova, Romania, Ukraine**

Conclusions

- The diversity of the DR countries is significant in the area of innovation. Some countries are innovation leaders or innovation followers; however, others are only moderate or modest innovators.
- This diversity has to be taken into account when developing strategies, further mechanisms and tools for cooperation in R&I. Issues like regional development and cross-border cooperation, cluster formation, network building, variable geometry, brain drain, education, capacity building needs may prove relevant in this context and should be considered as a basis for development of DRRIF scenarios.
- Consistent data for all countries is necessary to coordinate R&D support properly in the countries of EUSDR.
- Decisions will be made with a certain degree of uncertainty and inaccuracy as long as this data remains unavailable.
- Harmonized data collection both in non-EU member and candidate states is very important. DRRIF should therefore encourage lobbying activities of policy makers and experts on this topic at the EU level and interoperate with the JRC pilot project „Danube Reference Data and Service Infrastructure (DRDSI)" similar to that of the Member States.

3.2.12 Absorption score

The objective of the absorption score was to create a ranking of countries based on a calculation of normalised values for each DR country. The calculation consisted of multiple R&D and innovation indicators and compared to the IUS ranking it also includes non-EU member states (which were not included in the IUS) and provides a contrast with R&D leaders (USA, Japan).

The absorption score consists of the following:

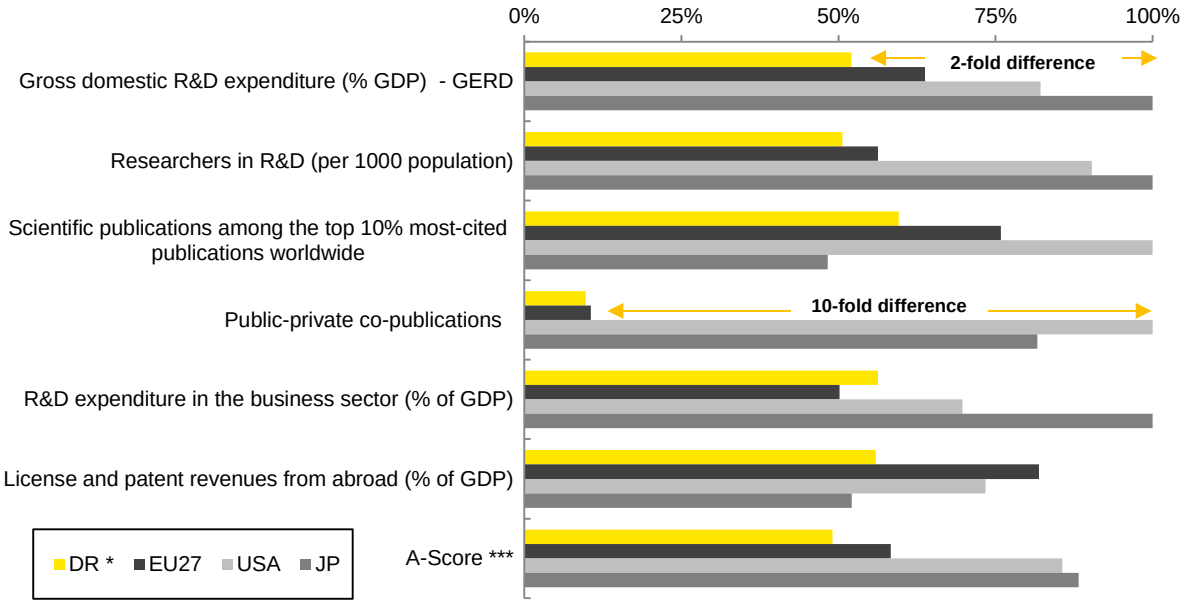
- **Gross domestic R&D expenditure** (% GDP) – GERD – 35% weight
- **Number of researchers** (per 1000 population) – 25% weight
- **Scientific publications among the top 10% most-cited publications worldwide** – 10% weight
- **Public-private co-publications** –10% weight
- **R&D expenditure in the business sector** – 10% weight
- **Licence and patent revenues from abroad** – 10% weight

We used the following methodology to calculate the absorption score:

- The value of each country's indicator was normalised (i.e., 100% is the highest value out of all countries).
- When calculating the DR average, we adjusted the normalised values for the population size in each country.
- The final absorption score was determined by the weighted average of six indicators.

The following graph displays the normalised values of the DR in comparison with the USA and Japan.

Graph 15: Comparison of the DR's absorption score



Source: Processed by EY
* population weighted average
*** weighted value of all normalised

Conclusions

- Based on the absorption score analysis that we have designed, we can conclude that the DR values are **half** those of innovation leaders (USA, Japan) both in terms of overall absorption score as well as gross R&D expenditure.
- Compared to the USA, the scientific co-publications of the business and public sector in the DR are **10 times lower**, which is further confirmed by our experience.
- The analysis of absorption score suggests that there is R&D absorption capacity in the DR and that it is substantial.

The following table displays detailed information used for the calculation of the A-score based on selected indicators.

Table 1: A-score calculation

Country	AT	BG	CZ	DE	HR	HU	RO	RS	SI	SK	BA	ME	MD	UA	DR *	EU27	USA	JP	DR - DE ****
Population (mil.)	8,40	7,33	10,50	80,32	4,28	9,93	20,10	7,21	2,05	5,40	3,84	0,62	3,54	45,53	209,1	500,3	311,9	127,8	129,2
Indicator 1: Gross domestic R&D expenditure (% GDP) - GERD	2,84	0,64	1,88	2,98	0,75	1,3	0,49	0,97	2,8	0,82	0,27	0,41	0,4	0,73	-	2,08	2,67	3,25	-
Normalized value **	87%	20%	58%	92%	23%	40%	15%	30%	86%	25%	8%	13%	12%	22%	54%	64%	82%	100%	29%
Indicator 1 weight	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
indicator 2: Researchers in R&D (per 1000 population)	4,4	1,6	2,9	4,0	1,6	2,3	0,7	1,2	4,3	2,8		0,8	0,8	1,3		2,9	4,7	5,2	
Normalized value **	85%	32%	56%	77%	31%	45%	14%	24%	83%	55%		15%	15%	24%	51%	56%	90%	100%	34%
Indicator 2 weight	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
Indicator 3: Scientific publications among the top 10% most-cited publications worldwide	11,1	3,2	5,6	11,6	3,2	5,2	3,5		7	4						11	14,5	7	
Normalized value **	77%	22%	39%	80%	22%	36%	24%		48%	28%					59%	76%	100%	48%	35%
Indicator 3 weight	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Indicator 4: Private-public co-publications	9,3	2	5,8	8,7	5,2	5,6	2,9	2,6	9,2	4						7,3	69,07	56,39	
Normalized value **	13%	3%	8%	13%	8%	8%	4%	4%	13%	6%					10%	11%	100%	82%	7%
Indicator 4 weight	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Indicator 5: R&D expenditure in the business sector	1,95	0,39	1,01	1,95	0,34	0,85		0,24	2,16	0,34	0,13	0,09				1,31	1,82	2,61	
Normalized value **	75%	15%	39%	75%	13%	33%		9%	83%	13%	5%	3%			56%	50%	70%	100%	31%
Indicator 5 weight	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Indicator 6: License and patent revenues from abroad	0,45	0,21	0,32	0,64	0,23	0,94	0,38	0,31	0,44	0,08						0,77	0,69	0,49	
Normalized value **	48%	22%	34%	68%	24%	100%	40%	33%	47%	9%					56%	82%	73%	52%	43%
Indicator 6 weight	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
A-Score ***	73%	21%	46%	75%	22%	43%			70%	28%					50%	58%	86%	88%	30%

Source: Eurostat, WHO. Calculated and processed by EY
* population weighted average
** normalised value: the highest value in the row equals 100%
*** weighted normalised indicator values
**** hypothetical DR score if Germany was excluded

3.3 Analysis of strengths, weaknesses, opportunities and threats (SWOT)

The aim of the SWOT analysis was to identify the most important R&I areas in order to examine the strengths, weaknesses, opportunities and threats of the DR. We examined the strengths and weaknesses of each country in relation to DRRIF. Additionally, the opportunities and threats focus mainly on external factors within the DR which could impact DRRIF.

3.3.1 SWOT analysis methodology

We carried out the SWOT analysis in three steps:

- **1. Meta-analysis of existing SWOT analysis of the DR**, either as a whole or its individual parts. Inputs for this analysis came from:
  - Socio-Economic Assessment of the Danube Region " State of the Region, Challenges and Strategy Development
  - Danube Transnational Programme 2014-2020
  - Central Europe programme - Results of the regional analysis
- **2. Preparation of brief SWOT analyses for each DR country** based on an examination of provided documents. The analysis focused mainly on qualitative indicators which are complementary to quantitative analyses from previous sections. Inputs for these analyses came from:
  - R&I performance in EU Member States and Associated countries – 2013
  - Erawatch - Country fiche
  - Questionnaire created by EY and sent to officially-nominated contact persons
  - Other sources and discussions
- **3. Creation of a high-level SWOT of the DR** based on steps one and two**.**

Our aim was to choose, in our opinion, the most important elements of R&I **affecting DRRIF's rationale and goals,** in order to identify the following:

- **S ("strengths") –** indicates an area which is particularly well-developed and which other countries could benefit from if the know-how was shared. It is likely that this area does not require extra support. In terms of finance, this means that the area is sufficiently funded and if DRRIF was to operate as a fund in this area it could potentially become a competition to other sources of funding. In another words, DRRIF would not provide much added value in this area.
- **W ("weaknesses")** – refers to room for improvement, be it in the form of international cooperation or knowledge sharing. However, if the weakness is too significant, it may hinder the country's involvement in DRRIF (absence of clearly defined national R&I strategy, low mobility of scientists or low priority of R&I).
- **O ("opportunities")** – describes goals which the country should focus on in the near future. Our aim was to identify the opportunities that multiple DR countries have in common and which, through cooperation, they could capitalize on.
- **T ("threats")** – signals threats that could be avoided or their impact mitigated if countries cooperated.

3.3.2 Meta-analysis of existing SWOT analyses of the DR

The SWOT analysis of the DR or its individual parts was performed in multiple documents (Socio-Economic Assessment of the Danube Region - State of the Region Challenges and Strategy Development [31], Danube Transnational Programme 2014-2020, Central Europe programme - Results of the regional analysis).

Our goal was to analyse the most relevant existing documents and to identify conclusions, information regarding strengths, weaknesses, opportunities and threats in common.

3.3.3 State of the region, challenges and strategy development

From the "State of the Region, Challenges and Strategy Development report", we determined the following relevant conclusions for DRRIF:

- The main challenge for the DR is to improve cohesion and increase competitiveness through cooperation. The less developed economies need to catch up with the wealthier DR countries at a faster pace than they have in the past.
- Cooperation potential for firms and clusters exists all along the Danube, based on existing structures, but, mirroring economic development and institutional gaps, the participation in cooperation initiatives is very uneven. Organisations, especially from less R&I intensive regions of South-East Europe, Moldova and Ukraine, need better integration into the cooperation process.
- Capital formation is an important driver of catch-up. Therefore, investment ratios will have to remain highest in the countries with the lowest level of GDP per capita. A better investment climate would encourage the activities of domestic investors and also increase the region's attractiveness for inward foreign direct investments.
- The DR has the potential to become a more competitive economic zone by improving transport network connectivity, accessibility, and resource efficiency.
- Reducing transmission and distribution losses in the electricity grid and increasing the share of renewable energy may help to reduce energy import dependency and further diversify the energy mix.

3.3.4 Danube Transnational Programme 2014-2020

From a draft of "Danube Transnational Programme 2014-2020", we selected the following opportunities, which we believe to be the most relevant:

- There is important potential in coordinating the R&I capacities of the macro-region. Its heterogeneity offering the opportunity to exploit the comparative advantages of optimized internal synergies (justification of PA 1 - R&I).
- The insufficient development of the cross-linkages between enterprises, R&D institutions and public sector (triple helix approach) needs to be improved, since it can contribute to the commercial use of the innovative technologies and processes (justification of PA 1 - R&I).
- The existing human resource capital can be utilised better (justification of PA 1 - R&I).
- Increased fragmentation of natural habitats due to human intervention (transport corridors, land use, logging) is endangering the exceptional biodiversity of the region (justification of PA 6 - Environment, resource efficiency).
- The relative underdevelopment of green infrastructure needs to be addressed in order to improve the management of protected areas (justification of PA 6 - Environment, resource efficiency).
- Mechanisms for management and control of water as a central resource for the area have to be further developed (justification of PA 6 - Environment, resource efficiency).
- There is a need to coordinate the capacities in the region related to forecasting, preparedness and intervention in case of natural or human activity-related disasters (justification of PA 6 - Environment, resource efficiency).
- There is a general need to shift transport to a more environmentally-friendly mode, by developing more efficient management solutions for transport systems to reduce pollution (justification of PA 7 – Transport).
- Multimodality facilitates more sustainable transport systems; therefore, efforts should be made in order to develop them (justification of PA 7 – Transport).

[31] Centre for European Economic Research GmbH: *Socio-Economic Assessment of the Danube Region " State of the Region, Chalanges and Strategy Development*, 2014. Available at: <http://wiiw.ac.at/socio-economic-assessment-of-the-danube-region-state-of-the-region-challenges-and-strategy-development-pj-7.html>

- The energy efficiency targets at the EU level require the development of smart grids in order to increase the level of energy security (justification of PA 7 – Transport).
- While enhancing the sharing of good practices, the institutional and policy coordination between countries should be strengthened, in order to increase the capacities to operate and further develop existing structures and processes for a better administrative performance of the public sector in the fields of major interest (justification of PA 11 – Governance).
- Assistance to the governance system of the EUSDR should be provided by supporting the activity of the key implementers and developing new tools for increasing communication between key actors (justification of PA 11 – Governance).

3.3.5 Central Europe Programme – results of the regional analysis[32]

Central Europe (CE) is a programme of the EU which promotes cooperation among regions of the following nine European countries: Austria, Czech Republic, Hungary, Slovakia, Slovenia, Ukraine, Italy and Poland (the last two countries are not part of the DR). The following DR countries are not a part of CE: Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Romania, Moldova and Bulgaria. Despite the fact that not all countries of the Danube Strategy participated in the programme, we believe the findings are still useful in understanding the DR.

From the section “Results of the regional analysis” of the CE programme analysis, we identified the following strengths, weaknesses, opportunities and threats that we believe are relevant for DRRIF:

Strengths:

- High R&D expenditures in urban regions and target work area for highly-skilled workers - some rural and intermediate areas show significant R&D activities (“islands of innovation”)
- High level of experience and know-how in high-tech services (e.g., renewable energy)
- Increasing level of education, lifelong learning and female education
- Tradition of inter-regional transnational and cross-border cooperation at institutional, political and administrative level and within projects
- Growth in cross-sectorial and technology-oriented industries
- Increase of renewable energy (wind, solar, biomass, geothermal energy potentials), use of energy saving technologies (infrastructure, housing)

Weaknesses:

- Low level of R&D (environment of innovation, cooperation projects) in several (rural) regions, insufficient technology transfer and lack in the access to R&D results – especially for SMEs
- Strong economic disparities between CE regions
- Inequalities in GDP between the peripheral and central areas
- Unidirectional workforce migration from new to old member states
- Bad air quality and high ozone concentrations in cities and bad water quality of rivers and lakes in some regions (eutrophication)
- Lack of quality and quantity of environmental infrastructure in some regions (waste and water treatment)
- Demographic changes pose increased challenges to financing of social and technical infrastructure especially in shrinking regions
- Weak civil society and better activation of citizens is needed

Opportunities:

- Promotion of innovation and an attractive investment climate in several regions
- Supporting R&D, technology and innovation and research centres
- Policy support of co-operative economic activities, development of clusters and networks
- Opportunity to improve energy connectivity in the wake of TEN-E and decentralized energy production
- Increasing awareness about climate change effects and counter measures
- Cohesion Policy focusing on environmental infrastructure, ranging from clean drinking water supply, waste management and waste water treatment
- Increase in "green" employment based on EU-funds, support for eco-innovation

[32] Includes countries: Austria, Czech Republic, Germany, Hungary, Italy, Poland, Slovakia, Slovenia and Ukraine. Available at: CE_Territorial_Analysis_2nd_report_APPROVED_clean: http://www.central2013.eu/fileadmin/user_upload/Downloads/Document_Centre/CE_Territorial_Analysis_2nd_report_APPROVED_clean.pdf

Threats:

- Increasing gap between regulation and implementation necessity and know-how and manpower of administration - threat of over-regulation
- Lack of competitiveness (due to lack of trained workforce, contracting financial markets, lack of multimodal accessibility)
- Increase of minimum temperature in winter and continuous reduction of snow blanket
- Climate change affects natural environment (extinction of species; geographical shift of crops)
- Ongoing desertification and increasing aridity in some regions as well as strong increase of number of tropical nights in urban areas
- Increasing occurrences of natural hazards and floods
- Increased unsustainable use of environmental resources due to economic activities
- “Brain drain” of young and creative talents from peripheral regions, due to loss of urban and environmental quality
- Ageing population
- Increasing gaps between innovative proactive regions and regions with innovation deficits, well-connected regions and those with ICT deficits

The authors of the SWOT analysis included feedback from the interviewees, which is in agreement with their findings, since most of the identified problems were well-known and relevant for individual regions and CE as a whole. However, the interviewees pointed out the differences between older and newer member states and the varying situations in different parts of CE.

The interviewees criticized the SWOT items which supposedly suffer from oversimplification and make it difficult to understand problems specific for CE. At the same time, it was pointed out that not all items are related to specific issues of the region and the relevancy and accuracy of SWOT items depended on geographic and socio-economic characteristics of the region.

Conclusions

- We have identified the following conclusions from existing reports on strengths, weaknesses, threats and opportunities:
- The main challenge of the DR is to increase cohesion through:
    - Cooperation and coordination
    - Improved utilisation of human capital
    - Connecting private and public sectors
- Structures for international cooperation already exist; however, participation is very uneven.
- Identified common thematic areas from the opportunities analysis:
    - Energy
    - Transport
    - Environment
- SWOT analysis of such a diverse region can be oversimplified, mainly due to the vast differences between new and old member countries, as well as different regional situations.

3.3.6 SWOT analysis of the DR countries

This section provides a brief overview of strengths and weaknesses of the DR in relation to the most recent situation in R&I. At the same time, it discusses the opportunities and threats that can potentially affect the countries in the future. It provides the reader with a concise snapshot of R&I in each country. It was not our goal to perform a detailed, complex analysis of each country since this can be found in our references.

3.3.6.1 Austria

Sources

- Research and Innovation performance in EU Member States and Associated countries – 2013
- Erawatch - Country page
- Austrian Research and Technology Report 2014
- Report on Austria's Scientific and Technological Performance Capability 2014
- Questionnaire created by EY and sent to officially-nominated contact persons

General features

- Education, R&I are considered priority policy fields that are least impacted by consolidation measures, taken in order to reduce the yearly overall public household deficit. [S]
- Upgrading of knowledge-intensity and linked increase in competitiveness. [O]

R&I expenditure

- On the R&D input side, Austria belongs to the EU countries with the highest GERD/GDP rate [S]
- A major part of R&D expenditure is funded by the business sector. As of 2011, this sector (excluding R&I investments by foreign owned companies in Austria) has invested € 3.821 million into R&D – that is 46.2% of total Austria's R&D expenditure. [S]
- Foreign-owned firms already account for about one-third of total R&D expenditure. After the US, Austria is the second most important destination country for cross-border R&D expenditure for German firms. German companies account for over 50% of all foreign R&D investments in Austria. [S]

Strategy, policy and governance

- Austria has a good starting position to achieve the goal set forth by the federal government's RTI strategy – become an innovation leader instead of innovation follower. [S]
- The development of the Austrian University Plan, begun in 2011, is an important academic and education policy project that aims to ensure top-quality education and research by coordinating partnerships, setting priorities and bundling resources. [S]
- The Austrian R&D instruments for the support of transnational R&D cooperation are by tradition not oriented towards grand challenges, but usually based on thematically open bottom-up approaches. Moreover budgets allocated to those activities are relatively small. [W]
- The government programme 2008-2013 defined the following goals for Austria's R&D policy (selected):
  - To foster international co-operation of all Austrian research performers especially within the European Union [O]
  - To support mission-oriented research which aims at solving societal problems, e.g., climate change, ageing of society, migration [O]

Human resources

- Austria remains far below the EU average (-30%) in tertiary degrees in the group of 30 to 34 year-olds. [W]
- General demographic development might lead to a scarcity of skilled people in the long term. [T]
- Despite the increasing trend the number of researchers is not increasing in line with similar countries. [T]

Thematic areas

- Thematically-targeted R&D priority funding still remains relatively small in Austria. [W]
- Hot-spots in key technologies: energy, environment and transport. [S]

3.3.6.2 Bosnia and Herzegovina

Sources

- World Bank - Western-Balkans - R&D - Bosnia-Herzegovina
- Erawatch - Country fiche
- Questionnaire created by EY and sent to officially-nominated contact persons

General features

- Outdated RTDI infrastructure [W]
- Existing scientific research and developmental-research institutes [S]
- Non-existence of a high-quality system of evaluating research work and modest applicability of the RTD results in the economy [W]
- Teaching-oriented higher education is the largest research performer in Bosnia and Herzegovina; low participation of business sector in research activities [W]

R&I expenditure

- Highly decentralized system which lacks compact direction of distribution of poor financial resources [T]
- Underfunded R&D - Gross Domestic Expenditure on Research and Development (GERD) in Bosnia and Herzegovina was 0.27% of BA's GDP, which is far below the EU average [W]
- The country is still in the status of potential candidate and does not have access to ERDF and other EU structural funds and uses only the first two components of IPA, which are aimed at adapting the BA legal framework to EU in preparation for the use of structural funds. [W]
- Lack of understanding of the decision-makers for the importance of the RTD for the country's development [T]
- Association to Horizon 2020, COST membership, NIP status EUREKA [O]

Strategy, policy and governance

- Research policy in BA is mainly generic. [W]
- Strategic documents at all levels share the dedication to transnational cooperation and sharing of information, but the cooperation is limited to bilateral agreements in the field of higher education and scientific research, in which results are visible in cooperation with Slovenia and Montenegro. [W]
- There are no strategies on smart specialization in BA yet. [W]
- Transforming the role of predominantly teaching-oriented universities as largest research performers. [O]
- In October 2013 the science ministers from Western Balkans adopted the Western Balkans Regional R&D Strategy for Innovation. [O]

Human resources

- “Brain drain”; low wages of scientific research personnel in BH compared to R&I intensive, well developed economies [W]
- Lack of understanding of social consequences due to scientific research emigration (“brain drain”) [T]
- Low capacity to retain and attract talent [W]
- Diaspora at prominent European universities which maintain contacts with researchers from home country [O]
- Potential of young scientific research experts [O]
- Higher level of engagement of our experts from abroad [O]

Thematic areas

- No specific priority areas, supported fields of science: agriculture science, natural science, engineering and technology, medical and health sciences, social sciences and humanities [S]

3.3.6.3 Bulgaria

Sources

- Research and Innovation performance in EU Member States and Associated countries – 2013
- Erawatch - Country fiche

General features

- Low cooperation between companies, R&D institutions and universities [W]
- Levels of knowledge-intensive economic activity, and its overall structure has not changed substantially over the last decade. [W]

R&I expenditure

- Underfunded R&D - GERD per inhabitant is € 29.8 (2011, Eurostat), and is the lowest in the EU 27. [W]
- GDP growth does not lead to any increase of R&D intensity. [T]
- The newly-set national goal for R&D investment to reach 1.5% of GDP by 2020 is a testimony to some change in priority setting by attributing a growing priority to innovation. [O]
- Programme and project-based public research funding is on the rise in Bulgaria. [O]

Strategy, policy and governance

- Bulgarian research policy attempts to follow the new National Strategy for Scientific Research 2020. This Strategy is aimed at facilitating the development of Bulgarian science by making it a factor of economic development based on knowledge and innovation. [O]
- There is a lack of sufficient coherent national research strategy to underpin R&I policy. [W]
- A separate operational programme for research and education for the next programming period is seen as an important contribution to reviving decapitalized and poorly-funded Bulgarian science and education. [O]
- The lack of administrative capacity of local authorities affects the ability to establish appropriate strategies, implement programmes and deliver high-quality projects and thus absorb EU funds. [T]

Human resources

- Working conditions are not attractive for highly productive researchers. Consequently, both public and private R&D investments are hampered by a lack of skilled human resources. [W]
- The intellectual assets are insufficient – patent applications per billion GDP are more than 10 times less than the EU average. [W]
- Bulgaria has been experiencing massive outflows of researchers and highly-skilled people. [W]
- Scientific co-publications based on collaborations between Bulgarian and other ERA country researchers are one of the lowest in Europe. [W]
- Mobility of research staff between the public and private sectors is rare and is in general not supported by specialized programmes for fostering inter-sector mobility. [W]
- Bulgarian education has suffered a steep decline in quality during the past 20 years. [W]

Thematic areas

- In spite of the progress, it is still early to say that there is a clear specific research field prioritised for inter-sector and cross-border knowledge circulation. [T]
- National Strategy for Scientific Research 2020 has listed *five priority areas for the development of research in Bulgaria:* energy, energy efficiency and transport; development of green and eco-technologies; biotechnologies and bio-foods; new materials and technologies; cultural and historical heritage; development of fundamentals. Additionally, information and communication technologies have been listed as horizontal topics. [O]
- Hot-spots in key technologies: agriculture, nanotechnology, biotechnology, ICT, energy. [S]

3.3.6.4 Croatia

Sources

- Research and Innovation performance in EU Member States and Associated countries – 2013
- Erawatch - Country fiche

General features

- The public R&D sector, with universities playing a leading role, is the largely dominant sector in both research manpower – low involvement of business sector in R&D and performing research activities. [W]
- Universities have a leading role in R&D and formation of National Centres of Scientific Excellence. [S]
- New reforms to higher education and changes towards performance-based competitive financing Increasing participation rate of Croatian universities in international scientific programmes [O]
- Weak interest of private businesses in innovation in general and for cooperation with the public research organisations and universities in particular [T]

R&I expenditure

- With investments in science and research of only 0.75% of GDP, when compared with 2.06% of the GDP in the EU-28, Croatia is considerably lagging behind the EU Member States. [W]
- Starting to attract business R&D from abroad [O]

Strategy, policy and governance

- The governance of R&D system in Croatia is highly centralized. [S]
- Croatia does not have a special strategy for S&T internationalization. [W]
- There is slow implementation of the envisaged actions and lack of reliable statistics and the administrative capacity to monitor and follow-up the envisaged reforms. [W]

Human resources

- Human capital building in S&T is below the EU average. [W]
- Lack of attractive research infrastructures and good research management is leading to a further increase in “brain drain”. [W]
- The number of researchers in Croatia has declined by 25% in less than a decade. [W]
- Solid number of new graduates and new doctoral graduates in science and engineering, potential of increasing the number of R&D personnel. [O]
- Nine Croatian institutes have been accredited for HR excellence in research. Croatia is participating in the work of the Steering Group on Human Resources and Mobility (SGHRM). [S]
- Remarkably low number of patents compared to the levels in comparable economies. [W]

Thematic areas

- Basic research thematic areas: broad area of basic research, the following priority thematic areas are preferred: ecosystems, Adriatic Sea, coastline and land; new energies, renewable energy resources; materials and new production technologies; ICT, food and water; health; learning and education; sustainable development; security; Croatian identity. [S]
- National Plan for Development of Scientific, R&I Infrastructure in Croatia, consists of: biomedicine (neurosciences; immunology and microbiology; biochemistry, genetics and molecular biology; public health), biotechnology (biotechnology; forestry and wood technology; sustainable agriculture, fisheries and aquaculture), natural sciences (environmental science; physics and astronomy; chemistry), engineering (ICT; advanced materials and manufacturing processes; safe and clean energy; social sciences and humanities (demographic challenges; inclusive, innovative, reflective and secure society; national sciences of special importance), interdisciplinary sciences. [S]
- RIS 3 priorities: Health and quality of life, Energy and sustainable environment, Transport and mobility, Security, Agro-food and Bio-economy. Cross-cutting themes are: Key Enabling Technologies (KETs), ICT and Engineering, Tourism, Creative and Cultural industries. [O]
- Hot-spots in key technologies: healthcare, food processing and agribusiness, energy technology, electronics and advanced materials, digital techniques. [S]

3.3.6.5 Czech Republic

Sources

- Research and Innovation performance in EU Member States and Associated countries – 2013
- Erawatch - Country fiche
- Update of the Czech national R&I policy for 2009 – 2015 with 2020 prospects
- Analysis of R&I status in Czech Republic and comparison with abroad for 2013

General features

- Low extent of cooperation between the science base and the business sector originating from a combination of poor absorptive capacity of domestic firms, a lack of incentives to support collaboration between universities and firms and the shortage of scientific and engineering skills. [W]
- Lack of clear long-term R&D concept. [T]
- Foreign-owned companies have a dominant position in business R&D and amount to 52% of all business R&D expenditure and employ 48% of people who work in business R&D. [S]
- The region of Prague is amongst the EU regions with the highest share of researchers (full-time equivalent) in total employment and is the EU leader in terms of the share of the labour force employed in a science and technology occupation (more than 50%). [S]

R&I expenditure

- In the past five years, R&D expenditure has been increasing despite unfavourable development of the Czech economy. [S]
- Low business investment in R&D in relation to the structure of the economy (size of the manufacturing sector in general and of HT and MT sectors in particular). [W]
- Insufficient quality of scientific and technological output of the science base, which is notably linked to an inadequate system for evaluating research and allocating public R&D funding [W] but new methodology is currently under preparation. [O]

Strategy, policy and governance

- R&D policies are largely generic. Thematic funding programmes continue to be under-developed and the thematic focus is not very strongly promoted by the existing funding sources. Neither of the national policy documents sets binding, quantified or explicit targets for the total R&D investment or under the priority areas. [W]
- RIS3, S3 strategies should play a key role when determining the future heading of Czech R&D. [O]

Human resources

- Still lagging behind the EU average in the number of researchers, mainly due to an inadequate career system. The low number can be detrimental to newly-built R&D infrastructures and to business R&D in implementation of new discoveries. [W]
- Catching up with the group of innovation followers and outperforms its reference group in terms of new graduates in science and engineering, business R&D intensity, researchers employed by the business sector and innovation in SMEs. [O]
- Ensuring sufficient number of researchers for R&D and improving conditions necessary for sustainable R&D infrastructure. [O]
- Improve internationalization, increase mobility and openness of the researchers towards international cooperation. [O]

Thematic areas

- Automotive industry dominates business R&D both in terms of investments and number of people employed. [S]
- Hot-spots in key technologies: medical research, automobiles, transport, construction, materials, energy, environment, medical research. [S]

3.3.6.6 Germany

Sources

- R&I performance in EU Member States and Associated countries – 2013
- Erawatch - Country fiche
- Questionnaire created by EY and sent to officially-nominated contact persons
- Bundesbericht Forschung und Innovation – 2014
- Die neue Hightech-Strategie - Innovationen für Deutschland – 2014

General features

- Germany has the largest research system in the EU, measured in terms of R&D expenditure. In 2011, gross domestic expenditure on R&D reached an all-time high with more than 75 billion Euros. With an expected further increase for 2012, Germany will almost have reached the 3% goal as stated in the Europe 2020 strategy. [S]
- There is room for more public-private cooperation and for implementing targeted supply-side and demand-side measures to foster innovation and fast-growing, innovative firms in Germany. Such measures should, in particular, be targeted at high-tech sectors such as ICT, biotechnology and medical technologies. [O]
- Business R&D especially in innovative SMEs, many of which are world leaders. [S]

R&I expenditure

- German R&D expenditure is among highest of EU countries. [S]
- Two-thirds of R&D expenditure – 49.6 billion EUR in absolute terms – is borne by the industry, 30% of the R&D expenditure is contributed by the state (federal government and states). [S]

Strategy, policy and governance

- In 2014, Germany adopted its new High-Tech Strategy – the 3rd phase since its first introduction in 2006. Germany continues to focus on challenging areas of research, namely digital economy and society, sustainable economy and energy, healthy living, intelligent mobility, civil security, and, as a new theme, innovative working environments. This thematic pillar is accompanied by several cross-cutting activities, such as a better transfer from science to industry, advancements in internationalization, an improvement of innovation-friendly framework conditions and transparency and participation initiatives. A new internationalization strategy is under preparation in Germany. [S]
- The German research landscape is rather complex and characterized by shared responsibilities between the federal level and the 16 German states. [W]
- At the same time, the manifold research actors cover a broad research spectrum with some very focused specializations. There is also a high degree of cooperation between science and industry. [O]

Human resources

- Strong base of human resources in R&D. More than half a million people work in the R&D area in Germany – in business, in research institutions and at universities. [S]
- It also performs well in the training of young scientists and scholars with figures well above the EU-27 and the US. [S]
- Below average number of first-time graduates for tertiary type-A programmes (programmes that lead to a traditional degree). [W]
- At the same time, Germany‘s dual system of vocational training (training takes place both in companies and in part-time vocational schools) is a strong backbone for industry and services. [S]
- Measures taken to remove restrictions on in-bound researcher mobility in view of a skills shortage in some science and technology domains. [O]

Thematic areas

- Scientific research has a clear focus on the natural sciences and engineering, which together account for about half of the research activities at universities and three quarters of those in public research organisations. [S]
- High level of patenting is an indication of industrial leadership in several domains, most notably in medium-high-tech industries including engineering, automobiles and chemicals and also in environmental and energy technologies. [S]
- A weak point of German R&D is the relatively low level of spending in high-tech areas such as pharmaceuticals and ICT. [W]
- Hotspots in key technologies: automobiles, environment, energy, new production technologies. [S]

Baden-Württemberg

Sources

- Bundesbericht Forschung und Innovation – 2014
- Bildungsindikatoren – 2013
- Innovationsstrategie Baden-Württemberg – 2013
- Questionnaire created by EY and sent to officially-nominated contact persons
- Die neue Hightech-Strategie - Innovationen für Deutschland - 2014

General features

- Highest R&D intensity in Germany (regionally in Europe), very high investment rate from private companies in R&D beside the relatively strong public funded basic research sector. [S]
- Lack of deeper R&D cooperation partly within the EU 28 and with some neighbouring countries including the DR because of orientation to other continents in research. [O]
- Strong non-university research landscape, strong linkages between industry and universities. [S]
- Further expansion of cooperation between businesses and research institutions is required in order to transform scientific findings into economic value. [O]
- High intensity of R&D in China, USA and other Asian Tiger economies that can be considered as competition to BW. [T]

R&I expenditure

- Highest gross domestic R&D expenditure (GERD) (5.1% GDP) among DR countries (~ 85% of the GERD are borne by industry) and continuous growth in general in the last 10 years. [S]
- The government intensively supports cooperation between business, R&D institutions and capacities. Due to a variety of programmes, universities gained more than 990 million EUR from third parties in 2011. [S]

Strategy, policy and governance

- The innovation policy is driven by constantly renewed strategies among them the “Innovationsstrategie Baden-Württemberg”. Regional government’s R&D policy mainly focuses on: sustainable mobility, environment, technology, renewable resources, efficient use of resources, healthcare, ICT, ecological IT and intelligent products and design. [S]
- Extensive information and communication between R&D partners is provided by regional cluster Atlas (*Regional Clusteratlas*), regional cluster databank (*Regional Clusterdatenbank*) and cluster forum (*Clusterdialog*). Clusters cover a wide range of topics including nanotechnology, energy, aerospace, satellite communication and the health industry. [S]
- Supporting mobility of workers within Europe through appropriate measures. [O]
- The research landscape is rather complex and characterized by shared responsibilities between the federal level and the 16 German states. [W]

Human resources

- Baden-Württemberg is a seat of three top-ranked German universities, nine research universities, six universities of teacher education, eight universities of arts and 23 state-owned universities for applied science and together with one dual university with 8 locations – focused on cooperation with SMEs. [S]
- Strong base of human resources in R&D - good performance (above EU 28) in the training of young scientists and scholars - the dual system of educational training at university level provides a strong and additional basis for skilled personnel. [S]
- Diversified portfolio of tertiary education – funding and attracting foreign professional scientists from different EU countries and regions. Moreover, young scientists are supported by the programme *Junge Innovatoren*, which enhances their projects and assists them to become independent. The state also provides scholarships for doctoral students and special support for women in order to support them in both their careers and family life. [S]
- Very low international level of scientific and administrative university staff. [W]
- Low staff shift rate between universities and industry in the research sector. [W]
- Targeted promotion of scientific professions in connection with establishment of adequate study space. Increase of permeability between R&D professionals and the academic sector. [O]
- One of the European regions with the highest density of tertiary education and the highest intensity of research. [S]

Thematic areas

- There is a clear focus on the natural sciences and engineering. Key technologies are mostly innovation-driven industry sectors: automotive and mechanical engineering (lightweight construction), electrical engineering, bio- and nanotechnology, ICT, optics, photonics, internal logistics and medicine- / measurement- / control- technology. Additionally important are the air and space technology and the creative industries. These areas are prioritised at both universities and R&D centres and most of them have their own innovation centre connected with universities. [S]
- The innovation policy is oriented to following fields of growth: sustainable mobility, environmental technology, renewable resources, healthcare, ICT, Green IT and intelligent products. [S]
- A weak point of R&D is the relatively low level of spending in some growing fields. [W]

Bavaria

Sources

- Bundesbericht Forschung und Innovation – 2014
- Bildungsindikatoren – 2013
- Questionnaire created by EY and sent to officially-nominated contact persons

General features

- Strong economic basis with a high R&I intensity (a mixture of global players and strong SMEs) [S]
- High intensity establishment of new companies and strong networks for founders of innovative and technology-oriented companies [S]
- Marginal private patronage in the R&I area [W]
- Dense network of universities and research facilities (amongst others 26 publicly funded universities / universities of applied science, about 75 non-university research facilities) [S]
- Well-practised system of technology transfer [S]
- Global development in R&I area (new situation of the competition / new competitive environment) [T]
- Sceptical approach towards (new) technology within the German society [T]

R&I expenditure

- Bavaria is one of the leading regions in Europe with expenditure on R&D of 3.16 % of GDP and above the national average in Germany.[S]
- There is low availability of private venture capital. [W]
- The highest political priority of education, science and technology has the objective of raising the R&D expenditure to 3.6 % of GDP by the end of 2020. [S]
- It is improving the basic financing of universities, aimed at R&D-penetration into all parts of the country. [O]

Strategy, policy and governance

- In May 2011, Bavaria adopted an inter-institutional concept of R&D policy defining strategic R&D objectives for the future. The main objective of the policy is to maintain its position of R&D leader both in Germany and in Europe. [S]
- *Bayerische Forschungsallianz GmbH* manages the position of Bavarian universities in EU R&D funding programmes. [S]

Human resources

- Bavaria has 17 state-owned universities for applied science, nine state-owned research universities in total, among which are two top-ranked German universities (Ludwig-Maximilians-University, Technical University of Munich). [S]
- International R&D cooperation, exchange of teachers and students, collaboration of scientists and financial support of international projects is managed by six centres focused on France, USA, Central-/East-/Southeast Europe, China, India and Latin America. Bavaria considers internationalization of universities to be a key field of R&D internationalization. [S]
- International programme for support of junior research groups (*Internationalen Nachwuchsforschergruppen*) offers talented young professionals from different countries top quality education and an international graduate programme. [S]
- As of 2011, the graduation rate in tertiary education was 29.8 %, compared to the German average of 30.9 % and OECD average of 39.9 %. [W]
- Bavaria puts strong efforts into maintaining human capital through the expansion of funding for international mobility of scientists and students, promoting the English language programmes of Bavarian universities abroad, funding a marketing concept to attract foreign students, promoting international research projects as well as aligned dual study programmes. [O]

Thematic areas

- Currently, Bavaria focuses on the following areas: IT, chemical industry, biotech, automobiles, mechatronics and robotics, material engineering, medical technologies, aeronautics, environmental technologies and energy industry. [S]

3.3.6.7 Hungary

Sources

- Research and Innovation performance in EU Member States and Associated countries – 2013
- Erawatch - Country fiche
- Research, Development and Innovation in Hungary

General features

- Hungary is a unitary state with a centralized decision-making system even in science, technology and innovation policies. [S]
- Low level of innovation activity, especially by SMEs, together with a low degree of co-operation in innovation activities among the key actors. [W]
- Despite a slight reduction, R&D expenditure still remains concentrated in Budapest. Dominance of this region is even more significant in public administration: 75% of all R&D expenditure is in the Central Hungary area. [W]
- The exploitation of R&D results is not sufficiently fast and widespread. [W]
- The issue of the low share of innovative enterprises needs to be urgently addressed. [T]

R&I expenditure

- Hungary's R&D expenditure has been increasing since 2008. [S]
- Access to finance and in particular early stage financing is limited. [W]
- According to the planning documents, Hungary will allocate about €2 billion for the development of the knowledge economy (i.e., support of company R&D and research programmes) out of the total Structural Funds available in the period 2014-2020. [O]

Strategy, policy and governance

- Adopted official policy statement - National Research-development and Innovation Strategy (2013-2020). [S]
- Unfavourable framework conditions for innovation, in particular an unpredictable business environment, a high administrative burden and competition not conducive to innovation. [W]
- Frequent changes to STI policy governance system may lead to disability to follow strategic research and innovation goals. [T]
- National R&I Strategy has increased the attractiveness of the research environment and the scientific excellence in all fields, as well as the talent management programmes to reverse "brain drain". [O]
- A new higher education strategy is under preparation and consultation; additionally, austerity measures and the disinvestment of resources are expected to end in 2014. [O]

Human resources

- Insufficient number of human resources for research [W]
- "Brain drain" [T]
- Although manufacturing in Hungary is mainly concentrated in low skills sectors, there is a growing and promising trend of specialization in high-tech sectors. [O]

Thematic areas

- Biotechnology, ICT and nanotechnology have been prioritised as specific research fields for cross-border knowledge circulation. [S]
- As for thematic fields, research activities concerning water basins, agri-food, energy, brain research, integration of Roma population as well as network research are foreseen. [O]
- Hotspots in key technologies: healthcare, environment, automobiles and biotech. [S]

3.3.6.8 Moldova

Sources

- Erawatch - Country fiche

General features

- Research infrastructure in Moldova is available mainly at leading research institutes of the Academy of Sciences. [W]
- Limited number of innovative companies, low R&D expenditure of business, and migration of qualified personnel abroad. [T]

R&I expenditure

- Investment in research infrastructure was rather limited over the last 20 years. [W]
- For Moldova only fragmented data on R&D funding and performance are available. [W]
- The overwhelming share (more than 80% – of public R&D funding) is performed in the government sector, by institutes of Academy of Science and branch research institutes of ministries. The business enterprise sector performs only a minor share. [W]
- The higher education sector, in terms of research performance, is comparable with that of research institutes of the Academy of Sciences, but with less public funding. [O]
- Cooperation between Moldovan and EU researchers is low. [W]

Strategy, policy and governance

- Approved Strategy of research-development of the Republic of Moldova to 2020 and approved the Innovation Strategy of the Republic of Moldova for the period 2013-2020: “Innovations for competitiveness”. [S]
- Moldova’s R&I system is rather centralized, with the Moldovan Academy of Sciences taking the central position. [W] However, in July 2014 the Ministry of Education became responsible for academic and research tasks.
- Quality control measures of research are implemented in Moldova through the National Council for Accreditation and Attestation. Research organisations, which would like to get access to public R&D funding need to get accredited and have to fulfil certain quality criteria [S] but due to multiple different committees and panels of experts, this system is bureaucratic and inefficient. [W]

Human resources

- “Brain drain” - Moldova has the problem that skilled people have left and still leave the country because of a shortage of adequate jobs and low salaries. [W]
- Recent trends show a strengthening of the role of R&D in higher education institutions, improvements of the innovation infrastructure (e.g., via recently established techno parks) and measures to enhance business R&D. [O]
- Declining demographic trend of university enrolment. [T]
- The level of income in science is lower than in the business sector, therefore career in science is not viewed as prestigious, combined with growing number of scientists of pension age. [W]

Thematic areas

- Thematic priorities at the national level and for international cooperation are defined rather broadly in Moldova, thematic areas are strongly influenced by the FP 7 programme, as it is seen as the main instrument for international cooperation. [W]
- Priority areas: innovative materials, technologies and products; energy efficiency and use of renewable energy resources; health and biomedicine; biotechnology; cultural heritage and development of the society. [S]

3.3.6.9 Montenegro

Sources

- Erawatch - Country fiche
- Questionnaire created by EY sent to officially nominated contact persons

General features

- Insufficiently high level of public awareness of the importance of science to society [W]
- Insufficiently developed system of statistical indicators in the field of monitoring scientific research activities [W]
- Lack of technology transfer centres [W]
- Lack of interest of university scientific research units to contract joint projects with the economic sector [T]
- Lack of interest of the economic sector in strengthening scientific research activities and lack of support for funding of projects [T]
- Low association and applicability of results of scientific research activities in the economy [W]
- Active in bilateral projects, participation in multilateral programmes (FP7, COST, EUREKA, JRC and EURAXESS Montenegro) [S]
- Development of multilateral, regional and bilateral cooperation and cooperation of the scientific research community with business sector [O]

R&I expenditure

- In 2014, the budget of the Ministry of Science should amount to €4.76m, which represent a 222% increase in comparison with the previous year. [O]
- Insufficient financial investment especially by business sector [W]
- A larger degree of financing from the state budget [O]

Strategy, policy and governance

- Adopted a Strategy for Scientific Research Activity 2012-2016 [S]
- Harmonized national legislative infrastructure in the field of scientific research activities with international standards [S]
- In order to encourage greater international cooperation, a number of concrete measures need to be put in place, aimed at establishing the infrastructure necessary for stimulating international cooperation and involvement in the European Research Area. [O]

Human resources

- A large number of higher education institutions [S]
- Passive scientific research institutions [W]
- Introducing more incentive mechanisms for researchers [O]
- Development of scientific research community [O]
- Inadequate evaluation of work results by professional and scientific communities, and society as a whole [T]
- Need to increase scientific output and mobility of researchers, the need to accelerate commercialization of research, deepen collaboration with the business sector and promote higher levels of private R&D investments as well as facilitate innovative start-up companies. [O]

Thematic areas

- The existence of clear priorities for research on national level [S]
- Priorities: energy, identity, ICT, competitiveness of national economy, medicine and health, science and education, new materials, products and services, sustainable development and tourism, agriculture and food and transport [S]

3.3.6.10 Romania

Sources

- Research and Innovation performance in EU Member States and Associated countries – 2013
- Erawatch - Country fiche

General features

- One of the lowest levels of business R&D intensity among EU countries. [W]
- The private sector's involvement in RDI activities is limited and innovation is not broadly considered to be an important driver of economic growth. [W]
- Linkages between private and public R&D organisations, as well as weak cooperation with universities, were reinforced by the National Plan for RDI (2007-2013) and a new National Plan (2014-2020) is currently under preparation. [S]

R&I expenditure

- Overall insufficient R&D funding. [W]
- The allocation of public funds for R&D is still at odds with the target of 1% of GDP by 2020. [T]
- Measures have been taken to improve science-industry links by grants for projects with industrial partners. [S]
- A large part of the Structural Funds for R&I has been focused on programmes for developing R&I infrastructure and human resources which have been developed as complementary to the national R&D programmes. [S]

Strategy, policy and governance

- Romania's RDI system has a complex multi-level structure, which is relatively stable, but its large size and complex setup often create significant incoherencies and gaps in policy-making and implementation. [W]
- *Elaboration of the National RTDI Strategy 2014-2020* – the consolidated vision stresses the aim of increasing competitiveness. [O]
- Fostering industry-university-R&D institution partnerships and the involvement of the private sector in R&D activities, to accelerate technology transfer to industry and increase the R&D capacity of domestic firms. [O]
- RIS were considered to have only an orientation purpose and did not become a part of regional innovation policy or get a mandatory character; therefore, their implementation was not significantly pursued after 2008. [T]

Human resources

- "Brain drain" due to overall underfinancing of R&I since the 1990s. [W]
- Net outflow of researchers (it is estimated that 15 000 researchers are currently working abroad). [W]
- Amount of international co-publications with other European countries is one of the lowest in Europe. [W]
- Increasing the participation of Romanian researchers in international programmes, especially in EU RTDI initiatives such as ERA and H 2020, to stimulate transnational learning and access to EU funding. [O]

Thematic areas

- Defined set of R&I priorities in the draft of National Strategy on RDI (2014-2020) [S]
- Romania has potential for regional clusters in the fields of ICT, nano-sciences and nanotechnologies, automobiles, security and new production technologies. [O]
- The broader transition of Romanian R&D policies and associated implementation instruments from a largely generic to a more thematic focus. [O]
- Hot-spots in key technologies: automobiles, ICT, new production technologies, nanotechnologies, security. [S]

3.3.6.11 Serbia

Sources

- Erawatch - Country fiche
- Questionnaire created by EY and sent to officially-nominated contact persons

General features

- Serbia exhibits leadership in West Balkan Region. [S]
- Low level of R&I activities in the business enterprise sector. [W]
- More intensive linkage of R&I with the economy. [O]

R&I expenditure

- Serbia is lagging behind most of the EU member countries in R&D investment, reaching GERD in 2012 of 46.6% of EU27 average. [W]
- Low R&D investment due to financial crisis. [W]
- Increasing and diversifying R&D expenditure. [O]

Strategy, policy and governance

- The Serbian research system is centralized. [S]
- Adopted Strategy of Scientific and Technological Development of the Republic of Serbia 2010-2015. [S]
- Current approach in strategy and policy-making process is traditionally based on expert opinion, without inter-sector dialogue, communication with community for identification of bottom-up initiatives and priorities, scenario development, forecasting, and other future-oriented activities, which are commonly collected under the foresight exercise umbrella. [W]
- The Regional and/or National R&I Strategies on Smart Specialization (RIS3) approach has not been implemented in creation of strategic policy documents in Serbia so far. [T]
- Serbia successfully participates in intergovernmental organisations and schemes, particularly in international programmes and many bilateral agreements. The impact of these agreements on the R&D landscape could be assessed as important for the R&D sector and S&T development in Serbia. [O]
- No reforms implemented. [T]

Human resources

- Labour costs in R&D are significantly lower in comparison with EU. [S]
- The number of researchers in Serbia is changing from year to year, due to permanent “brain drain”. [W]
- Implementing incentives to fight the emigration of Serbian researchers. Identification, development and support of talented young researchers. [O]
- The best practice case and recommended example of public-private knowledge transfer model is the (public) University of Novi Sad with almost 60 spin-off companies created within last five to six years. [O]
- The average age of researchers is 44.3 years, which is above the average age of the population as a whole, pointing to the need to take action to support and nurture young scientific researchers. [T]

Thematic areas

- R&D priorities: natural sciences, engineering and technology, agricultural sciences. [S]
- Targeted research and technology fields listed in Strategy of Scientific and Technological Development of the Republic of Serbia 2010-2015: Biotechnology, Energy, Environment, Food agriculture and fisheries, Government and social relations, Health, ICT, Materials, Nanoscience and nanotechnologies, Socio-economic sciences and humanities. [S]

3.3.6.12 Slovakia

Sources

- Research and Innovation performance in EU Member States and Associated countries – 2013
- Erawatch - Country fiche
- RIS 3 Slovakia – DRAFT
- Questionnaire created by EY and sent to officially-nominated contact persons

General features

- Lagging behind the rest of EU countries in the knowledge-intensity of the economy in EU. [W]
- Administrative barriers to implementation of projects funded from EU Structural Funds; low utilisation of risk capital. [W]
- Low business R&D activities, including low patenting, business researchers and R&D investments. [W]
- Bratislava is the major centre of R&D activities, accounting for about one half of Slovak R&D personnel and spending. [S]
- Low cooperation between universities, research institutions and business. [W]
- Transition of foreign investments from Slovakia into more favourable business and investment environment. [T]

R&I expenditure

- Slovak research system is heavily underfunded. [W]
- Solid drawing of EU Structural Funds to Research, Innovation and Entrepreneurship despite administrative barriers in implementation of projects funded from EU Structural Funds. [S]

Strategy, policy and governance

- The unfavourable situation in R&D is recognized and admitted by relevant government bodies and authorities. [O]
- Numerous political statements without any reforms. [T]

Human resources

- Significantly lower human capital costs in R&D costs in comparison with EU 15 [S]
- High quality scientists in specific fields (i.e., ICT, medicine). [S]
- Underfunded R&D and low R&D infrastructure may contribute to “brain drain”, even though steps to increase the number of young people in science have been implemented. [T]
- Growth of doctoral studies graduates may contribute to increasing the number of young researchers. [O]
- Increase in R&D attractiveness of Slovakia may lead to transition of foreign investors in R&D from other countries to Slovakia and decrease “brain drain”. [O]

Thematic areas

- Due to presence of three strong automakers, Slovakia shows particular strengths in patenting and technological specialization in automotive sector. [S]
- RIS 3 specialization areas: materials and nanotechnology, ICT, biotechnologies and biomedicine, agriculture and environment, sustainable energy. [S]
- Hot-spots in key technologies: food and agriculture, energy, ICT, materials. [S]

3.3.6.13 Slovenia

Sources

- Research and Innovation performance in EU Member States and Associated countries – 2013
- Erawatch - Country fiche
- Questionnaire created by EY and sent to officially nominated contact persons

General features

- Slovenia is one of the top performers in EU in terms of business R&D. [S]
- Insufficiently integrated platforms to promote technology transfer and links between business sector and public R&D. [T]
- Even though the national economy was hit by crisis the situation in R&D was stable or even prosperous. [S]
- Fragmentation of R&I system. [W]
- Lower performance in knowledge commercialization, private and public sector internationalization and research quality. [W]
- Lack of cooperation between research institutes, and the fragmentation and sub-optimisation of R&I utilisation. [W]
- Clusters of excellence in academic and industrial research. [S]
- Outdated and obsolete research equipment. [W]
- Focus mainly on scientific excellence without clearly set priorities for basic research. [T]
- RISS 2011-2020 shows increasing level of consensus on the scientific excellence and research priorities. [S]

R&I expenditure

- Private investments in RTDI have grown significantly in last few years. [S]
- Significant contribution of business sector to R&D funding. [S]
- R&D intensity as well as increasing expenditure on R&D in the business sector. [S]

Strategy, policy and governance

- Adopted Research and Innovation Strategy of Slovenia which defines the R&D priorities for the next decade (2011–2020). [S]
- Slovenia is meeting the challenge of reaching its 2020 R&D intensity target of 3% by mobilizing incentives and resources from public and private sources (human, financial, infrastructural) and providing smooth paths for more technological innovation. [S]
- Better exploitation of the existing national research infrastructure; upgrade and construction of new research infrastructure in priority areas and international integration based on access to large research infrastructures. [O]

Human resources

- Strong human resources in a broad range of R&I areas. [S]
- Substantial increase in the number and quality of scientific publications. [S]
- Problem with employability of students may influence the quality and motivation of doctoral graduates. [T]
- Employment of researchers by business enterprises and in knowledge-intensive activities is at a high level. [S]

Thematic areas

- The segmentation of BERD shows that two sectors have a predominant role in financing R&D activities, i.e., chemicals, especially pharmaceuticals, and machinery and equipment, particularly electrical. [S]
- Broad range of research areas resulting in lack of depth and competitive edge in the global environment. [T]
- Hotspots in key technologies: healthcare, nutrition and agriculture, ICT, material engineering, new production technologies, environment. [S]

3.3.6.14 Ukraine

Sources

- Erawatch – Country fiche

General features

- Cost of doing R&D in Ukraine has become attractive for foreign customers. This is especially true in the case of space and aviation and also in oil and gas transport sectors. [S]
- The country still has substantial R&D potential but has been shrinking over the last 23 years. [O]
- The role of the business sector, with respect to both the financing and implementation of R&D, is decreasing. [T]
- The total number of universities in Ukraine exceeds 360; however, only 176 are involved in R&D. [W]

R&I expenditure

- The higher education sector, in terms of research performance, is extremely dependent on public funding. [T]
- Low research activity of universities, while the National Academy of Sciences of Ukraine, as well as five other state-supported academies, traditionally acts as a very important player in the national research system, receiving three-quarters of the state's R&D budget. [W]

Strategy, policy and governance

- Currently high level of political instability. [W]
- The Ukrainian research system remains centralized, with individual regions playing a limited role in policy formulation and implementation. [S]
- R&D advisory councils are generally considered to be inefficient. [W]
- International cooperation is supported by agreement between Ukraine and the EU on Scientific and Technological Co-operation and number of bilateral agreements on S&T co-operation with individual EU countries which complement the main agreement with EU. [O]
- Existing internal taxation practices do not support international project implementation, despite there being some clauses in EU-Ukraine agreements on special financial conditions for R&D projects. This creates serious barriers to co-operation. [T]

Human resources

- The level of income in science is much lower than in the business sector, therefore career in science is not viewed as prestigious. [W]
- The demographic situation in the country is such that the number of students enrolling in university is expected to decline in coming years. [T]
- Growing number of Ukrainian scientists are of pension age. [T]
- Emigration of specialists from the country. [T]
- Utilisation of intensive factors, such as innovation and qualitative improvements in human capital. [O]
- Co-operation between Ukrainian and EU researchers remains relatively low. [W]

Thematic areas

- Priorities: basic research of the most important problems of S&T, social and economic, political and demographic development for provision of competitiveness and sustainable development of the state, ICT, energy and energy efficiency, rational utilisation of natural resources, life sciences, new technologies in medicine, especially in fighting widespread diseases, new materials and substances. [S]

3.3.7 Conclusion of SWOT analysis

The SWOT analysis of each DR country focused mainly on qualitative R&I indicators and its purpose was to supplement the quantitative analysis carried out in section “2.2 Quantitative analysis and benchmarking”.

Strengths (S)

- There is significant activity in terms of R&D support in the DR and there are multiple initiatives. [S]
- The majority of countries have R&D as their priority and expenditure has been growing in the past few years. [S]

Weaknesses (W)

- Insufficient R&D human capital and its relatively lower mobility and international cooperation – “brain drain” are a significant problem. [W]
- Low number of patents and scientific publications. [W]
- Lack of strategic R&I documents, which define goals and direction, both at national and international level. [W]
- Cooperation between the private sector and public R&D institutions is low and so is that with universities. [W]
- Insufficiently developed/obsolete R&D infrastructure, especially in less developed countries of the DR. [W]
- Inconsistent indicators when measuring R&D results/performance in neighbouring and candidate countries. [W]

Opportunities (O)

- The following priority areas are shared by multiple countries: ICT, new materials, renewable energy resources. [O]
- Relatively high number of university graduates that could potentially be transformed into new R&D personnel. [O]

Threats (T)

- High level of R&D investments in China. [T]
- Relocation of private innovation activities to countries with more developed infrastructure and job market. [T]
- Frequent changes in management of R&D. [T]
- Vast difference between quality and status of R&D and academic institutions within the region. [T]

The SWOT analysis of DR countries confirms the diversity of the DR countries, in terms of level of economic development, level of education and level of integration into the EU. A suitable strategy for DRRIF to approach these differences would be to identify clusters of countries (e.g., by industry or role in value chain) according to their strengths and identify goals and thematic areas for each cluster (Chapter 5. Analysis of DRRIF thematic areas investigates this further).

Conclusions

- Countries have various strengths, weaknesses, threats and opportunities which can be counterproductive to compromise. Yet they can also help to reduce homogeneity and reveal comparative advantages and synergies.
- Considerations regarding DRRIF will have to take into account the diversity of countries involved, as well as the importance of specific areas to each country. In order to arrive at a common understanding and set of tools, there will have to be a willingness to make compromises.
- The results of SWOT analysis, questionnaire and interviews confirmed the conclusions of our quantitative analysis.

3.4 PESTEL analysis

We have carried out PESTEL analysis (political, economic, social, technological, environmental and legal analysis) of the DR as a whole.

Compared to the previous chapter (SWOT analysis), PESTEL analysis provides an alternative and complementary perspective on the DR; one that is more general and applies to the whole region, while considering both the risks and advantages of DRRIF's future function in this diverse European area.

Its aim is to evaluate the Danube region's absorption capacity by way of a macro-environmental analysis of six external aspects and their impact. Moreover, it will also be helpful for future elaboration on areas from the SWOT analysis.

Political pros

- Common history of selected Danube region countries (e.g., Yugoslavia, Czechoslovakia, Habsburg Monarchy).
- Prior working cooperation between countries of the region (1996 - CADSES; 2007 - CADSES II; South East Europe Programme, Central Europe Programme).
- Stable and predictable political situation in western countries of the Danube Region.
- EUSDR is approved by the EC and widely supported in Danube Region countries – even informal discussions with delegates of DR countries suggest endorsement for DRRIF's establishment.
- Political commitment of EU members to increase R&D expenditures every year by 3% until 2020.

Political cons

- Unstable (national and international) political situation in some Danube Region countries.
- Political cycle – frequent changes to R&D administration and how it is managed at the national level. While working on this feasibility study there have been political changes in Hungary, Serbia and Slovakia which have impacted its potential outcome.
- DR consists of EU Member, candidate and non-member states. Additionally, there are federacies/regions as well (Germany, Ukraine).
- R&D is not a politically attractive issue – does not have sufficient political support.
- Lack of strategic political documents in some countries (e.g. RIS 3).

Economic pros

- Germany (namely BY and BW) is the economic leader not only in DR but also at the European and international level.
- Increase in R&D spending (up to 3% of GDP) is anticipated. If properly coordinated, this has a potential synergistic effect.
- New programme period has provided more EU funds designated for R&I (Horizon 2020, structural EU funds) – the goal is to improve financing and allocate the funds to projects with real added value.
- DR countries (apart from Germany and Austria) have lower personnel costs than Western European countries.

Economic cons

- Most DR countries have underfinanced R&D.
- Most economic and R&D indicators are lagging behind those of Western Europe.
- During fiscal consolidation, R&D expenditures are often the first to be reduced.
- EU funding is not accessible to all DR countries and there are no alternatives of equal size.
- High corruption indexes exist in public administration in many different DR countries.

Social pros

- Socio-cultural enrichment when working on joint projects thanks to social diversity.
- In spite of language barriers, plus cultural and geographical distances, researchers are looking forward to cooperation with other researchers – science is not limited by the borders of nations.

Social cons

- Outflow of skilled labour to countries with better working conditions and more developed job markets.
- Large gap in quality and ranking of research and academic institutes within the region.
- Different working styles on joint projects might cause disagreements.
- Language diversity could be a barrier to cooperation.
- Possible slower progress and processes due to geographical distance.

Technological pros

- Potential gains from synergies and sharing of R&D technologies used by individual DR countries.

Technological cons

- Significant difference in available R&D infrastructure and equipment, which can potentially hinder international cooperation.

Environmental pros

- Common environmental challenges – finding solutions to increasing intensity of natural disasters, particularly floods.
- Danube river connects all DR countries (possible thematic area).

Environmental cons

- Diverse environmental priorities among DR countries.

Legal pros

- Harmonized legislation among EU Member States.

Legal cons

- Difficult law enforceability in some DR countries.
- Legal question marks regarding DRRIF's financing from national and/or European funds.
- Non-harmonized legislation in non-EU states.

3.5 Analysis of the Danube Region countries' participation in selected programmes

This section is dedicated to an analysis of programmes[33], in which the institutions from the DR countries participated during the 2007 - 2013 programme period. This includes: Seventh Framework Programme, South East Europe Programme, Central Europe Programme and Black Sea Joint Operational Programme. Although the last three do not concentrate solely on R&I, their projects focus on areas that need further development in individual regions. Thus, we consider programme analysis important.

Our goal was to evaluate the participation rate of individual DR countries in programmes, to analyse the ability of countries to lead the projects and to measure their cooperation. As a result, we would be able to tell how proficient the institutions in these countries are in acquiring EU funds, the competitiveness of proposed projects and to determine areas in which the particular country carried out the highest number of projects.

3.5.1 Overview of analysed programmes

Seventh Framework Programme 2007 - 2013
The Seventh Framework Programme (FP7) fostered all EU research initiatives and played a key role in achieving growth, competitiveness and employment goals.

FP7 goals were divided into four main categories: Cooperation, Ideas, People and Capacities. Each category had an individual programme that related to major EU policies on research. The purpose of these individual programmes was to collectively promote and support the development of European scientific excellence.

DR countries that participated in the FP7: Germany, Austria, Czech Republic, Slovakia, Hungary, Slovenia, Romania, Bulgaria, Croatia, Serbia, Bosnia and Herzegovina, Montenegro, Moldova, Ukraine.

South East Europe Programme 2007 - 2013.

The South East Europe Programme's aim was to improve the process of territorial, economic and social integration and promote the region's cohesion, stability and competitiveness through development of international partnerships and joint activities of strategic significance.

It encouraged improved integration among EU Member, candidate and potential candidate states as well as neighbouring countries, since cooperation in the South Europe region is a must, no matter how different the integration status of the countries. The EU's main priorities in this region are stability, prosperity and security.

DR countries that participated in SEE: Bosnia and Herzegovina, Bulgaria, Montenegro, Croatia, Hungary, Moldova, Austria, Romania, Slovakia, Slovenia, Serbia and Ukraine.

Central Europe Programme 2007 - 2013
The Central Europe Programme promoted cooperation among regions of nine European countries: Czech Republic, Germany, Hungary, Poland, Slovakia, Slovenia, Italy and Ukraine. Its aim was to strengthen overall competitiveness by encouraging innovation, improving accessibility, environment and increasing the attractiveness of cities and regions of given countries.

DR countries that participated in CE: Czech Republic, Germany, Hungary, Slovakia, Slovenia, Austria, Romania and Ukraine.

Black Sea Joint Operational Programme 2007 - 2013
The Black Sea Joint Operational Programme's goal was to encourage sustainable economic and social development of regions in the Black Sea area. It was greatly beneficial for economic development of local communities, solving issues related to the environment as well as for most people, interaction.

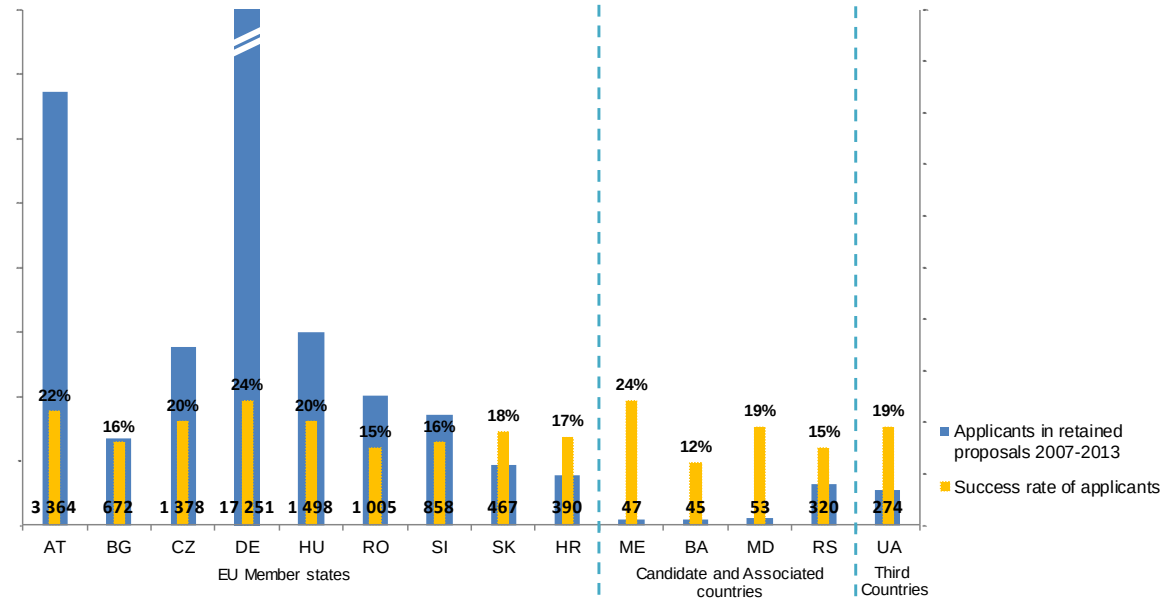
DR countries that participated in the Black Sea JOP: Bulgaria, Moldova, Romania, Ukraine.

[33] Analysed data come from publically available data of individual programmes. Due to differences and inconsistencies in data, some analyses could not be applied to every programme.

3.5.2 Analysis of proposal success rate within the Seventh Framework Programme

The overall success rate of proposals submitted within the FP7 was roughly 20%, but it differs according to priority area. Among EU Member States of the DR, Slovenia, Bulgaria and Romania had the lowest success rates. On the other hand, the highest rates of retained proposals submitted were from Germany and Austria. In the candidate states group, Bosnia and Herzegovina had the lowest success rate of 12%, which is the lowest among all the DR countries. Montenegro showed a very promising rate of 24%; however, the number of proposals submitted was low.

Graph 16: Number of applicants in retained proposals and success rate in FP7 2007 - 2013



Source: e-Corda k 20.6.2014, processed by EY

FP7 success rate of organisations providing higher or secondary education[34]

Based on the sixth FP7 monitoring report for the 2007 to 2012 period, none of the DR's organisations providing higher or secondary education (HES)[35] was ranked within the top 10. Six organisations from Germany and one from Austria were present in the top 50 HES but no other DR countries are represented.

FP7 success rate of research organisations

Based on the sixth FP7 progress report for the 2007 to 2012 period, three German organisations were ranked within the top 10 most successful research organisations (REC)[36] with one of them coming in the second place. As for the top 50, research organisations from Germany, Slovenia and Austria were present; however, no other DR countries were included in the ranking.

Conclusions

- DRRIF should encourage and support proposals for funds in countries with a low number of FP7 proposals and low success rate.
- DRRIF should actively engage in improving the competitiveness of research and academic institutions applying for funds from strategic initiatives (Horizon 2020).
- Even countries like Austria and Germany have potential for improvement when compared to other high-performing countries of the EU.

[34] Sixth FP7 monitoring report, available at; http://ec.europa.eu/research/evaluations/pdf/archive/fp7_monitoring_reports/6th_fp7_monitoring_report.pdf
[35] HES – Higher or Secondary Education Organisation
[36] REC – Reasearch organisation

3.5.3 Analysis of project management capability

The purpose of the analysis was to evaluate the ability of countries to establish partnerships and manage joint projects. The aim was to identify countries with the highest propensity to use provided funds efficiently.

Countries (institutions) that acted as a lead partner presumably have the necessary experience and infrastructure for effective project management as they bore financial and administrative responsibility for the projects. Relating to the absorption capacity, these countries are more likely to obtain and use entrusted funds efficiently as they already house organisations that are able to successfully propose new projects.

Seventh Framework Programme

The highest number of retained proposal coordinators within the FP7 was from Germany, which also submitted the most projects altogether. As for the success rate, Montenegro had the best results with 28% but its small number of proposals submitted has to be taken into account. Overall, the most successful participants were Germany, Austria and Hungary. Nonetheless, the participation rate of other DR countries has to be encouraged and increased within the next Horizon 2020 programme.

Table 2: Proposal coordinators and their success rate within the FP7 in the 2007 - 2013 period

Country	Coordinator in eligible proposals	Coordinator in retained proposals	Success Rate
Germany	14 883	3 103	21%
Austria	3 225	680	21%
Hungary	1 174	213	18%
Czech Republic	949	118	12%
Romania	888	70	8%
Slovenia	770	58	8%
Bulgaria	488	48	10%
Serbia	399	42	11%
Croatia	375	40	11%
Slovakia	344	38	11%
Ukraine	67	8	12%
Montenegro	25	7	28%
Bosnia and Herzegovina	39	6	15%
Republic of Moldova	45	5	11%

Source: e-Corda z 20.6.2014
The table is an overview of retained proposal applicants, where countries acted as a coordinators.

South East Europe Programme

Within the South East Europe programme, Italy was the most dominant and led 45 out of a total of 122 projects. As for DR countries, the most successful were Austria and Hungary, but many other DR countries were not a lead partner on a single project.

Table 3: Lead partners of the South East Europe Programme

Lead partner	Number of projects
Italy	45
Austria	17
Greece	17
Hungary	17
Slovenia	15
Romania	7
Slovakia	3
Bulgaria	1

Source: South East Europe project database[37], processed by EY
* Countries that did not act as a lead partner on a single project: Albania, Bosnia and Herzegovina, Macedonia, Croatia, Montenegro, Serbia, Ukraine, Moldova.

[37] An overview of projects approved under the SEE: http://www.southeast-europe.net/en/projects/approved_projects/

Central Europe Programme

The most successful in terms of lead partners was Germany with 40 projects in total and Italy which came in second with 27 projects.

Table 4: Lead partner[38] of the Central Europe Programme

Lead partner	Number of projects
Germany	40
Italy	27
Austria	20
Hungary	15
Poland	12
Czech Republic	5
Slovenia	3
Slovakia	2

Source: Central Europe Cooperating for Success[39], processed by EY
* Countries that did not act as a lead partner on a single project: Ukraine, Romania

Joint Operational Programme Black Sea

Two calls were announced within the Joint Operational Programme Black Sea in the 2007 to 2013 period that fostered 62 projects in total. Out of all countries, Romania participated on the highest number of projects and also had the highest amount of recipients. Among other DR countries, Bulgaria had 12 recipients and took part in 43 projects. Moldova, Ukraine and other DR countries that engaged in the programme did not have many recipients but participated on projects relatively extensively.

Table 5: Overview of participation rate within the Black Sea Joint Operational Programme

Country	Country of Recipient	Project partner
Romania	19	48
Greece	16	29
Bulgaria	12	43
Moldova	6	41
Armenia	5	22
Georgia	3	32
Ukraine	1	40
Turkey	0	37

Source: Black Sea JOP Projects grant awarded[40], processed by EY
* Turkey was not the country of recipient in a single project carried out.

Conclusions

- Due to the low number of DR countries acting as the lead partners on joint projects, additional help and support is necessary for countries, which did not manage any projects or managed very few, in the next programme period.
- In order to increase the amount of lead partnerships, DRRIF should help reduce the administrative burden, promote programmes in certain countries and encourage cooperation and networking among DR countries.
- Further conclusions and recommendations for cooperation within the DR will be developed when analysing the potential for different thematic areas.

[38] The lead partner, selected from all the partcipants, bears full financial and administrative ERDF responsibility throught the whole duration of the project. The lead partner is also responsible for the provision of monitoring reports in JTS as it is stated in the subsidy contract. Generally, the lead partner has functional (coordination of project activites) and financial responsibility in relation to ERDF resources. In case the project is co-funded by IPA or ENPI, this responsibility can be separated in to functional and financial.
[39] An overview of projects approved under the Central Europe programme, available at: <http://www.central2013.eu/nc/projects-2007-2013/approved-projects/>
[40] An overview of projects approved under the Black Sea JOP, available at: <http://www.blacksea-cbc.net/index.php/eng/Projects/Grants-awarded>

3.5.4 Analysis of country activity and cooperation in the SEE, CE and JOP Black Sea

The aim of the analysis is to evaluate the intensity of cooperation among the DR countries in the selected programmes. As a result, we would be able to determine which DR countries had the closest partnerships and which countries should cooperate more.

Based on the analysis of the South East Europe, Central Europe and Joint Operational Programme Black Sea for the 2007 to 2013 period, we created a matrix of joint projects of countries that participated in the programmes. Furthermore, it also illustrates each country's overall level of participation in the projects.

South East Europe

A total of 122 projects were fostered during the 2007 to 2013 period of the South East Europe Programme. The lowest number of countries working on a single joint project was five and the maximum number of countries involved on a single project reached 14.

Matrix 4: Cooperation of countries within the South East Europe Programme

	RO	HU	IT*	BG	GR*	SI	AT	RS	HR	SK	AL*	BA	MK*	ME	UA	MD
(106) **Romania**																
(103) **Hungary**	90															
(103) **Italy***	91	84														
(93) **Bulgaria**	86	79	77													
(87) **Greece***	77	69	81	70												
(83) **Slovenia**	69	70	77	59	66											
(80) **Austria**	69	67	65	60	53	57										
(75) **Serbia**	66	66	59	62	49	47	53									
(64) **Croatia**	56	56	53	50	40	46	42	47								
(48) **Slovakia**	46	46	33	34	24	26	35	34	30							
(36) **Albania***	33	29	35	28	31	29	23	23	26	14						
(35) **Bosna and Hercegovina**	31	32	34	24	27	30	25	24	26	15	20					
(28) **Macedonia***	23	23	25	21	25	25	20	20	19	12	70	14				
(27) **Montenegro**	21	21	24	20	24	21	22	18	16	10	17	15	13			
(18) **Ukraine**	16	16	13	13	10	8	11	16	10	10	4	3	3	3		
(15) **Republic of Moldova**	13	13	11	9	11	10	9	9	9	8	3	2	3	3	6	

Source: South East Europe project database[41], processed by EY
The number in the bracket refers to the total number of projects the country participated in.
* Country is not a part of the DR.

In this programme, the most active countries by number of projects were Romania (106 projects), Italy (103) and Hungary (103). Moldova (15) participated on the least number of projects.

In terms of cooperation, Italy and Romania worked together on the highest number of joint projects (91) and Romanian cooperation with Hungary reached 90 projects. Overall, cooperation among Austria, Bulgaria, Hungary, Italy, Romania, Slovenia, Serbia, Greece and Croatia was quite intensive within the South East Europe programme. However, the number of projects suggests both Ukraine's and Moldova's cooperation rate was rather low.

Central Europe Programme

Within the 2007 to 2013 Central Europe programme period, there was a total of 124 projects with the minimum number of countries participating on a single joint project being four and the maximum being nine.

[41] An overview of projects approved under the SEE:< http://www.southeast-europe.net/en/projects/approved_projects/>

Matrix 5: Cooperation of countries within the Central Europe Programme

	PL*	DE	IT*	CZ	HU	AT	SI	SK	UA	RO
(101) **Poland***										
(100) **Germany**	84									
(97) **Italy***	85	78								
(92) **Czech Rep.**	75	73	71							
(90) **Hungary**	73	71	72	64						
(89) **Austria**	70	73	70	68	69					
(82) **Slovenia**	68	66	71	60	64	54				
(60) **Slovakia**	46	43	46	50	32	47	41			
(8) **Ukraine**	7	8	5	6	5	5	4	2		
(3) **Romania**	2	3	2	2	3	3	2	2	1	

Source: Central Europe Cooperating for Success[42], processed by EY
The number in the bracket refers to the total number of projects the country participated in.
* Country is not a part of the DR.

In terms of number of projects, the most active countries within this programme were Poland (101 projects), Germany (100), Italy (97). On the other hand, the least active were Romania (3) and Ukraine (7).

As for the level of cooperation, Poland and Italy had the highest number of 85 joint projects, followed by Germany and Poland's 84. Among DR countries, Germany and Austria had very intensive cooperation (73) as was the cooperation between Germany and the Czech Republic (72). Ukraine and Romania's single joint project was the lowest number of all. Overall, both Ukraine and Romania's participation rate was 12 times lower than that of Germany.

Black Sea Joint Operational Programme

There were two calls within the 2007 to 2013 period of the Black Sea Joint Operational Programme that fostered a total of 62 projects. The lowest number of countries involved in a single joint project was three and the highest was seven.

Matrix 6: Cooperation of countries within the Black Sea Joint Operational Programme

	RO	BG	MD	UA	TR*	GE*	GR*	AR*
(48) **Romania**								
(43) **Bulgaria**	31							
(41) **Moldova**	35	25						
(40) **Ukraine**	34	28	27					
(37) **Turkey***	29	27	24	24				
(32) **Georgia***	20	25	20	16	22			
(29) **Greece***	19	21	18	19	17	17		
(22) **Armenia***	14	10	15	9	11	13	14	

Source: Black Sea JOP Projects grant awarded[43], processed by EY
The number in the bracket refers to the total number of projects the country participated in.
* Country is not a part of the DR.

In terms of the number of projects, Romania (48), Bulgaria (43), Moldova (41) and Ukraine (40) were the most active. Otherwise, Greece (29) and Armenia (22) were the least active. As the numbers suggest, the DR countries were rather active in this programme.

Romania and Moldova had the highest cooperation rate as they took part in 35 joint projects followed by Ukraine and Romania, which worked together on 34 projects. Cooperation of Armenia and Turkey on 11 joint projects was the lowest within the programme.

Conclusions

- Due to different levels of cooperation among DR countries, this needs to be promoted.
- The smooth flow of knowledge in R&I projects is necessary. This can be achieved by promoting and developing cooperation among countries.

[42] An overview of projects approved under the Central Europe Programme, available:< http://www.central2013.eu/nc/projects-2007-2013/approved-projects/>
[43] An overview of projects approved under the Black Sea Joint Operational Programme, available at: <http://www.blacksea-cbc.net/index.php/eng/Projects/Grants-awarded>

3.5.5 Summary of analysis of the DR countries participation in selected programmes

In order to increase the absorption capacity of the DR, it is important to promote organisations proposing new projects. During the 2007 - 2013 period, Germany and Austria were well ahead of the other DR countries in their participation rate especially in FP 7 and it is clear that they have the highest absorption capacity. However, to ensure the progress of the whole DR, further cooperation and knowledge sharing of the upstream countries with the downstream countries is necessary.

It is necessary for most of the help to be focused on those countries of the DR that led fewer projects or did not manage any projects at all, which might have been due to a high administrative burden, low awareness about the programmes or insufficient cooperation.

As there is no comprehensive overview of all international projects funded from different sources and programmes, establishing an institution that would monitor such projects and evaluate the share of these projects on the total R&D in individual countries would be of great benefit. Availability of such information is crucial for the analysis of cooperation rate among individual countries.

3.6 Evaluation summary of R&I absorption capacity in the DR countries

This section of the document, in which we examined the R&D absorption capacity of the DR, became the essential component of DRRIF's feasibility study. Key findings:

The analysis of absorption score suggests that there is R&D absorption capacity in the DR and that it is substantial.

- Based on the absorption score analysis that we have designed, we can conclude that the DR values are half those of innovation leaders (USA, Japan) both in terms of overall absorption score as well as gross domestic R&D expenditure.
- Similar to the EU level, where Horizon 2020, even with its substantial budget of 70 billion Euros for 2014-2020, only constitutes a small fraction of the total R&D expenditure in the EU countries, a potential Danube Region Research and Innovation Fund – whatever size and form it may take – would also only represent a small share of the total GERD in the region. Therefore measures/activities will have to concentrate and relevant impacts will only be reached with additional strengthened coordination of available resources in the region.

In order to improve the R&D situation in the DR, improvements in the human capital utilisation rate in countries with low R&D intensity are required.

- Employment rate indicators in fast-growing and knowledge-intensive sectors suggest a sufficient knowledge level of human capital in the DR.
- Differences in employment rate indicators in fast-growing and knowledge-intensive sectors are much smaller among the DR countries than for any other indicators. A lot of countries are above or near the EU 27 average, mainly due to the activities of international companies that spread know-how.
- However, analysis of the other indicators suggests that this tendency is not applicable to R&D. Thus, similar measures as in the knowledge-intensive business sector should be taken in order to achieve development of human capital in R&D (promote mobility of the population, foreign investments, overall political support).
- One of DRRIF's goals could be dedicating future calls to education, in a similar way to other EU flagship projects (Graphene, Human Brain).

Compared with other R&D leaders such as the USA, Japan and EU 27, the whole DR lags behind in collaboration between the business and public sectors. Therefore, cooperation in this area should be a high priority throughout the DR.

- Collaboration between public and business sectors on scientific publications is 14 times lower than in the USA. Insufficient collaboration of public and business sectors is a weakness of many DR countries.
- Connecting scientists and public institutions with the business sector through projects, events and their participation in DRRIF's administrative bodies could potentially be beneficial for DRRIF's goals.
- Improved cooperation between public and business sectors could bring more opportunities to talented students and scientists and help to eliminate the brain drain which appeared to be a limiting factor in several DR countries.

There is space for improvement in terms of cooperation among the DR countries. Establishing new institutions promoting cooperation and coordination and their proper functioning will help to utilise the resources for R&I support more effectively.

- Different levels of cooperation of the DR countries on selected analysed projects [44] suggest the need to improve and strengthen cooperation between some of them.
- Meta-analysis of existing SWOT analyses of the DR[45] confirmed that improving cohesion through cooperation and coordination, better utilisation of human capital and collaboration between the public and private sectors are the main challenges of the DR.

[44] Analysed programmes: Seventh Framework Programme, South East Europe programme, Central Europe programme, Black Sea Joint Operational Programme.
[45] Analysed reports: Socio-Economic Assessment of the Danube Region – State of the Region Challenges and Strategy Development, Danube Transnational Programme 2014–2020 and Central Europe programme – Results of the regional analysis

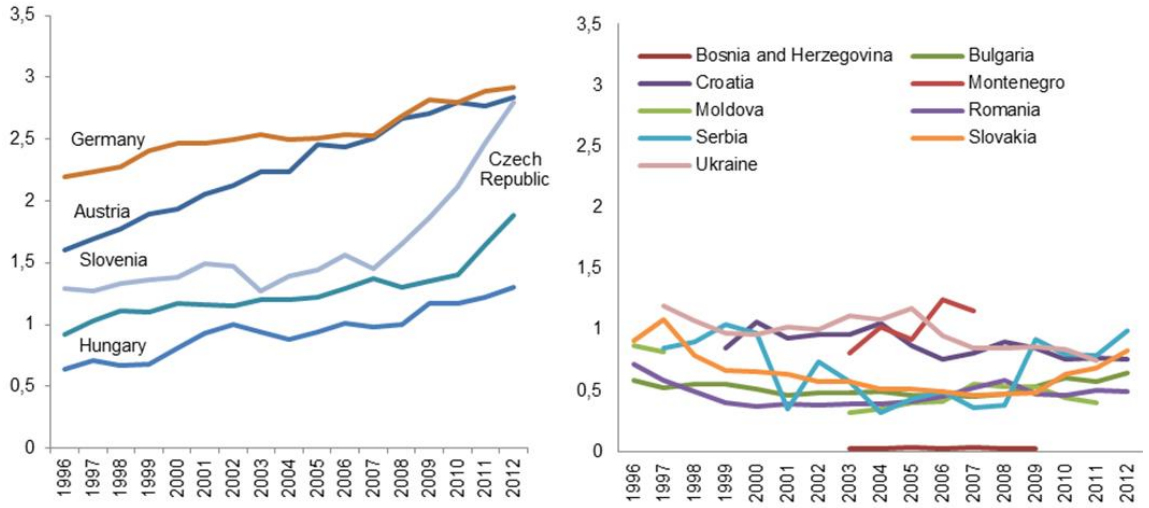
Overlapping R&D areas with the highest priority for many DR countries are ICT, new materials, renewable energy sources, transportation and environment.

- During the SWOT analyses of individual DR countries, we have discovered the following overlapping priority areas: ICT, new material, renewable energy sources.
- Meta-analysis of existing SWOT analyses of DR[46] suggests the following joint thematic areas: energy, transportation and the environment.
- Understanding strengths of DR countries in particular areas is important for DRRIF to be able to address specific needs (e.g., by supporting the formation of clusters by industries or role in value chain)
- Detailed analysis of DRRIF's potential thematic areas is discussed in section 5.

Considerations regarding DRRIF will have to take into account the diversity of the region, specificities of the countries involved as well as the importance of specific areas to each country. In order to arrive at a common understanding and set of tools, a willingness to make compromises will have to be present in the countries. Differences in political stability, economic situation and legal certainty exist among the DR countries. However, despite all the diversity there are certain country clusters that share common history, culture and values.

- Countries have various strengths, weaknesses, opportunities and threats which can be counterproductive to finding a compromise. Yet, they can also help to reduce homogeneity and to discover comparative advantages and synergies.
- The diverse situation of countries and the resulting differences in goals and motivations are illustrated by the progression of the basic R&D indicator – evolution of GERD as a percentage of GDP.

Graph 17: Gross domestic R&D expenditure (GERD, % GDP) – countries with growing/fluctuating trend



Source: Eurostat, processed by EY

- The significantly dominant position of the upstream countries needs to be taken into consideration when developing approaches for joint funding and cooperation mechanisms.
- Multiple DR countries do not have any strategic documents for R&D and many non-EU countries are missing data related to R&D. Both of these facts can be detrimental to countries' 'decision-making processes. DRRIF should therefore encourage lobbying activities of policy makers and experts for this topic at the EU level and interoperate with the JRC pilot project "Danube Reference Data and Service Infrastructure" (DRDSI).

Based on the data analysed, we can conclude that R&D absorption capacity exists in the DR and that it is substantial. Bodies like DRRIF could have a significant impact on improving the cohesion of the DR and development of international R&I.

All conclusions are subject to further discussions with the contact persons of the DR countries that will take place at joint workshops. Detailed analysis of DRRIF's mission, goals and thematic areas is discussed in the next step of our analysis – sections covering DRRIF's thematic areas analysis and DRRIF's goals and mission in the DR.

[46] Analysed reports: Socio-Economic Assessment of the Danube Region – State of the Region Challenges and Strategy Development, Danube Transnational Programme 2014–2020 and Central Europe programme – Results of the regional analysis

4. Analysis of cooperation with relevant existing grant and other schemes

There are multiple institutions and programmes in the EU and the DR that support R&D.

Grant schemes and programmes have valuable information, experience and financial resources which could improve DRRIF's implementation and cooperation among the DR countries and level out the differences in R&D if combined and used properly.

Our goal was to propose DRRIF's form so that it would be attractive for its future stakeholders. Thus, we consider the identification of DRRIF's competitive advantage to be crucial in attracting R&D staff and their applications for funding. In turn, it would also help to fund projects with high added value and prompt the cooperation of the business sector.

When setting DRRIF's goals, it is necessary to evaluate existing schemes that could be either partners or competition to DRRIF (i.e., DRRIF should avoid areas that are within the scope of other organisations).

Instead of focusing solely on the number of programmes, we identified programmes and grant schemes that are actually viable for long-term cooperation and can **mutually benefit** from "win-win" situations.

We analysed the existing programmes, grant schemes and institutions active in the DR and their potential cooperation with DRRIF. Furthermore, most of these programmes function at international level and we also considered how DRRIF should go about approaching them. **We did so in the following five steps:**

- **1. Identification of international grant schemes and initiatives** which are active in the European area, especially those that have the DR in scope and focus on R&I:
  - For the purpose of this analysis, we used publicly-available data from websites of the EU, the European Commission and official websites of identified grant schemes, funds, initiatives etc. – for simplicity's sake we will refer to them as grant schemes throughout this section.

- **2. Analysis of grant schemes based on the following criteria:**
  - 2.A Alignment of the scheme's goals with those of the DRRIF:
    - This criterion determines whether the cooperation focuses on similar goals. For example, the goal of the 7th Research Framework Programme was to increase mobility of scientists and researchers; therefore, we can assume that the cooperation will be more likely as the programme focuses on the same goal as DRRIF.

  - 2.B The scheme's thematic areas and their overlap with DRRIF:
    - Each grant scheme has clearly defined its priority areas. Some grant schemes and programmes at the European level support a broader array of areas. On the other hand, the regional grant schemes, such as BONUS in the Baltic Sea region, tend to concentrate on more specific areas. It is important for future cooperation to consider how closely related thematic areas are to DRRIF's.

  - 2.C Extent of cooperation (financial, non-financial) – during our analysis we evaluated the potential cooperation with DRRIF and grouped it by financial or non-financial nature.
    - Non-financial cooperation – knowledge and best practice sharing from the area of fund management (e.g., with BONUS), transnational project management and sharing of finished project results.
    - Financial cooperation – DRRIF's funding opportunities by grant scheme. DRRIF's funding will have a separate chapter in this document.

  - 2.D Possible cooperation opportunities:
    - It is important to take the legal aspects of the cooperation, particularly financial, into account when identifying opportunities. We took the partnership agreement with the EC negotiations and necessary agreements into consideration when evaluating the potential cooperation with DRRIF.

- **3. Arrangement of schemes into four groups** according to the level of recommended cooperation
- **4. Creation of scheme cooperation matrix**
- **5. Formulation of suggested approach for establishing cooperation with the schemes:**
    - The objective of this section was to categorize the analysed grant schemes and recommend the intensity of communication with their contact persons in order to verify the propensity to cooperate and to determine the extent of the cooperation.

The willingness and extent of cooperation of the grant schemes will be verified throughout the project, based on scheduled meetings with the relevant contact persons. Therefore, the extent of proposed cooperation (financial, non-financial) is solely based on our findings at the time of this study.

4.1 Identification of grant and other schemes and evaluation of potential cooperation

Grant and other schemes, programmes and projects in this chapter are sorted in alphabetical order.

4.1.1 BONUS

Period: 2010 to 2017 **Budget**: up to 100 million EUR in 2011 – 2017. Half comes from the EU programmes and the other half from national governments **Scope**: international, within the Baltic Sea Region **Proposed extent of cooperation:** non-financial http://www.bonusportal.org/	BONUS brings together research communities that solve problems common to the Baltic Sea Region in areas such as sea, navy, economic and social research. Its members are research institutions from the following countries: Denmark, Estonia, Finland, Germany, Lithuania, Latvia, Poland and Sweden.

Alignment of the scheme's goals with those of the DRRIF: BONUS brings together naval, coastal, land, economic and societal research communities of the Baltic Sea region.

Its objective is the development of the Baltic Sea region with its main focus on the sea. Its goal, vision and mission are clearly defined and are governed by relation to the Baltic Sea.

Despite the fact that BONUS is active in a different region, it has common goals with DRRIF:

- Cross-border cooperation
- Intention to coordinate with national and regional programmes, structural funds and Horizon 2020

The scheme's thematic areas and their overlap with DRRIF: We did not identify an overlap of thematic areas between BONUS and DRRIF.

Extent of potential cooperation: The cooperation is most likely going to take shape in the form of sharing best practice.

Summary: BONUS is a grant scheme that has been active in Europe since 2010. Although there are not that many possibilities for cooperation in the specific thematic areas, the cooperation in relation to DRRIF's administrative activities is quite possible. BONUS is an Article 185 measure of the Treaty on the Functioning of the European Union and its lessons learned could be very useful for the development of DRRIF, especially in the initial stages of its formation. BONUS being operated by EU Member States, its experience in fund management and obtaining support (financial and political) is relevant. The BONUS involvement of Russia could provide some insights into cooperation with non-EU Member States.

4.1.2 Central European Initiative

Period: 1989 – **Scope**: international **Proposed scope of cooperation:** non-financial http://www.cei.int/	Established in 1989, the CEI is the largest intergovernmental forum for regional cooperation in Europe - encompassing 18 Member States from Central, Eastern and South-Eastern Europe - and is committed to supporting European integration through the promotion of regional cooperation in various areas of intervention outlined in its tri-annual Plan of Action.

Alignment of the CEI's strategic goals with those of the DRRIF:

- Support CEI Member States on their path towards European integration
- Promote the alignment of CEI Member States with EU standards
- Implement small and medium-sized projects
- Convert constructive ideas into innovative results

Overlap of its goals with DRRIF:

- Promoting international cooperation
- Supporting innovation

The scheme's thematic areas and their overlap with DRRIF: The CEI pursues its goals through an innovative working methodology, i.e., a combination of multilateral diplomacy and fund/programme/project management. Indeed, in addition to providing a platform for political dialogue at the highest governmental/ministerial level (Summit of CEI Heads of Government; Meeting of CEI Ministers of Foreign Affairs), the CEI has developed a strong project-oriented approach over the last 12 years. The CEI acts both as donor of resources (provided from its CEI Cooperation Fund and Know-how Exchange Programme) and as recipient of EU resources, through participation in EU co-financed projects as partner and lead partner. The CEI has more than 10 years of experience in EU project management, which includes both European Territorial Cooperation (Central Europe, South-East Europe, MED, Cross-Border Cooperation Programme Italy-Slovenia, Interreg IV C) and sectorial programmes directly managed by the European Commission (Intelligent Energy Europe, Seventh Framework Programme, IPA Regional Programme, Competitiveness and Innovation Programme, LEONARDO Life-Long Learning, TEN-T Programme).

Extent of potential cooperation: Financial and Non-financial cooperation could be possible.

Summary: The cooperation between DRRIF and CEI could be financial and non-financial and organisations would cooperate on identifying best practices, promoting commonly-supported areas and networking. Even the possibility of joint R&I projects is not totally out of the question.

4.1.3 Central Europe Programme

Period: 2014 to 2020 **Budget**: 246 million EUR from ERDF (80 – 85 % of total financing, the rest comes from budgets of EU member states) **Scope**: international, within EU – majority of it in the DR **Proposed scope of cooperation:** financial, non-financial http://www.central2020.eu/	Central Europe (CE) is an EU programme which **promotes cooperation among regions** in the following nine countries: Austria, Czech Republic, Germany, Hungary, Italy, Poland, Slovakia, Slovenia and Ukraine. The programme aims to achieve a better innovation rate, higher competitiveness and increased attractiveness of cities and regions of given countries.

Alignment of the scheme's goals with those of the DRRIF: CE's main goal is to make Central European cities better places to work and live in through cross-border cooperation.

The international cooperation should be the catalyst for implementation of intelligent solutions which help to solve regional problems in the areas of innovation, low-carbon economy, environment, culture and transportation.

CE's goal is to coordinate regional efforts with national and regional programmes backed by structural and investment funds, macro-regional strategy, Horizon 2020 or the European Investment Bank.

Overlap of its goals with DRRIF:

- Cross-border
- Focus on innovation
- Goal to coordinate with national and regional programmes, structural funds and Horizon 2020.

The scheme's thematic areas and their overlap with DRRIF: CE fosters an area called "transfer of technologies and business innovation".

Additionally, it helps to improve the business cooperation framework in order to achieve better competitiveness of businesses in the globalized market.

It supports small and medium enterprises in discovering their innovative potential and increasing the transformation rate of scientific and research results into business opportunities.

Extent of potential cooperation: CE operates under the EU and is co-financed by ERDF and contributions from Member States. The extent of cooperation is subject to agreements between countries. There is some possibility for DRRIF's administrative activities to be partially financed through CE's calls. At the same time, we are investigating the possibility of DRRIF's projects being financed by CE. If this was possible, it would most likely involve small and less expensive projects.

Summary: The first part of the CE programme was quite successful during 2007 to 2013 and complemented the structural funds in fostering cross-border cooperation. It has great potential for cooperation with DRRIF but its geographical scope does not include the whole DR.

4.1.4 COSME

Period: 2014 to 2020 **Budget**: 2,3 billion EUR **Scope**: International, EU. Serbia, Montenegro and Moldova are expected to start cooperating with COSME in 2014. Bosnia and Herzegovina has yet to show interest in cooperation and Ukraine's participation is still subject to the local political situation. **Proposed extent of cooperation:** non-financial http://ec.europa.eu/enterprise/initiatives/cosme/index_en.htm	COSME is the EU's programme that promotes competitiveness of small and medium enterprises (SME).

Alignment of the scheme's goals with those of the DRRIF: COSME promotes competitiveness, especially of SMEs. It is an EU programme which strengthens competitiveness and sustainability of businesses. At the same time, it promotes business culture and establishment and development of SMEs.

Overlap of its goals with DRRIF:

- Supporting innovation

The scheme's thematic areas and their overlap with DRRIF:

- Better access to finance for SMEs
- Access to markets
- Supporting entrepreneurs
- More favourable conditions for business creation and growth

The overlap of the thematic areas is most significant in the area of innovation; however, COSME does not focus on R&D.

Extent of potential cooperation: The non-financial cooperation – knowledge and best practice sharing – seems more probable in DRRIF's initial stages.

Summary: COSME is an EU mechanism supporting SMEs and its cooperation with DRRIF is most likely in the area of innovation. Initially, the cooperation could be non-financial, which might over time change into the financial form of cooperation.

4.1.5 Danube-INCO.NET

Period: January 2014 to December 2016 **Scope**: international, within the DR **Proposed extent of cooperation:** non-financial http://danube-inco.net/	Danube-INCO.NET is financed by the Seventh Framework Programme and **promotes activities that are in line with R&I of EUSDR.** Instead of a broad spectrum of priorities typical for EUSDR (from PA 1A "Mobility/Waterways" to PA 11 "Security"), Danube-INCO.NET focuses primarily on just two of them: PA 7 "Knowledge society" and PA 8 "Competitiveness". The project encourages policy dialogue and networking, analyses and **promotes R&I activities and examines coordination of funding mechanisms**.

Alignment of the scheme's goals with those of the DRRIF: Danube-INCO.NET is a project carried out as a part of EUSDR; thus, the overlap should be automatic.

The scheme's thematic areas and their overlap with DRRIF: Danube-INCO.NET is a project carried out as a part of EUSDR; thus, the overlap should be automatic.

Extent of potential cooperation: Danube-INCO.NET is a project supporting implementation of the EUSDR. As a result, there should not be any legal issues which could affect the cooperation.

Summary: Danube-INCO.NET is not a grant scheme but a network project carried out supporting PA 7 and 8 of EUSDR, which makes it highly relevant for cooperation with DRRIF. However, the extent of the cooperation should be understood as solely non-financial in the form of know-how and best practice sharing and exchange.

4.1.6 Danube Transnational Programme

Period: 2014 to 2020 **Budget**: 273,3 million EUR **Scope**: international, DR countries (EUSDR) **Proposed extent of cooperation:** financial, non-financial https://survey.metis-vienna.eu/grafstat/formulare/consult/ https://www.nth.gov.hu/en/activities/european-territorial-cooperation/danube-transnational-programme-new-transnational-cooperation-programme-for-2014-2020	European Territorial Cooperation programmes such the Danube Transnational Programme (DTP) complement other European programmes, e.g., Rural Development or EU Investment for growth and jobs. These programmes focus on investing in infrastructure, companies and people. DTP focuses mainly on **further territorial integration through improved cooperation on specific policy areas**. Due to the limited budget, any vast investment is out of the question and thus the programme does not have a significant economic impact.

Alignment of the scheme's goals with those of the DRRIF: In order to achieve higher territorial integration of the very heterogeneous DR, DTP will serve as an intermediary in addressing common problems and needs. It will be active in specific areas where international cooperation could be of great benefit and it will try to connect and cooperate with EUSDR.

Overlap of its goals with DRRIF:

- Promotion of international cooperation
- Development of the DR

The scheme's thematic areas and their overlap with DRRIF:

The thematic areas of DTP include:

- R&I
- Coordination of R&D
- Connecting key sectors, which provide employment, with scientific-technological centres
- Mitigating factors which hinder knowledge and innovation sharing
- Increasing the employment rate in areas with high added value, especially in the R&I sector, and promoting cooperation between existing and potential R&D centres

Extent of potential cooperation: Both DRRIF and DTP are fostered by the European Strategy for the DR; thus, their cooperation should be much easier than with other grant schemes which could potentially fund DRRIF's activities. Although, funding of DRRIF's projects by DTP is unlikely, nonetheless, some of DRRIF's administrative activities might get funded through DTP's calls.

Summary: The cooperation between DTP and DRRIF seems obvious and is highly expected; however, not all of DTP's seven year budget of 273.28 million EUR is dedicated to R&D. Due to this, DRRIF will also have to be financed from sources other than DTP, but it could at least fund DRRIF's administrative activities.

4.1.7 ERA-NET (Cofund) under Horizon 2020

Budget: 92,3 mil EUR in 2014, and about 163,9 mil EUR in 2015 **Scope**: international, EU **Proposed extent of cooperation:** financial http://ec.europa.eu/research/era/era-net-in-horizon-2020_en.htm http://ec.europa.eu/research/era/index_en.htm	ERA-NET under Horizon 2020 unites previous ERA-NET with ERA-NET plus into one single mechanism. The aim of ERA-NET projects shifts from network funding towards **funding of joint international R&D calls** with high added value for Europe and alignment with Horizon 2020. As a part of Horizon 2020, ERA-NET will be carried out in the form of new activity type: ERA-NET Cofund.

Alignment of the scheme's goals with those of the DRRIF: Selected goals of the ERA-NET mechanism which functions as a part of Horizon 2020:

- Accumulate resources for areas that are highly relevant and significantly impact Europe
- Reduce duplicate activities through promotion of international cooperation in R&D – coordinate R&D in Europe
- Ensure sufficient funding of joint calls and actions
- Increase the participation of all member states and secure R&D support by connecting its R&D capacities and promoting international cooperation
- Optimize project management
- Reduce the administrative burden of implementation at EU level
- Simplify the participation of national/regional bodies in R&D funding

The scheme's thematic areas and their overlap with DRRIF: ERA-NET Cofund is designed to promote partnerships between public bodies, including joint planning initiatives of the EU member states. This involves preparation, organisation of network structure, designing, implementing and coordinating of joint actions, as well as supplementing EU funding of international projects.

ERA-NET Cofund's main activity is the implementation of calls for international R&D proposals which require co-funding.

ERA-NET Cofund is in line with all three Horizon 2020 priorities (excellent science, industry leadership, societal challenges).

Extent of potential cooperation: Once the minimal criteria are met and the cooperation proposal is approved.

Summary: ERA-NET is a mechanism for financing international R&D projects. It finances their administrative and preparation phases and even their implementation up to 33% of total expenses, if the remaining 67% is funded by national resources (not from EU funds).

4.1.8 Erasmus+

Erasmus+	
Period: 2014 to 2020 **Budget**: 14,7 billion EUR **Scope**: international, EU **Proposed extent of cooperation:** financial http://ec.europa.eu/programmes/erasmus-plus/index_en.htm	Erasmus+ focuses on promoting skills, employment, modernization of education, training and development of youth.

Alignment of the scheme's goals with those of the DRRIF:

Programme Erasmus+ helps to achieve:

- The objectives of the Europe 2020 Strategy, including the headline education target
- The objectives of the strategic framework for European cooperation in education and training (ET 2020), including the corresponding benchmarks
- The sustainable development of Partner Countries in the field of higher education
- The overall objectives of the renewed framework for European cooperation in the youth field (2010-2018)
- The objective of developing the European dimension in sport, in particular grassroots sport, in line with The EU work plan for sport
- The promotion of European values in accordance with Article 2 of the Treaty on the European Union

Overlap of its goals with DRRIF:

- Cross-border cooperation
- Development of higher and vocational education

The scheme's thematic areas and their overlap with DRRIF:

Education and training

- Including vocational education and training

Youth

- Promoting mobility of youth and strategic partnerships

Extent of potential cooperation: The potential cooperation will depend on the thematic areas supported by DRRIF and their overlap with Erasmus+. So far the cooperation is most expected in the following areas: building partnerships, exchanging know-how and best practices and mobility of people in general. However, this programme focuses mainly on youth and the education system and it is questionable whether it can be widely used by scientists and researchers.

Summary: Erasmus+ is a mechanism which promotes education and helps people gain international experience; thus, it could help DRRIF in achieving mobility of researchers and post-graduates.

4.1.9 EUREKA

Period: since 1985 **Scope:** international including all EU Member States **Proposed extent of cooperation:** financial, non-financial http://www.eurekanetwork.org/	EUREKA is an intergovernmental organisation established in 1985 which promotes market-driven R&D of the private sector, research centres and universities. It has 41 members including the EU, represented by the European Commission.

Alignment of the scheme's goals with those of the DRRIF: The objective of EUREKA is to support national economies in the international market, strengthen the basis for sustainable prosperity and employment in Europe, and to increase the productivity and competitiveness of European companies through promotion of technology.

Overlap of its goals with DRRIF:

- Cross-border cooperation
- Promotion of innovation and competitiveness

The scheme's thematic areas and their overlap with DRRIF:

Individual projects – EUREKA individual projects are market-driven R&D projects started with a "bottom-up" approach and include at least two partners from EUREKA member countries.

EUROSTARS – European R&D programme focused on SMEs and their new products, processes and services.

CLUSTERS – long-term and strategic industrial initiatives that have a higher number of participants and strive for development of generic technologies of key importance for European competitiveness.

UMBRELLAS – thematic areas that focus on specific technology areas and their main goal is to facilitate the generation of EUREKA projects in their area.

Extent of potential cooperation: Most of the DR countries are already members of EUREKA which should make the cooperation easier. Rather than concentrating on certain areas of science and technology, EUREKA focuses on supporting specific horizontal projects which makes cooperation with DRRIF very probable. In 2015 a pilot call was launched, specifically focused on DR countries in cooperation with the Danube-INCO.NET project called "EUREKA Danube Region Multilateral Call 2015 for Cross-border Co-operative Projects (E!DI Eureka Danube Initiative Call 2015)".

Summary: EUREKA promotes innovation, competitiveness and SMEs and it emphasizes mainly market-driven use of resources. It will be greatly beneficial for DRRIF to further develop existing EUSDR cooperation with EUREKA, a scheme which has been active for almost 30 years and has had some great achievements.

4.1.10 European Neighbourhood Instrument

Period: 2014 to 2020

Budget: 18,2 billion EUR

Scope: The European Neighbourhood Instrument (ENI) includes 16 partners east and south of EU borders including Moldova and Ukraine.

Proposed extent of cooperation: financial, non-financial

http://www.enpi-info.eu/ENI

Building on the previous successes of European Neighbourhood and Partnership Instrument (ENPI), ENI is going to **promote bilateral relationship-building between partner countries** and bring palpable benefits for the EU and its partners in areas of democracy, human rights, justice, better public administration and sustainable growth.

Alignment of the scheme's goals with those of the DRRIF:

- Fostering human rights and fundamental freedoms, the rule of law, equality, sustainable democracy, good governance and a thriving civil society
- Achieving progressive integration into the EU internal market and enhanced co-operation including, through legislative approximation and regulatory convergence, institution building and investments
- Creating conditions for well managed mobility of people and promotion of people-to-people contacts
- Encouraging development, poverty reduction, internal economic, social and territorial cohesion, rural development, climate action and disaster resilience
- Promoting confidence building and other measures contributing to security and the prevention and settlement of conflicts
- Enhancing sub-regional, regional and neighbourhood wide collaboration as well as cross-border cooperation

The scheme's thematic areas and their overlap with DRRIF:

- Boosting small businesses
- Civil-society engagement
- Climate change action
- Better mobility of people
- Energy cooperation
- Gender equality promotion
- Gradual economic integration
- People-to-people contacts
- Transport connections
- Youth and employment

The overlap of thematic areas with DRRIF is medium.

Extent of potential cooperation: ENI is financed by the EU, specifically the ERDF. The extent of cooperation will, therefore, depend on agreements with Moldova and Ukraine.

Summary: ENI does not focus on R&D and its structure is similar to structural and investment funds available to EU Member States.

4.1.11 European Regional Development Fund

Period: 2014 to 2020 **Budget**: 185,37 billion EUR **Scope**: international, EU **Proposed extent of cooperation:** financial http://ec.europa.eu/regional_policy/thefunds/regional/index_en.cfm	European Regional Development Fund (ERDF) focuses on improving the economic and social cohesion in the EU by levelling out the difference among the regions. It promotes regional and local development through **co-financing investments** in: ► **Innovation and Research** ► Climate change areas and the environment ► SMEs ► Services of joint economic interest ► Telecommunications, energy and transport infrastructure ► Health care, education and social infrastructure ► Sustainable city development

Alignment of the scheme's goals with those of the DRRIF: ERDF helps fund activities strengthening the economic, social and territorial cohesion. It levels out regional differences by fostering growth and structural changes of regional economies including transformation of declining industrial regions and other regions which are lagging behind.

ERDF should actively promote the Europe 2020 strategy and its activities should focus on R&D, SMEs and reducing the impact of climate change.

Overlap of its goals with DRRIF:

- Fostering R&I

The scheme's thematic areas and their overlap with DRRIF:

ERDF focuses on investing in key priority areas:

- Innovation and research
- Digital agenda
- Support for SMEs
- Low-carbon economy

Eighty percent of all ERDF's funds are spent on the areas above.

In more developed regions, the ERDF should not focus on infrastructure investments, which provide basic services in the areas of environment, transportation and ICT.

The overlap is most significant in the first area – innovation and research.

Extent of potential cooperation: ERDF is implemented at national level with the help of national managing authorities. The calls for proposals are published in local languages and potential applicants should contact the local managing authority for more information.

Summary: ERDF is one of many EU structural funds. Its priority areas include fostering of innovation and research which makes it a relevant cooperation partner for DRRIF. Additionally, ERDF can access funds dedicated to promotion of European Territorial Cooperation (European Commission directive C*OM (2011) 615*).

4.1.12 European Social Fund

Period: 2014 to 2020

Budget: approximately 74 billion EUR

Scope: international, EU

Proposed extent of cooperation: financial

http://ec.europa.eu/regional_policy/thefunds/social/index_en.cfm

The European Social Fund (ESF) promotes policies and priorities that help to achieve:

- Full employment
- Higher work quality and productivity
- Increased geographical and career mobility within the EU
- Improved education systems and vocational training
- Social inclusivity

The ESF aims to achieve economic, social and territorial cohesion.

Alignment of the scheme's goals with those of the DRRIF: From 2014 to 2020, ESF will focus on four areas:

- Strengthening employment and mobility
- Giving a chance to all – fighting marginalization and promoting inclusiveness
- Better education – improving education and training
- Better public services – strengthening institutional capacity and effective public administration

Overlap of its goals with DRRIF:

- Promoting innovation, particularly social innovation

The scheme's thematic areas and their overlap with DRRIF:

- Strengthening employment and mobility
- Investment in education, training and life-long learning
- Fighting marginalization and promoting inclusiveness
- Strengthening institutional capacity and effective public administration
- Promoting a shift to a low-carbon economy
- Better utilisation of ICTs and strengthening research
- Technological development, innovation and increased competitiveness of SMEs

Overlap of its thematic areas with DRRIF:

- Better utilisation of ICTs and strengthening research
- Technological development, innovation and increased competitiveness of SMEs

Extent of potential cooperation: The fund's strategy and budget is agreed on by EU Member States, the European Parliament and European Commission. This determines the operational programmes of Member States for the following seven years, which are then implemented by the national administrative bodies at national level. The call for proposals and offers are usually published in the local language.

The ESF can promote activities and polices in its scope through financial mechanisms, such as shared risk schemes, equity and debt instruments, guarantees, credit and mutual funds.

Summary: The ESF is one of many EU structural funds and among its priorities is social innovation, which makes it partially related to DRRIF's goals.

4.1.13 Horizon 2020

Period: 2014 to 2020

Budget: approx. 80 billion EUR

(roughly a quarter more than in the last programme period)

Scope: international, EU, Western Balkans and Moldova

Proposed extent of cooperation: financial, non-financial

http://ec.europa.eu/programmes/horizon2020/

Horizon 2020 is the **EU's largest R&I programme** ever created. The EU expects it to bring in new breakthrough ideas and discoveries thanks to the transfer of knowledge from laboratories to the market.

It is the flagship initiative of Europe 2020, focused on ensuring Europe's **global competitiveness** and at the same time, it serves as a financial mechanism for the implementation of Innovation Union.

It is perceived as a mechanism which boosts employment and economic growth. Horizon 2020 has the wide **political support of EU delegates and politicians of the European Parliament.**

Alignment of the scheme's goals with those of the DRRIF: Horizon 2020 brings together R&I with emphasis on scientific excellence, industry leadership and solutions to societal challenges. Its goals are to ensure that Europe's science is world-class, barriers to innovations are mitigated and cooperation between the public and private sectors is made easier.

Overlap of its goals with DRRIF:

- International cooperation not limited by national borders
- Focus on R&I

Horizon 2020 focuses on science, R&I and there is a significant overlap in these areas with DRRIF.

The scheme's thematic areas and their overlap with DRRIF:

Horizon 2020 areas:

- Agriculture and forestry
- Water resources
- Bio-industry
- Biotech
- Energetics
- Environment and climate changes
- Food and nutrition
- R&D funding
- Health
- ICT research and innovation
- Innovations
- International cooperation
- Key technologies
- Partnership between companies and Member states
- Raw materials
- Research infrastructure
- Security
- SMEs
- Social sciences and humanities
- Society
- Space

Extent of potential cooperation: The cooperation with Horizon 2020 is expected to be of a financial nature. Ideally, Horizon 2020 should be one of DRRIF's sources of financing. However, this was not taken into account when Horizon was created and this possibility is not included in its programme documents. Therefore, the DR countries should coordinate with Horizon 2020's programme committees when designing calls.
Another potential legal issue is the geographic scope of Horizon 2020. Its aim is to fund R&I in EU countries and the acceding countries that have signed an individual bilateral agreement. These agreements are yet to be finalised for the majority of acceding countries (as of July 2014) and support for Ukraine is not even considered.

Summary: Horizon's budget is almost 80 billion EUR, which is higher by a quarter compared to the previous programme period (2007 to 2013), and will potentially increase even more, thanks to resources from the private sector. Horizon 2020 seems to be one of the most important mechanisms of R&D support for the DR countries.

4.1.14 Instrument for Pre-Accession Assistance II

Period: 2014 to 2020

Budget: 11,3 billion EUR

Scope: Albania, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Iceland, Kosovo, Montenegro, Serbia, and Turkey.

Proposed extent of cooperation: financial, non-financial

http://ec.europa.eu/regional_policy/thefunds/ipa/index_en.cfm

The **Instrument for Pre–accession Assistance** (IPA) aims to support candidate countries and potential candidates in implementing the political, institutional, legal, administrative, social and economic reforms required to bring the countries closer to Union values and to progressively align to Union.

Alignment of the scheme's goals with those of the DRRIF:

- Support for political reforms
- Support for economic, social and territorial development
- Strengthening the ability of the beneficiaries to fulfil the (future) obligations stemming from EU membership by supporting progressive alignment with the Union acquits
- Strengthening regional integration and territorial cooperation

The scheme's thematic areas and their overlap with DRRIF:

IPA II Regulation states that financial assistance should mainly address five policy areas:

- Reforms in preparation for Union membership and related institution and capacity-building,
- socio-economic and regional development
- Employment, social policies, education, promotion of gender equality, and human resources development
- Agriculture and rural development
- Regional and territorial cooperation

The overlap of thematic areas with DRRIF is medium.

Extent of potential cooperation: IPA is financed by EU. The beneficiaries are limited to candidate countries and potential candidate countries. Therefore this instrument cannot be used by EU Member States.

Summary: IPA II does not primarily focus on R&D; thus, the cooperation can be rather financial. Its cross-border cooperation programmes, in case of appropriate application, may contribute to financing of DRRIF's activities in non-EU member states from DR.

4.1.15 Widening participation activities under Horizon 2020

4.1.15.1 COST

Scope: international – 35 member countries, majority of DR countries **Proposed extent of cooperation:** financial, non-financial http://www.cost.eu/	European Cooperation in Science and Technology (COST) is one of the oldest **cooperation mechanisms for researchers and scientists**. COST is also the first and largest international network for **coordination of nationally funded R&D** in Europe. COST **financially supports cooperation** of R&D groups in Europe. This even includes networking expenses such as costs of meetings (e.g., travel expenses, travel diet etc.), conferences, seminars, short-term exchanges, training, publications and spreading awareness. However, COST does not fund the research.

Alignment of the scheme's goals with those of the DRRIF: COST's mission is to strengthen Europe's scientific and technical research by promoting cooperation and interactions among European researchers.

Its goal is to maximize European synergy and added value of non-competitive and pre-normative research.

COST enables cooperation of researchers on a wide spectrum of key scientific areas.

Overlap of its goals with DRRIF:

- International cooperation not limited by national borders
- Focus on R&I

The scheme's thematic areas and their overlap with DRRIF:

- Biomedicine and molecular biosciences
- Food and agriculture
- Forestry, products and services
- Materials, physics and nanoscience
- Chemistry and molecular sciences and technologies
- Earth system science and environmental management
- Information and communication technologies
- Transport and urban development
- Individuals, societies, cultures and health

Apart from these nine thematic areas, there is additional overlap because of other multidisciplinary proposals.

Due to COST's wide focus, it is almost certain there will be a significant overlap with DRRIF's thematic areas.

Extent of potential cooperation: COST serves as an initiative which connects not only European researchers. It also cooperates with Horizon 2020, which is expected to operate closely with DRRIF. As a result, potential cooperation seems to be possible.

4.1.15.2 Teaming

Teaming provides new opportunities to the parties involved, with real prospects for growth through tapping into new collaboration and development patterns, including the establishment of new scientific networks, links with local clusters and opening up access to new markets.

The aim is to invest in Europe's R&I potential through supporting the creation of new (or upgrading of existing) Centres of Excellence on the basis of partnerships with internationally leading institutions.

The Partners:

- An institution of R&I excellence (public or private) or a consortium of such institutions
- A participant organisation from a low performing Member State

Budget allocated to Teaming: 270 million EUR, 2 calls (2014 and 2018)

4.1.15.3 Twinning

Strengthening the area of R&I in knowledge intensive institutions in a low performing Member States or regions through linking at least two internationally-leading counterparts in Europe.

The aim is to build on the huge potential of networking for excellence through knowledge transfer and, exchange of best practice between research institutions and leading partners.

The Partners

- One institution located in a Low Performing MS/region (Coordinator)
- Minimum of two additional partners from two different EU Member States or Associated Countries

Budget allocated to Twinning: 100 million EUR, 2 calls (2015 and 2018)

Summary: COST, Teaming and Twinning are mechanisms that bring together R&I. They foster networking and cooperation of human capital (researchers and scientists), spread the excellence from high performing institutions to lower performing R&D institutions. We assume that the level of cooperation would be rather non-financial with great potential to complement DRRIF's funding.

4.1.16 WISE/RCC

THE WORLD BANK	
Scope: international, Western Balkans countries **Budget:** projected budget of 210 million EUR **Proposed extent of cooperation:** non-financial http://wbc-inco.net/object/news/13995	The Western Balkans Innovation Strategy Exercise (WISE) is a part of *The Western Balkans Regional R&D for Innovation Strategy*, which is fostered by the World Bank.

Alignment of the scheme's goals with those of the DRRIF: The objective of WISE is to promote stability and continuous R&I reforms in the Western Balkan countries.

WISE will manage the implementation of four regionally proposed R&D programmes in coordination with the national institutions.

Overlap of its goals with DRRIF:

- Focus on development and innovation
- Promotion of international cooperation

The scheme's thematic areas and their overlap with DRRIF:

- To improve research base and conditions for excellent science (measured in number of citations, co-publication, share of young scientists, participation in Horizon 2020 projects)
- To support cooperation with research companies and transfer of technologies (measured in number of patents and co-patents, licences, spin-off companies; volume of R&D projects; share of innovative companies working on research with public R&D institutions etc.)
- To promote investments of the business sector in R&I and establishment of start-ups (measured in share of innovation companies, public sector R&D expenditure; number of trademarks, ISO certificates; volume of venture capital)
- To enhance national R&I policies (measured in R&D volume; share of basic and applied research; share of competitive funding on expenditure of public research organisations; indicators of productivity of public R&D system, e.g., patents / GERD).

Extent of potential cooperation: Similar to other analysed schemes, non-financial cooperation seems to be more likely and achievable. Despite only a partial geographic overlap, WISE could potentially become DRRIF's competition when it comes to obtaining funding and cooperation of scientists, companies and institutions.

Summary: The cooperation with WISE seems necessary in order to ensure synergies and avoid duplication of calls and thematic areas.

4.1.17 Other relevant schemes

Apart from the grant schemes, programmes, funds and initiatives above, we have identified additional schemes.

4.1.17.1 Netwatch

Scope: international within the European Research Area **Proposed extent of cooperation:** non-financial http://netwatch.jrc.ec.europa.eu/home	NETWATCH is the European Commission's information platform which focuses on **transnational R&D programme collaboration**. Currently, it is active in ERA-NET countries but it is expected to take on additional initiatives.

Alignment of the scheme's goals with those of the DRRIF: The NETWATCH's goal is to provide a European central information platform. It monitors transnational R&D programme collaboration, starting with the ERA-NET scheme.

Overlap of its goals with DRRIF:

- Cross-border cooperation

The scheme's thematic areas and their overlap with DRRIF: NETWATCH supports transnational R&D programme collaboration by:

- Mapping networks
- Providing information on joint calls
- Analysing the impact of programme collaboration
- Describing the scope and results of individual networks
- Supporting mutual learning among transnational programme networks

Due to NETWATCH's wide focus, it is almost certain that the overlap with DRRIF will be significant.

Extent of potential cooperation: Since the cooperation is expected to be non-financial, there should not be any legal issues with it. For example, BONUS is among the cooperating networks which could serve as a role model for DRRIF.

Summary: NETWATCH is a mechanism mapping transnational R&D programmes within ERA and offers a lot of information on active networks and institutions in ERA countries and timelines for submission of proposals.

The ERA-LEARN initiative is active within NETWATCH and systematically studies lessons learned from international cooperation and sharing of know-how in order to identify and develop a system of best practice.

Thanks to complex analysis of existing and proven approaches, ERA-LEARN helps to identify mechanisms suitable for general use.

4.1.17.2 Enterprise Europe Network

Scope: international, EU **Proposed extent of cooperation:** non-financial http://een.ec.europa.eu/	Enterprise Europe Network (EEN) is a tool of the EU's Strategy for growth and jobs. It brings together almost 600 organisations that promote entrepreneurship in more than 50 countries. Its goal is to assist small enterprises in finding unique opportunities in the EU market.

Alignment of the scheme's goals with those of the DRRIF: EEN's goal is to support small companies so they can make the most out of business opportunities in the EU.

Overlap of its goals with DRRIF:

- Cross-border cooperation

The scheme's thematic areas and their overlap with DRRIF:

EEN supports small enterprises in the following areas:

- Technology transfer
- Access to finance
- Advice on EU law and standards
- Intellectual property rights
- Going international

Extent of potential cooperation: EEN helps small companies to acquire new business contacts in the EU, which makes non-financial cooperation with DRRIF quite viable.

Summary: EEN nicely complements other organisations and schemes which cooperate with DRRIF in a non-financial way.

Schemes which we consider for possible future cooperation with DRRIF, but are within an approval process in progress, or with unclear relevance for DRRIF, were analysed in less detail and are listed below:

- **Bilateral and multilateral cooperation schemes**
  - Promote cross-border R&I
  - The cooperation with bilateral and multilateral cooperation schemes of the DR countries which promote cross-border R&I is substantial and should be one of the starting points for development of DRRIF.

- **Networking programmes**
  - URBACT II, INTERACT II a ESPON
  - Out of all, **only ESPON focuses on R&D**; however, it is yet to be approved by the European Commission for the programme period 2014 to 2020.
  - ESPON's estimated budget will be little bit more than 50 million EUR for the seven year period and it includes roughly 34 million from ERDF.
  - http://ec.europa.eu/regional_policy/cooperate/cooperation/interregional/index_en.cfm

- **Repayable investment programmes**
  - An example is Jeremie (Joint European Resources for Micro to medium Enterprises) which focuses on **providing sustainable investment, bank guarantees and loans to SMEs**.
  - It is a different form of financing which is suitable for supporting innovation rather than basic research.
  - There are possibilities to combine funding both from public as well private sectors.
  - http://ec.europa.eu/regional_policy/thefunds/instruments/jeremie_en.cfm

- **INTERREG EUROPE**
  - **Supports cross-border cooperation** among EU regions and **focuses on innovation and the knowledge economy.**
  - The programme should start in the middle of 2015.
  - Currently 30 countries are participating in it (EU + Norway and Switzerland).
  - The budget is yet to be approved but has been estimated at 359 million EUR.
  - http://www.interreg4c.eu/programme/2014-2020/

- **KEEP/Interact**
  - KEEP is a database of territorial cooperation projects of the EU and neighbouring countries which take part in territorial cooperation, project partnerships and programmes.
  - KEEP's objective is to develop transnational cooperation.
  - http://www.interact-eu.net/focus_on_etc_2014/focus_on_2014/512/14848
  - http://www.territorialcooperation.eu/keep/

- **DTC – Danube Transfer Centres**
  - Focus on **knowledge sharing.**
  - So far there are only four – two in Slovakia – Bratislava, Nitra, one in Romania – Cluj and Serbia – Novi Sad.

- **DCCA – Danube chambers of Commerce Association**
  - Chamber of commerce that brings together companies from the DR countries.
  - http://www.danubechambers.eu/

- **centrope_tt/centrope capacity**
  - Focus on **border areas** of the Czech Republic, Slovakia, Hungary and Austria.
  - "CENTROPE capacity" is the main project funded by EU's Central Europe programme.
  - http://www.centrope-tt.info/ a http://www.centrope.com/en/

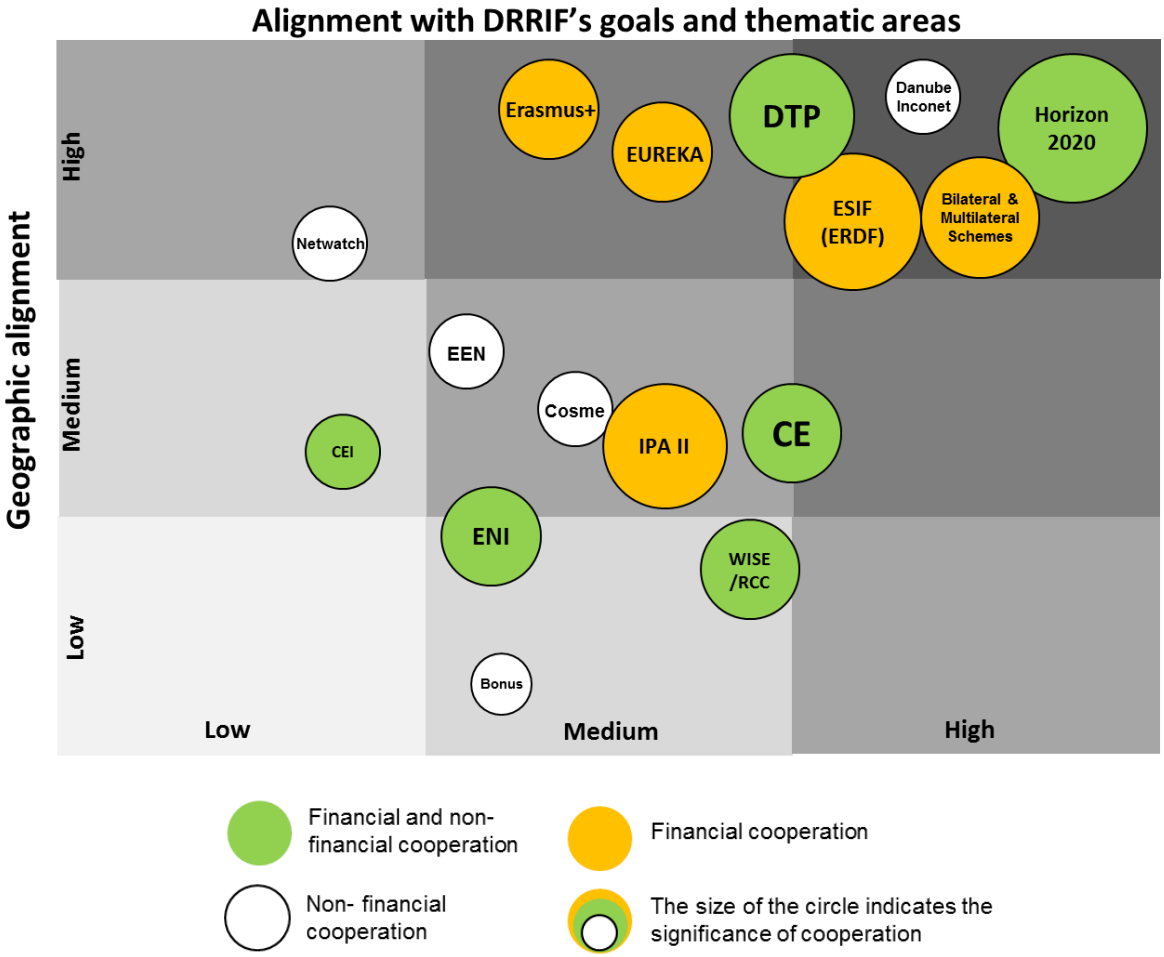
- **Balkan-Mediterranean Programme, Alpine region strategy, Adriatic & Ionian Programme etc.**
  - Programmes of **cross-border territorial cooperation.**
  - **Knowledge** gained from these programmes could be used in **DRRIF's administration and management.**

Additional schemes which, in our opinion, currently do not have a potential for cooperation with DRRIF are covered in Appendix 4.

4.2 Matrix of schemes

The following matrix includes an overview of all relevant grants and other schemes. The schemes are arranged based on their intersection with DRRIF's goals and thematic areas (X axis) and of geographic scope (Y axis) and were discussed and agreed with DRRIF WG.

Matrix 7: Grant and other schemes alignment with DRRIF



Source: Processed by EY

Considering both criteria, the more a scheme is located towards the right-hand corner, the more suitable it is for cooperation with DRRIF. The right-hand corner indicates greater overlap with DRRIF both in thematic areas as well as geographic scope which makes the schemes more suitable for cooperation.

We have arranged the grant schemes into categories based on the importance of proposed cooperation and suggested individual approaches for establishing cooperation with each category.

4.3 Categories of grant schemes and suggested approach for establishing cooperation

We arranged the analysed schemes into four distinct categories. The most important categories are 1 and 2 which are also included in the matrix of schemes.

Category 1 – Very intensive cooperation, harmonization or even coordination is recommended and the possibilities of financial cooperation, particularly, should be considered[47]:

- Horizon 2020 (including ERA-NET (Cofund), Widening (Teaming and Twinning, Cost)
- EU structural funds (primarily ERDF followed by ESF)
- Danube Transnational Programme
- Instrument for Pre-accession II
- Bilateral and multilateral cooperation schemes
- European Neighbourhood Instrument
- WISE/RCC (as this facility with the envisaged programmes is currently in the set-up phase, it is important to kept track of the developments in order to avoid duplications and reach synergies wherever possible)
- Central Europe Programme
- Central European Initiative
- EUREKA
- Erasmus+

Suggested approach for establishing cooperation with the schemes of category 1:

- When getting in touch with schemes' contact persons, the future DRRIF representatives – future DRRIF employees and/or those entitled to act on behalf of DRRIF – should learn about already completed programmes (especially the period from 2007 to 2013). These programmes usually have a formal "evaluation report" or similar progress reports which could help identify lessons learned. This would help DRRIF to avoid mistakes made by other schemes and to build on already established best practice.
- We expect active and intensive mutual cooperation in the future.

Category 2 – Cooperation is recommended, especially **non-financial** cooperation opportunities such as knowledge and best practice sharing.

- Danube-INCO.NET
- Netwatch
- COSME
- Enterprise Europe Network
- Relevant cross-border cooperation projects in the region: e.g., flagship projects of PA7 or FP7 funded projects as they may serve as good practice e.g., for combining different funding sources or coordinating research efforts or research infrastructures around a specific topic
- Ulm Follow Up Working group
- JRC Scientific Support to the EUSDR
- BONUS
    - We recommend intensive non-financial cooperation mainly on topics of DRRIF's establishment, its mechanisms, administration and management.

Furthermore, EUSDR flagship projects such as DREAM and DANCERS should be also considered for potential cooperation. However, as these are only projects and not grant schemes, they will not be analysed any further.

Suggested approach for establishing cooperation with the schemes of category 2:

- Periodic cooperation

Category 3 – The cooperation is not recommended in DRRIF's initial stages.

- Cohesion Fund
- Connecting Europe Facility
- Creative Europe
- European Agricultural Fund for Rural Development
- European Maritime Affairs and Fisheries Fund

[47] Potential financial cooperation and DRRIF's funding is discussed in a separate section Proposed system for raising funds.

Suggested approach for establishing cooperation with the schemes of category 3:

- We do not recommend cooperation with these schemes due to their focus, which differs from DRRIF's (more information about these schemes can be found in Appendix 4).

Category 4 – **Unassigned** due to incomplete information, approval process still in progress, unclear relevancy for DRRIF etc. We will continue monitoring these schemes during this feasibility study.

- ESPON
- Jeremie
- INTERREG EUROPE
- KEEP/Interact
- DTC – Danube Transfer Centre
- DCCA – Danube chambers of Commerce Association
- centrope_tt/centrope capacity
- Balkan-Mediterranean Programme, Alpine region strategy, Adriatic & Ionian Programme
- The following schemes should be continuously monitored and cooperation with them considered:
  - CEEPUS (Central European Exchange Program for University Studies)
  - Danube Rector's Conference

Suggested approach for establishing cooperation with the schemes of category 4:

- We suggest gradual networking with these schemes and examination of potential cooperation opportunities. However, we consider these activities to be of secondary importance as DRRIF should primarily focus on categories 1 and 2.
- Limited/ad hoc cooperation is expected in the future.

Future DRRIF representatives should start networking with the most substantial grant schemes even prior to DRRIF's establishment as soon as its focus and structure are clear. The organisations of the Danube countries responsible for the following programmes should be approached:

- Horizon 2020
- EU Structural funds (primarily ERDF followed by ESF)
- Danube Transnational Programme
- Instrument for Pre-accession II
- BONUS
- Danube - INCO.NET

When we were writing this section of the Programme Document, DRRIF's thematic focus and specific goals were still unclear. Due to this, the analysis provided in this section should be updated when definitive thematic areas are established.

Conclusions

- Horizon 2020, structural and investment funds (mostly ERDF), EUREKA and IPA II (for accession countries) appear as potentially most important partners of DRRIF **in terms of financial cooperation.**
- **The cooperation with bilateral and multilateral cooperation schemes** of the DR countries which promote cross-border R&I **is substantial** and should be one of the starting points for development of DRRIF.
- **As for non-financial cooperation,** BONUS seems relevant, due to the potential gains from know-how and best practice sharing.
- Ensuring wide political support and legal compliance are prerequisites of any cooperation – especially financial. This goes for all schemes without exception.
- In the DR, there are many R&I schemes operating with the support of EU funds. This situation makes it potentially confusing for applicants as they might have problems deciding which organisation to contact and when.
- There are multiple schemes in the region with a focus similar to DRRIF. Therefore, DRRIF should complement those schemes but at the same time **avoid the overlap of goals and activities** with existing schemes.
- A lot of initiatives **focus on fostering networking** and promoting cooperation among EU regions.
- Drawing of funds within the 2007 to 2013 programme period is still ongoing (up to 2015) and there are programmes yet to be approved for the 2014 to 2020 period (no call announced, no projected budgets, and no agreements with participating countries).
- There is a certain risk that schemes with already approved **programme documents do not have cooperation with DRRIF or other similar institution included in their goals**, especially financial cooperation. In such cases, potential cooperation should be sought – e.g., by examination of existing goals and assessment of their match with EUSDR or DRRIF goals.
- Non-financial cooperation (know-how sharing) with other grant schemes should be easy to carry out. However, it will be DRRIF's responsibility to establish closer cooperation (e.g., with BONUS) and finance the participation of its employees.

5. Analysis of DRRIF's thematic areas

5.1 Lessons learned in selecting thematic areas

Significant potential exists in many R&D areas in the DR countries. Nevertheless, due to limited financial resources and capacities, attention should only be focused on those thematic areas which have **the highest absorption capacity and the biggest estimated added value**, which could be delivered by international cooperation in these areas.

The selection of thematic areas – **one of the key steps in defining the future form of DRRIF** – is a complex process of seeking to achieve consensus among a number of stakeholders; thus, it is crucial to base decision-making on accurate information.

In drafting the most appropriate procedure for selecting the thematic areas supported by DRRIF, we took into consideration recommendations from the documentation regarding wbc-inco.net, the Notre Europe think-tank and BONUS Baltic programme.

Strategy formation phases

A strategy must be energizing to ensure long-term support.

- *"Healey has identified different phases in strategy formation processes in complex institutional settings, starting with the filtering of ideas and prioritizing and framing of the strategy. She argues that only if the strategy is sufficiently focused and convincing will it be able to generate 'mobilizing force' that ensures the long-lasting support of actors."*[48]

Strategy formation method

A strategy should not be formed only through the combination of partial issues and objectives.

- *"Identifying issues for cooperation inevitably involves struggles about the prioritizing interests, rights and claims for policy attention. Yet the filtering is a crucial process, because if strategies are to inspire and motivate a range of actors over a long period, they need to be more than merely an aggregation of issues and claims"*[49]

[48] HEALEY, P. *Urban Complexity and Spatial Strategies: Towards a Relational Planning for Our Times*. 2007, Routledge, London, New York. In DURH, Stefanie. *Baltic Sea, Danube and Macro-Regional Strategies: A model for Transnational Cooperation in the EU?*. Notre Europe 2011. p. 40 a 41.
[49] DURH, Stefanie. *Baltic Sea, Danube and Macro-Regional Strategies: A model for Transnational Cooperation in the EU?*. Notre Europe 2011. p. 40 a 41. available at:< http://www.oerok.gv.at/fileadmin/Bilder/2.Reiter-Raum_u._Region/4.Europ-Raumentwicklung/Makroregionen/allgemein/2011-09_Stefanie_Duehr_-_2011_-_Baltic_Sea_-_Danube_and_Macro-Regional_Strategies_-_A_model_for_transnational_cooperation_in_the_EU.pdf>

Defining objectives and a strategy is a long and complex process with many parties involved.

- *The development of the BONUS-169 Science Plan took more than a year and half (May 2005 to December 2006). The approach to developing a scientific strategy incorporated several key aspects which the strategy was intended to meet:*
  - *Scientific requirements should change to those for which the Baltic Sea scientific community is able to find solutions.*
  - *A science plan must take into account relevant international institutions, policies and documents, such as international conventions, agreements and directives.*
  - *For the success of the science plan it is necessary that top-down planning and bottom-up input and ideas (e.g., from scientists and scientific institutions) are effectively coupled.*
  - *A completed science plan must represent a basis for project challenges which should be funded through BONUS.*

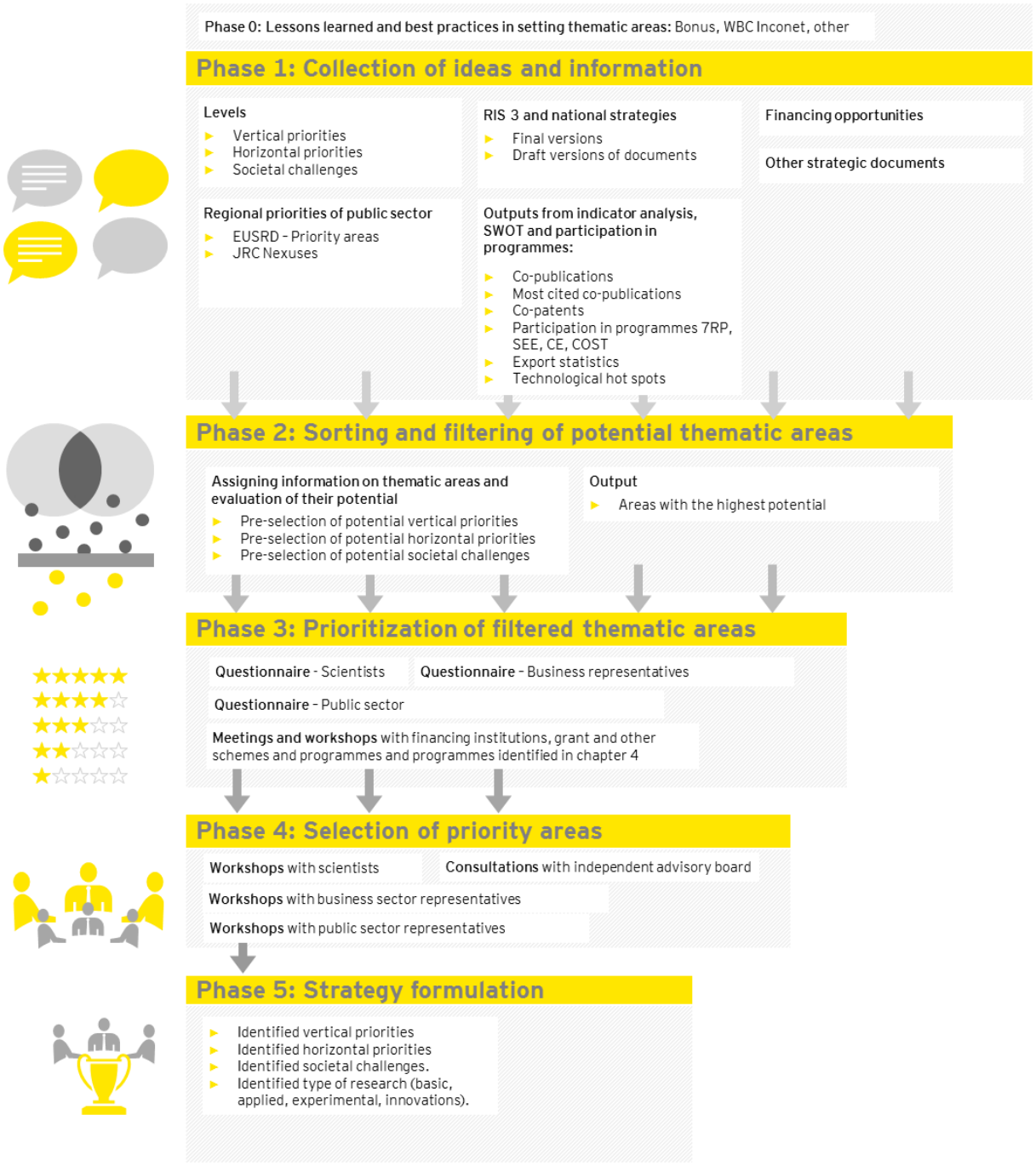
Political support is essential in determining objectives and defining a strategy.

- *"There is a danger that prioritisation exercises remain disconnected from actual policy-making; the prioritisation exercise is of value only if it is clearly linked to the existing policies and results in decisions concerning the distribution of public research funds. For this, a number of starting conditions need to be fulfilled:*
  - *Presence of political commitment to implementation of consequences of prioritisation in actual policy-making*
  - *Consensus among various ministries and agencies in charge of policy implementation, to avoid competing priorities*
  - *Long-term views on prioritisation"*[50]

[50] MARKOVIC, I. – DALL, E. *R&D and Innovation in Western Balkans. Moving Towards 2020* . Vienna: WBC-INCO.NET c/o ZSI, 2014. p. 121. ISBN 978-3-200-02960-6.

5.2 Proposed approach

The procedure to be applied in the analysis and selection of priority thematic areas reflects the outcomes acquired from consultations and the lessons learned from relevant literature. It comprises the following phases and steps:



Phase 1: Collection of ideas and information

The first phase aims at establishing a set of DRRIF-focused thematic areas and associated relevant data and information on absorption capacities and priorities of countries in individual R&I thematic areas.

The collection of ideas and information on thematic areas will run in parallel at the following levels:

- **Identification of potential vertical priorities** – R&D thematic areas – e.g., energy, IT, health, new material:
  - **Approach**: collection, filtering of data from publicly available sources and realized analyses
  - **Resources:** priority areas of the DR strategy, RIS 3 strategy, JRC Nexuses, priority areas of EU programmes in which the DR countries were involved, export commodities, patents, scientific publications, main export commodities of the DR countries, technology hotspots.

- **Identification of potential horizontal priorities** –cross-cutting themes, e.g., mobility of scientists, support of young scientists, connecting business and public sectors, support of co-publications:
  - **Approach:** summary of outputs from performed analyses
  - **Resources:** analyses realized in previous chapters of this document (analyses of statistical indicators, SWOT analysis, PESTEL analysis), supplemented with outputs from meetings and consultations.

- **Identification of potential societal challenges** – DRRIF should contribute to the solution of major problems shared by countries inside and outside the DR. Therefore, the information about challenges faced by the countries is crucial when formulating the short-list of the DRRIF thematic areas. With respect to this type of objective, the following may be expected: stronger political support, potential release of new financial resources, the need for urgent solutions and at the same time, their complexity anticipates a higher success rate in searching for solutions at the transnational level. The search for societal challenge solutions will be closely linked to search for vertical and horizontal priorities, due to their interdisciplinary character - bringing together resources and knowledge across different R&I areas.
  - **Approach:** using the consultations and questionnaires to collect information from the members of the DRRIF working group and/or nominated contact persons from the DR countries about long-term, national and societal challenges in their country – with regard to potential added value of science, R&I to their solution,
  - **Resources:** a questionnaire sent to representatives of the DR.

During the collection phase, the main principle will be openness to any ideas from representatives of the public and private sectors – these proposals will be evaluated in the following phase on the basis of data on absorption capacities and priorities of countries in individual R&D areas, which were collected in the previous steps of the feasibility study.

Duration of this phase: three months. After collection of inputs (e.g., preliminary drafts of RIS3 strategies, societal challenges of countries) and confirmation of data correctness by the DR countries, it will be possible to proceed to the next phase of sorting and filtering ideas and information.

Phase 2: Sorting and filtering of potential thematic areas

This phase aims to attribute information (quantitative and qualitative) to every thematic area. The information should allow the potential evaluation and pre-selection of areas with the highest potential.

From the wide set of thematic areas to be collected in Phase 1, those which are common to a number of countries from the DR and which address challenges in the region will be selected. This will involve the following approach to selection:

- **Pre-selection of potential vertical priorities** – we will strive to identify thematic areas which will overlap the priority areas of EUSDR, JRC Nexuses and RIS 3, thus reflecting the capacities of countries in individual regions by focusing on export, patents and scientific publications and analyses of the EUSDR countries in the EU programmes.
- **Pre-selection of potential horizontal priorities** – priorities which the DR representatives consider to be of the most importance will be identified on the basis of a questionnaire.
- **Pre-selection of potential societal challenges** – societal challenges for individual countries will be identified on the basis of a questionnaire. In this context, we will strive to find an intersection of challenges which are common in a number of the DR countries and link them to appropriate vertical and/or horizontal thematic areas.

Approach to filtering of thematic areas:

- The objective will be to identify an amount and type of common and/or complementary thematic areas which will be interesting from the national point of view (considered a priority) and relevant for every country (they will represent a country's strength).
- An Excel tool will be used to identify the intersection. Using this tool, every theme will be given scores which will determine the relevancy of the given theme for all the DR countries.

This is aimed at evaluating the themes over the long-term and establishing specificity in defining the priority themes. The publication Baltic Sea, Danube and Macro-Regional Strategies: A model for Transnational Cooperation in the EU indicates that "*experience with the transnational INTERREG programmes has shown that broad frameworks with largely generic funding priorities rarely result in projects of real significance for the macro-region*"[51].

The output of this phase will be the evaluation of the thematic areas, taking into consideration the strengths of the DR countries in every area, as well as the prioritisation of the selected thematic areas in the countries. In view of this data, we will select vertical and horizontal thematic areas with the highest potential. This underlying documentation will allow informed decision-making in the next step on priorities during meetings and workshops.

Duration of this phase: three weeks. After collecting inputs for the thematic areas from the previous phase, it will be necessary to sort, analyse and filter them on the basis of their relevancy for DRRIF.

Phase 3: Prioritisation of filtered thematic areas

The previous phases of data collection, sorting and filtering will result in a set of potential – broadly defined – thematic areas of the DRRIF fund. We recommend that these are then subject to validation, specification and prioritisation.

As an appropriate tool to perform the steps above, we recommend using questionnaires addressed specifically to the scientific community, private sector and public administration in the DR countries. The objectives of the questionnaires should be as follows:

- Confirmation/rejection of pre-selected potential thematic areas
- Short-listing of potential thematic areas
- Determination of the significance of individual areas
- Specification of vertical thematic areas (e.g., Energy – Renewable energy sources – New manufacturing procedures for renewable energy generation facilities)
- Validation of horizontal/cross-cutting priorities of DRRIF, for example:
    - Support of mobility, networking, matchmaking
    - Creation of a programming group to promote themes under the EU support schemes
    - Funding cooperation of international consortiums prior to their applying for a project under one of the EU support schemes

Timely verification with the scientific community is an essential step because "*in a democracy, if government alone is left to decide about scientific and technical policies, it will result in second-rate policy. Participation by scientists is necessary for sound policy development.*"[52]

Verification with funding organisations and with the business sector will provide feedback on the interest in research outputs from this area because *"seeking funds for research and development is also an excellent way to test the market and user response to research outputs* "[53].

Simultaneously, the objective of this phase will be to determine the number of priority areas and the need for their reciprocity.

Duration of this phase: six months. We know from our past experience that the collection of data in the form of a questionnaire survey is time-consuming for such a wide group of contact persons, as in the case of the DR. In addition to the collection of data for the purposes of prioritizing thematic areas, this data will need to be sorted again and prepared for the next phase.

[51] DURH, S. *Baltic Sea, Danube and Macro-Regional Strategies: A model for Transnational Cooperation in the EU?*. Notre Europe 2011. p. 40 and 41. Available on the internet:< http://www.oerok.gv.at/fileadmin/Bilder/2.Reiter-Raum_u._Region/4.Europ-Raumentwicklung/Makroregionen/allgemein/2011-09_Stefanie_Duehr_2011_Baltic_Sea_Danube_and_Macro-Regional_Strategies_-_A_model_for_transnational_cooperation_in_the_EU.pdf>
[52] JAIN, R.K.- TRIANDIS, H.C. – WEICK: *Managing research, development and innovation.* John Wiley & Sons, Inc. 2010 New Jersey. ISBN 978-0-470-40412-6 – p. 331
[53] JAIN, R.K.- TRIANDIS, H.C. – WEICK *Managing research, development and innovation.* John Wiley & Sons, Inc. 2010 New Jersey. ISBN 978-0-470-40412-6 – p. 334

Phase 4: Selection of priority areas

A short-listed and specific set of potential DRRIF- focused areas will be derived from the outcomes of the questionnaire survey.

For the purposes of the final selection of thematic areas, **workshops** with scientists recognized in their fields, high-ranking officials from the public sector as well as key entities in funding R&I in the private sphere, should be organised under the auspices of the DR.

We recommend considering the establishment of an **independent scientific advisory board** prior to determining thematic areas. This board could then recommend the final – horizontal and vertical – thematic areas under DRRIF support, from the pre-selected list of thematic areas. At the same time, the independent scientific advisory board would professionally look into the possibility of addressing societal challenges within the selected thematic areas. Similar bodies have various institutions established – for example, the United Nations (UN Secretary-General's Scientific Advisory Board), BONUS (BONUS Advisory Board), European Commission (European Research Council), MIT - Massachusetts Institute of Technology (The External Advisory Board), NASA (NASA Advisory Council) and UNESCO (Scientific Advisory Board).

These bodies have several features in common:

- Members are excellent, internationally-recognized high-ranking scientists.
- They provide independent opinions and guidance with respect to high-level strategic direction.
- They ensure that the most up-to-date results in science, research and development are taken into account when determining strategies and setting policies.

Duration of this phase: three to six months. Organisation of workshops and the entire agenda involved will take most of the time allocated for this phase.

Phase 5: Strategy formulation

The last phase aims to transform the thematic areas into strategies and objectives. To illustrate the form, we include the objective and priorities of the BONUS programme: *"BONUS brings together the research communities of marine, maritime, ground, economic and societal fields to address the major challenges faced by the Baltic Sea regions.*

- *Priority 1 – Developing and implementing a Baltic Sea System Research Programme of high scientific excellence and relevance*
- *Priority 2 – Facilitating the cooperation of Baltic Sea System researchers and the integration of individual Baltic Sea System research programmes*
- *Priority 3 – Carrying out strategies to strengthen human-capacity building in interdisciplinary science and science-based management*
- *Priority 4 – Facilitating an active involvement of policy-makers and other stakeholders in the research programme"*

The final strategy should clearly define and justify the orientation of DRRIF in all dimensions:

- What are vertical and horizontal objectives? In which ways are they complementary?
- Will the activities of the fund be targeted at addressing societal challenges ("targeted at specific solutions")? If yes, which specifically would they be?
- Which area will the DRRIF fund be primarily targeted at – fundamental research, experimental research, applied research or innovation?

The final step will be commenting on the formulated strategy by all countries.

Duration of this phase: three months. The outcomes of the previous phases will be used in defining the DRRIF thematic areas, whereby their basis for the fund's strategy and objectives will be formulated.

5.3 Phase 1: Collection of ideas and information

The following chapters contain data and analyses prepared with the objective of acquiring relevant information which will be used as a basis for the final determination of the priority areas.

5.3.1 Identification of potential vertical priorities

5.3.1.1 Priority areas of the DR Strategy

The DR Strategy covers a wide range of areas that are divided to four pillars and 11 priority areas:

- Connecting the DR:
  - PA 01 To improve mobility and multimodality – rail, road and air
  - PA 02 To encourage more sustainable energy
  - PA 03 To promote culture and tourism, people-to-people contacts
- Protecting the environment of the DR:
  - PA 04 To restore and maintain the quality of water
  - PA 05 To manage environmental risks
  - PA 06 To preserve biodiversity, landscapes and the quality of air and soil
- Building property in the DR:
  - PA 07 To develop the Knowledge Society through research, education and ICT
  - PA 08 To support the competitiveness of enterprises, including cluster development
  - PA 09 To invest in people and skills
- Strengthening the DR:
  - PA 10 To step up institutional capacity and cooperation
  - PA 11 To work together to tackle security and organised crime

When selecting the thematic areas we will take into consideration their compliance with the priority areas of the DR Strategy and evaluate their contribution to the common objectives. Those thematic areas will be preferred which overlap more with the four pillars and 11 priority areas.

With respect to the finally selected thematic areas, we will identify the related priority areas and also engage those countries which are responsible for coordinating a particular priority area in the consultation process.

5.3.1.2 RIS 3 and national strategies in science and research

R&I Strategies for Smart Specialization – RIS3 – represent the main national priorities, policies and strategies in the area of R&I which will be approved at a country and/or regional level.
At the time of finalizing this document (January 2015), only RIS3 for Slovakia, Czech Republic[54], the Serbian region of Vojvodina and the German Baden-Württemberg[55] were available from all the DR countries.

The fact, that individual DR countries have not finished their national R&I strategies, poses the risk of possible indecision and delay in approval of the DRRIF thematic areas. Moreover, the missing data reduces the quality of analysis and involves a risk that the resulting thematic areas identified on the basis of other data do not have to reflect the subsequently-approved national RIS3 documents of the DR countries.

In every available RIS3 document, vertical (scientific) as well as horizontal (cross-cutting) priorities of a respective state/region were identified.

[54] As of 10th December 2013, the RIS3 document for the Czech Republic was processed as pending and not yet approved.
[55] In the case of BW, it is not directly a RIS3 document. However, a representative of BW instructed us that the document which we have at our disposal can be considered of similar contribution as RIS3.

Table 6: Horizontal and vertical priorities of RIS3 specialization of DR countries

Baden-Württemberg

RIS 3 areas – vertical priorities:

- Healthcare
- ICT, green IT and intelligent products
- Aerospace industry

Knowledge-based domains (KETs):

- Microsystem engineering
- Photonics
- Nanotechnologies
- IT
- Light technologies (engineering).

RIS 3 areas – cross-cutting priorities:

- Sustainable mobility
- Multisectoral sustainability
- Social safeguards and equal opportunities
- Intensive cooperation of the base research with the applied research and their linkage to economy
- Cooperation of all levels which participate in developing the R&D policy
- Technological transfer to SMEs
- Cooperation of various institutions and scientific disciplines, mobilizing human resources in R&D
- Strengthening of applied research
- International cooperation within Europe
- Environmental technologies, renewable energy, resource efficiency

RIS 3 areas – solution orientation

- Unidentified

Czech Republic

RIS 3 areas – vertical priorities:

Knowledge-based domains (KETs):

- Material research
- ICT
- Electronics and photonics
- Advanced production technologies
- Biotechnologies and biomedicine

Key sectors of knowledge application:

- Manufacturing of transport equipment
- Engineering
- Electronics and electrical engineering
- IT services and software
- Healthcare
- Public infrastructure.

RIS 3 areas – cross-cutting priorities:

- Sustainable and cost-cutting transport and mobility
- Reduction of material intensity, savings and recycling of waste
- Sustainable energy and reduction of energy intensity
- Sustainable healthcare and ageing
- Reduction of natural resources intensity (mostly water, raw material), minimization of environmental risks (reduction of emissions and the impact of global climate change, dangerous substances)
- Security of network systems and cyber security
- Food security and food sufficiency

RIS3 areas – solution orientation

- Unidentified

Croatia

RIS 3 areas – vertical priorities:

- Health and quality of life
- Energy and sustainable environment
- Transport and mobility
- Security
- Agro-food and bio-economy

RIS 3 areas – cross-cutting priorities:

- Key Enabling Technologies (KETs)
- ICT and engineering
- Tourism
- Creative and cultural industries

RIS3 areas – solution orientation

- Unidentified

Serbia – region of Vojvodina

RIS 3 areas – vertical priorities:

- Agricultural production and food industry
- Renewable energy sources
- Information and communication technologies and professional electronics (hardware, microchips, etc.)
- Metal industry
- Tourism

RIS 3 areas – cross-cutting priorities:

- Ecology and environment protection (disposal of waste water, recycling, reduction of harmful gas emissions)
- Energy efficiency (renewable energy sources)

RIS3 areas – solution orientation

- Unidentified

Slovakia

RIS 3 areas – vertical priorities:

Economic specialization areas:
- Automobile industry and engineering
- Consumer electronics and electrical apparatus
- Information and communication products and services
- Production and processing of iron and steel

Perspective specialization areas:
- Automation, robotics and digital technologies
- Processing and evaluation of light metal and their alloys
- Production and processing of polymer and progressive chemical substances (including intelligent fertilizers)
- Creative industry
- Evaluation of domestic raw material base
- Support of intelligent technologies in the area of processing of raw material and waste in the region of their occurrence

Specialization areas in terms of available scientific and research capacities:
- Material research and nanotechnologies
- Information and communication technologies
- Biotechnologies and biomedicine
- Agriculture and environment including modern chemical environmentally-friendly technologies
- Sustainable energies

RIS 3 areas – cross-cutting priorities:
- Ageing of population and quality of life
- Multi-ethnicity, social inclusion and problems of poverty
- Integration of young people in the changing conditions

RIS3 areas – oriented on specific solutions
- Unidentified

Information which we acquired from RIS 3 documentation is to be used as supplementary in the decision-making and sorting process of the thematic areas. The reason for this is that information for the majority of countries is not available.

RIS 3 or similar strategies for other countries and regions (Germany, Bavaria, Austria, Hungary, Slovenia, Romania, Bulgaria, Croatia, Bosnia and Herzegovina, Montenegro, Moldova and Ukraine) were not available at the time when this document was prepared.

5.3.1.3 JRC Nexus

These represent four areas determined by the Joint Research Centre (JRC) – the so-called JRC Nexuses. They are directly connected to the DR and the Danube River and are linked to the priorities of the European Strategy for the Danube Region. JRC Nexuses and their linkage to the EUSDR priority areas are as follows:

The Danube Air Nexus: The objective of this Nexus is to address issues related to air quality and assess and evaluate the consequences of air pollution on health. Linkage to the EUSDR priority areas:

- PA 1A To improve mobility and multimodality: inland waterways
- PA 02 To encourage more sustainable energy
- PA 06 To preserve biodiversity, landscapes and the quality of air and soil

The Danube Water Nexus: The objective is to create a database to improve the water management decision-making process, develop a hydro-economic model to assess the impact of measures on water resources availability and allocation by means of an analysis. Linkage to the EUSDR priority areas:

- PA 1A To improve mobility and multimodality: inland waterways
- PA 02 To encourage more sustainable energy
- PA 04 To restore and maintain the quality of water
- PA 05 To manage environmental risks
- PA 06 To preserve biodiversity, landscapes and the quality of air and soil

The Danube Bioenergy Nexus: The objective is to address issues of energy production in the DR, focus on development of bioenergy and its consequences on agriculture and environment and to reduce disparities in knowledge among the DR countries. Linkage to the EUSDR priority areas:

- PA 02 To encourage more sustainable energy
- PA 06 To preserve biodiversity, landscapes and the quality of air and soil

Landscapes and soil: The objective is to preserve and restore ecosystems and biodiversity, to collect and monitor data in a harmonized way and to raise awareness about issues relating to soil and soil ecosystems. Linkage to the EUSDR priority areas:

- PA 1A To improve mobility and multimodality: inland waterways
- PA 02 To encourage more sustainable energy
- PA 04 To restore and maintain the quality of water
- PA 05 To manage environmental risks
- PA 06 To preserve biodiversity, landscapes and the quality of air and soil

Each of the four areas is treated with respect to the following four general priorities: environment protection, irrigation needs and agriculture development, energy production and navigability.

In determining the DRRIF thematic areas we also recommend considering topics dealt by JRC Nexuses with respect to the DR; however, not limiting the potential DRRIF thematic areas with the broad coverage of JRC Nexus.

Should the proposed areas of JRC Nexus for the DR be successfully implemented and should the DRRIF themes relate to one of the JRC Nexuses, the JRC data may then assist in better and more specific definition of the DRRIF themes. At the same time, JRC may serve as an institute which the DRRIF can contact in the case of applications for peer reviews or other consultations.

5.3.1.4 Participation of countries in the EU programmes

The analysis of thematic areas under the European programmes, in which the DR countries were involved, gives a picture of the areas in which the institutions from the DR countries realized the highest number of projects.

The high number of projects in the selected areas indicates an increased interest of the region in them as well as the existing capacities of countries, which are signs of successful proposal submission in these areas.

A weakness of this approach to identifying the most appropriate thematic areas is that it only focuses on the past, whereby its result may only represent those areas which in the past were already considered as important (and therefore, were included in the priority areas of the given programme).

We deal with the following programmes in our analysis:

- Seventh Framework Programme
- South East Europe Programme
- Central Europe Programme

We believe that the analysis of the selected programmes is important for the understanding of the DR. Their more detailed description is provided in the chapter: 3.5 Analysis of the Danube Region countries participation in selected programmes.

Seventh Framework Programme

The following table provides an overview of the number of retained proposals[56] with at least one applicant from the given country. All the DR countries have participated in the programme.

Table 7: Priority areas by number of retained proposals of the DR countries – FP7

Priority area/Country	AT	BA	BG	HR	CZ	BW	BY	DE	HU	MD	ME	RO	RS	SK	SI	UA	Total
Information and Communication Technologies	495	4	70	38	134	541	790	1 684	158	6	8	104	44	52	118	8	4 254
Health	181	2	24	18	67	287	256	685	87	4	0	44	7	18	46	8	1 734
Nanosciences, Nanotechnologies, Mat. and new Production Technologies	135	0	17	9	104	211	348	645	67	0	0	80	4	30	68	11	1 729
Transport (including Aeronautics)	156	1	29	26	97	137	227	548	68	3	0	76	15	24	26	13	1 446
Environment (including Climate Change)	142	5	46	22	61	91	113	368	52	1	2	68	20	17	53	15	1 076
Food, Agriculture and Fisheries, and Biotechnology	117	2	43	24	80	72	92	357	85	1	2	45	24	21	55	11	1 031
Energy	70	2	17	12	24	87	107	273	25	0	0	17	10	14	22	7	687
Security	77	1	21	9	30	30	113	199	28	0	1	31	6	19	20	2	587
Socio-economic sciences and Humanities	72	0	27	13	31	33	27	164	71	1	1	28	4	18	25	8	523
Space	48	0	12	5	23	27	55	162	16	0	0	18	1	2	7	10	386
General Activities	10	0	1	1	1	1	1	10	2	0	0	3	0	1	2	0	33
TOTAL	1 503	17	307	177	652	1 517	2 129	5 095	659	16	14	514	135	216	442	93	

Source: e-Corda as at 20 June 2014, processed by EY
Selected data from the table in Annex 4. It includes proposals under the specific programme Cooperation (does not include JTI).
The priority area with the greatest number of successful applications in the given country is marked with green colour. The priority area with the lowest number of successful applications in the given country is marked with red colour. The column 'Total' does not show the aggregate number of proposals and is only to be used to determine the order of the priority areas.

The most common successful applications under the Seventh Framework Programme were experienced in the following fields:

- **Information and communication technologies**
- **Health**
- **Nanoscience, nanotechnologies, materials and new production technologies**

We recommend that in the phase of sorting and determining priorities, these areas are considered important, mainly with respect to determination of the DRRIF vertical priorities.

[56] Number of proposals with at least one applicant from the selected region or country where the proposals were submitted and the call closed in the selected year.

Below we include a table which provides an overview of eligible proposals in FP7 to complete information about retained proposals by area. All the proposals fulfilled formal conditions and were designated as eligible for a financial contribution. However, the financial contribution was only received with respect to the retained proposals listed in the previous table.

Table 8: Priority areas by number of submitted proposals of the DR countries – FP7

Priority area/Country	AT	BA	BG	HR	CZ	BW	BY	DE	HU	MD	ME	RO	RS	SK	SI	UA	Total
Information and Communication Technologies	2909	45	592	268	882	2744	4284	9982	1081	28	30	1081	332	342	948	67	25615
Health	667	12	132	98	306	844	913	2539	401	15	6	243	83	105	208	39	6611
Nanosciences, Nanotechnologies, Mat. and new Production Technologies	452	5	81	49	299	668	1026	2030	182	5	4	227	29	94	232	38	5421
Transport (including Aeronautics)	511	6	133	98	407	427	808	1973	259	4	7	322	72	101	155	64	5347
Food, Agriculture and Fisheries, and Biotechnology	526	22	220	133	337	386	456	1725	423	16	14	335	111	141	269	81	5195
Socio-economic sciences and Humanities	580	49	358	165	329	206	223	1388	632	31	14	419	126	201	376	92	5189
Environment (including Climate Change)	577	24	233	114	304	380	386	1569	310	18	13	333	93	123	244	76	4797
Security	327	6	136	45	191	182	487	1001	155	2	3	238	34	95	130	15	3047
Energy	309	17	113	61	116	332	412	1064	132	2	3	155	42	78	103	49	2988
Space	169	2	41	12	88	92	191	569	61	0	2	75	6	32	42	74	1456
General Activities	13	0	1	1	3	2	2	13	2	0	0	3	0	1	3	0	44
Total	**7040**	**188**	**2040**	**1044**	**3262**	**6263**	**9188**	**23853**	**3638**	**121**	**96**	**3431**	**928**	**1313**	**2710**	**595**	

Source: e-Corda as at 20 June 2014, processed by EY
Selected data from the table in Annex 4. It includes proposals under the specific programme Cooperation (does not include JTI).
The priority area with the greatest number of successful applications in the given country is marked with green colour. The priority area with the lowest number of successful applications in the given country is marked with red colour. The column 'Total' does not show the aggregate number of proposals and is only to be used to determine the order of the priority areas.

The order of the first three priority areas remained the same with respect to retained, as well as eligible proposals. It is clear that there is strong DR interest in these areas, as the ratio of retained proposals to eligible proposals fluctuates from 17% to 35% in the areas with the highest number of approved proposals.

Table 9: Ratio of retained proposals to eligible proposals – FP7

Priority area/Country	AT	BA	BG	HR	CZ	BW	BY	DE	HU	MD	ME	RO	RS	SK	SI	UA
Information and Communication Technologies	17%	9%	12%	14%	15%	20%	18%	17%	15%	21%	27%	10%	13%	15%	12%	12%
Health	27%	17%	18%	18%	22%	34%	28%	27%	22%	27%	0%	18%	8%	17%	22%	21%
Nanosciences, Nanotechnologies, Materials and new Production	30%	0%	21%	18%	35%	32%	34%	32%	37%	0%	0%	35%	14%	32%	29%	29%
Transport (including Aeronautics)	31%	17%	22%	27%	24%	32%	28%	28%	26%	75%	0%	24%	21%	24%	17%	20%
Environment (including Climate Change)	25%	21%	20%	19%	20%	24%	29%	23%	17%	6%	15%	20%	22%	14%	22%	20%
Food, Agriculture and Fisheries, and Biotechnology	22%	9%	20%	18%	24%	19%	20%	21%	20%	6%	14%	13%	22%	15%	20%	14%
Energy	23%	12%	15%	20%	21%	26%	26%	26%	19%	0%	0%	11%	24%	18%	21%	14%
Security	24%	17%	15%	20%	16%	16%	23%	20%	18%	0%	33%	13%	18%	20%	15%	13%
Socio-economic sciences and Humanities	12%	0%	8%	8%	9%	16%	12%	12%	11%	3%	7%	7%	3%	9%	7%	9%
Space	28%	0%	29%	42%	26%	29%	29%	28%	26%	0%	0%	24%	17%	6%	17%	14%
General Activities	77%	0%	100%	100%	33%	50%	50%	77%	100%	0%	0%	100%	0%	100%	67%	0%

Source: e-Corda as at 20 June 2014, processed by EY

On the basis of this data, it appears that in the areas of:

- **Information and communication technologies**
- **Health**
- **Nanoscience, nanotechnologies, material and new production technologies**

there is a presumption that the DR countries have capacities and interest in submission of projects provided that calls are announced in the given areas.

South East Europe Programme (SEE)

The table below shows the number of projects in which the DR countries were engaged under the SEE Programme. They are divided by individual priority area and related support area. The following DR countries were engaged in the programme: Austria, Bosnia a Herzegovina, Bulgaria, Croatia, Hungary, Moldova, Montenegro, Romania, Serbia, Slovakia, Slovenia and Ukraine.

Table 10: Areas of support with the highest number of approved projects in the DR countries – SEE

Priority/Country	AT	BG	GR	HU	IT	RO	SI	SK	AL	BA	MK	HR	ME	RS	UA	MD	Total
Facilitation of Innovation and Entrepreneurship																	
Develop technology and innovation networks in specific fields	3	6	7	5	7	7	4	2	1	3	2	2	1	5	1	1	57
Develop the enabling environment for innovative entrepreneurship	9	8	8	12	13	11	11	4	3	3	3	9	0	10	2	2	108
Enhance the framework conditions and pave the way for innovation	7	9	10	11	9	10	8	1	3	5	1	2	3	7	2	1	89
Protection and Improvement of the Environment																	
Improve integrated water management and flood risk prevention	4	3	3	5	5	4	3	2	1	1	0	4	0	4	1	1	41
Improve prevention of environmental risks	6	10	8	7	7	9	6	4	6	2	3	7	6	7	1	1	90
Promote cooperation in management of natural assets and protected areas	6	4	2	5	4	5	1	4	0	1	0	2	1	4	1	0	40
Promote energy and resource efficiency	9	8	12	10	13	12	11	3	5	4	4	9	3	5	1	2	111
Improvement of the Accessibility																	
Improve co-ordination in promoting, plan. and operation for primary/secondary transp. networks	8	8	6	10	6	9	7	9	1	2	2	5	1	6	2	2	84
Develop strategies to tackle the "digital divide"	8	6	4	7	4	5	6	3	2	3	4	4	2	4	2	0	64
Improve framework conditions for multi-modal platforms	6	6	5	5	5	6	5	3	5	2	3	4	4	6	1	0	66
Development of transnational synergies for sustainable growth areas																	
Tackling crucial problems affecting metropolitan areas and regional systems of settlements	6	10	10	9	12	12	8	6	5	3	1	6	2	6	2	2	100
Promoting a balanced pattern of attractive and accessible growth areas	3	7	3	9	7	7	6	4	2	5	2	7	2	7	2	2	75
Promoting the use of cultural values for development.	5	8	9	8	11	9	7	3	2	1	3	3	2	4	0	1	76
Total	80	93	87	103	103	106	83	48	36	35	28	64	27	75	18	15	15

Source: South East Europe database of projects[57], processed by EY. The column 'Total' does not show the aggregate number of proposals and is only to be used to determine the order of the priority areas.

Under the SEE Programme, the greatest number of projects in the DR was approved in the following areas:

- **Development of the enabling environment for innovative entrepreneurship**
- **Promotion of energy and resource efficiency**
- **Dealing with crucial problems affecting metropolitan areas and regional systems of settlements**

We recommend that in the phase of sorting and determining priorities, these areas are considered important mainly with respect to determination of the DRRIF vertical as well as horizontal priorities.

[57] SEE approved projects:<http://www.southeast-europe.net/en/projects/approved_projects/>

Central Europe Programme (CE)

The table below shows the number of projects in which the DR countries were engaged under the CE Programme. They are divided by individual priority area and related support area. The following DR countries were engaged in the programme: Austria, Czech Republic, Germany, Hungary, Slovakia, Slovenia, Romania and Ukraine.

Table 11: Areas of support with the greatest interest of the DR countries – CE

Priority/Country	DE	HU	AT	CZ	SI	SK	UA	RO	Total
Innovation									
Enhancing Framework Conditions for Innovation	10	11	9	11	9	10	0	0	60
Establishing Capabilities for the Diffusion and Application of Innovation	7	9	7	7	9	5	0	0	44
Fostering Knowledge Development	8	7	4	5	8	2	1	0	35
Accessibility									
Improving Central Europe's Interconnectivity	5	3	4	5	1	4	2	0	24
Developing Multimodal Logistics' Cooperation	2	3	4	4	3	2	0	1	19
Promoting Sustainable and Safe Mobility	5	3	4	5	3	4	0	0	24
Promoting Information and Communication Technologies and Alternative Solutions for Enhancing Access	3	4	4	4	3	2	0	0	20
Environment									
Developing a High Quality Environment by Managing and Protecting Natural Resources and Heritage	8	4	7	7	6	5	1	1	39
Reducing Risks and Impacts of Natural and Man-made Hazards	6	7	6	6	4	2	1	0	32
Supporting the Use of Renewable Energy Sources and Increasing Energy Efficiency	14	11	12	8	9	4	1	1	60
Supporting Environmentally Friendly Technologies and Activities	7	9	8	7	5	8	0	0	44
Competitiveness									
Developing Polycentric Settlement Structures and Territorial Cooperation	7	5	6	9	7	6	0	0	40
Addressing the Territorial Effects of Demographic and Social Change on Urban and Regional Development	8	6	6	7	6	3	1	0	37
Capitalising on Cultural Resources for More Attractive Cities and Regions	10	8	8	7	9	3	1	0	46
Total	**100**	**90**	**89**	**92**	**82**	**60**	**8**	**3**	

Source: Central Europe Cooperating for Success[58], processed by EY

Under the CE Programme, the greatest number of projects in the DR was approved in the following areas:

- **Improvement of framework conditions for innovation**
- **Support of the use of renewable energy sources and increased energy efficiency**
- **Capitalization of cultural resources to achieve more attractive cities and regions**

We recommend that in the phase of sorting and determining priorities, these areas are considered important mainly with respect to determination of the DRRIF vertical as well as horizontal priorities.

[58] An overview of projects approved under the Central Europe Programme: http://www.central2013.eu/nc/projects-2007-2013/approved-projects/

5.3.1.5 Export commodities

In defining the thematic areas we believe it is important to take into account the main export commodities in the DR countries, which reflect the areas significantly affecting the economies of the countries. We assume that sectors, in which a country has the main export drivers, are more developed and therefore should also be taken into consideration when identifying the vertical priority areas.

Table 12: Export commodities of the DR countries

Country	Period	Top 5 export commodities
Austria	2010 to 2012	Medicaments (excluding goods of heading); motor cars and other motor vehicles principally designed for transport; parts and accessories of motor vehicles; spark-ignition reciprocating or rotary internal combustion piston engines; compression-ignition internal combustion piston engines.
Bosnia and Herzegovina	2011 to 2013	Seats; unwrought aluminium; electrical energy; petroleum oils, other than crude; footwear with outer soles of rubber, plastics, leather.
Bulgaria	2011 to 2013	Petroleum oils, other than crude; refined copper and copper alloys, unwrought; unrefined copper; copper anodes for electrolytic refining; wheat and meslin; commodities not specified according to kind.
Croatia	2011 to 2013	Petroleum oils, other than crude; cruise ships, excursion boats, ferry-boats, cargo ships, barges; medicaments; electrical transformers, static converters; wood sawn or chipped lengthwise, sliced or peeled.
Czech Republic	2011 to 2013	Motor cars and other motor vehicles principally designed for transport; parts and accessories of motor vehicles; automatic data processing machines and units thereof; electrical apparatus for line telephony or line telegraphy; insulated (including enamelled or anodized) wire, cable.
Germany	2011 to 2013	Motor cars and other motor vehicles principally designed for transport; commodities not specified according to kind; parts and accessories of the motor vehicles of headings; medicaments; other aircraft (for example, helicopters, airplanes).
Hungary	2011 to 2013	Electrical apparatus for line telephony or line telegraphy; motor cars and other motor vehicles principally designed for the transport; commodities not specified according to kind; parts and accessories of motor vehicles; medicaments.
Montenegro	2011 to 2013	Unwrought aluminium; electrical energy; wine of fresh grapes, including fortified wines; ferrous waste and scrap; remelting scrap ingots of iron or steel; wood sawn or chipped lengthwise, sliced or peeled.
Moldova	2011 to 2013	Insulated (including enamelled or anodized) wire, cable; wine of fresh grapes, including fortified wines; sunflower seeds, whether broken or not; medicaments (excluding goods of heading 30.02, 30.05 or 30.06); other nuts, fresh or dried, whether shelled, peeled or not.
Romania	2011 to 2013	Parts and accessories of motor vehicles; motor cars and other motor vehicles principally designed for transport; Insulated (including enamelled or anodized) wire, cable; petroleum oils, other than crude; electrical apparatus for line telephony or line telegraphy.
Serbia	2011 to 2013	Motor cars and other motor vehicles principally designed for transport; insulated (including enamelled or anodized) wire, cable; maize (corn); new pneumatic tires, of rubber; fruit and nuts.
Slovakia	2010 to 2012	Motor cars and other motor vehicles principally designed for transport; reception apparatus for television; petroleum oils, other than crude; parts and accessories of the motor vehicles of headings; electrical apparatus for line telephony or line telegraphy.
Slovenia	2011 to 2013	Medicaments; motor cars and other motor vehicles principally designed for transport; Petroleum oils, other than crude; electrical energy; parts and accessories of motor vehicles .
Ukraine	2011 to 2013	Semi-finished products of iron or non-alloy steel; iron ore and concentrates, including roasted iron pyrites; sunflower-seed, safflower or cotton-seed oil; flat-rolled products of iron or non-alloy steel; maize (corn).

Source: United nations International Merchandise Trade Statistics[59]

The DR countries export mainly the following:

- **Motor cars and other motor vehicles**
- **Parts and accessories for motor vehicles**
- **Petroleum oils, other than crude**

This joint orientation has previously resulted in the origination of the so-called automobile clusters. There is a presumption that the outcomes of R&D in these areas may directly produce increased competitiveness of companies in the region. In determining the DRRIF thematic areas, we recommend that representatives of companies from the above sectors be included in a questionnaire, so they may contribute with their opinions to the correct definition of the thematic areas which will also be attractive for the private sector.

[59] Available at: http://comtrade.un.org/pb/CountryPagesNew.aspx?y=2013

5.3.1.6 Scientific cooperation

On the basis of an analysis included in the *Intra-European Cooperation compared to International Collaboration of ERA Countries,* we identified areas with the highest publication intensity. The first matrix focuses on determining areas in which the most scientific publications were issued. The second matrix lists areas in which the published scientific works made the greatest contribution to science, as expressed by an average of relative quotations. Such a view gives a picture of the quantity of published scientific works as well as the areas in which the DR has published high-quality scientific works.

Table 13: Outcomes of scientific cooperation (expressed by number of publications) of the ERA countries[60] in the FP7 thematic areas for 2000 to 2011

	AT	BG	CZ	DE	HU	RO	SK	SI	HR	Total
Health	63 127	7 614	40 789	486 179	27 325	8 488	12 681	9 392	15 645	671240
ICT	12 919	1 803	8 225	74 779	5 159	6 245	2 478	3 247	2 143	116998
Environment	6 953	1 019	5 441	52 496	3 219	2 046	2 012	1 521	1 432	76139
Materials	4 481	1 295	5 515	46 053	2 572	4 165	2 734	2 218	1 343	70376
Socio-Economic Science	4 872	361	3 243	34 278	2 247	2 048	1 334	2 299	1 324	52006
Food, Agriculture and Fisheries	4 177	886	6 719	27 035	3 168	495	2 087	1 443	2 281	48291
Humanities	1 934	309	2 276	17 427	1 548	163	882	865	2 739	28143
Energy	2 004	789	1 261	18 365	105	172	369	862	744	24671
New production technologies	1 853	269	1 137	14 141	1 261	1 334	316	1 207	1 034	22552
Other Transport technologies	1 523	239	1 083	12 507	734	1 849	243	843	909	19930
Biotechnology	1 407	967	661	10 642	531	533	255	344	282	15622
Nanosciences and Nanotechnologies	722	142	509	8 214	282	537	89	199	32	10726
Construction and constrruntion technologies	591	63	393	5 726	295	286	160	238	118	7870
Aeronautics	507	187	223	4 795	152	125	66	38	0	6093
Security	305	68	310	1 809	104	142	60	153	136	3087
Automobiles	194	0	35	1 848	223	51	0	0	0	2351

Source: Intra-European Cooperation compared to International Collaboration of the ERA Countries[61], processed by EY

The scientific publication analysis has shown that the highest number of publications was produced in the following areas:

- **Health**
- **ICT**
- **Environment**
- **Materials**

The analysis shows that there is increased scientific activity in the above areas and that there are professionals available in the region that focus on these areas. We recommend that in the phase of sorting and determining priorities, these areas are considered important, mainly with respect to determining the DRRIF vertical priorities.

Danube-INCO.NET performed a thorough analysis on scientific co-publications and co-patents in the DR[62] for the years 2003 to 2013 when data on co-publications from all DR (except Germany) countries were gathered. The highest co-publication activity of DR countries was identified in the following scientific fields:

- **Clinical medicine**
- **Physics and astronomy**
- **Engineering**
- **Information and communication**

For the purposes of sorting the co-publication into scientific fields, Danube-INCO.NET used Science-Matrix Ontology of Science classification, which differs from the source used in the above matrix. Nevertheless the overlap of thematic areas is obvious.

[60] The matrix includes the DR countries which are part of the ERA due to data availability.
[61] Intra-European Cooperation compared to International Collaboration of the ERA Countries. European Commission. Brussels 2013. ISBN 978-92-79-32714-8. Available at: < http://ec.europa.eu/research/innovation-union/pdf/intra-european_intern_collab.pdf> p. 7
[62] For more information refer to: Danube-INCO.NET: *Co-publication and co-patenting analysis among countries in the Danube Region*

Moreover, the report of the European Commission *Intra-European Cooperation compared to International Collaboration of ERA Countries*[63] contains an analysis of the scientific impact of the publications, as expressed by an average of relative quotations, with the objective of identifying which type of publication makes the greatest scientific contribution.

Table 14: Contribution of scientific publications of the ERA countries in the FP7 thematic areas during 2000 to 2008

	AT	BG	CZ	DE	HU	RO	SK	SI	HR	Total
Other Transport technologies	1,37	1,48	1,16	1,19	0,90	1,13	1,70	1,21	0,29	10,43
Energy	1,22	1,36	1,20	1,51	1,23	0,79	0,92	1,33	0,75	10,31
Aeronautics	1,23	1,37	1,48	1,41	1,53	0,67	1,64	0,38	0,00	9,71
Security	1,20	0,42	0,72	1,14	0,88	0,83	0,88	1,34	1,07	8,48
Environment	1,24	0,80	1,00	1,30	0,79	0,85	0,62	0,80	0,58	7,98
Materials	1,34	0,93	0,92	1,15	0,82	0,62	0,70	0,90	0,48	7,86
Biotechnology	1,26	0,28	1,11	1,43	1,11	0,59	0,84	0,71	0,49	7,82
Food, Agriculture and Fisheries	1,19	0,58	0,79	1,13	0,71	1,14	0,64	0,98	0,58	7,74
Construction and construction technologies	1,18	0,72	0,79	0,68	1,39	0,42	0,77	0,78	0,50	7,23
ICT	1,14	0,46	0,81	1,13	0,84	0,64	0,71	0,88	0,45	7,06
Health	1,23	0,50	0,59	1,13	0,92	0,71	0,55	0,75	0,42	6,80
New production technologies	0,96	0,63	0,78	1,14	0,69	0,62	0,67	0,69	0,37	6,55
Nanoscience and Nanotechnologies	1,37	0,43	0,61	1,35	0,70	0,56	0,32	0,82	0,00	6,16
Humanities	0,90	0,68	0,52	0,96	0,52	0,49	0,51	0,62	0,63	5,83
Socio-Economic Science	0,92	0,36	0,45	0,89	0,58	0,46	0,43	0,46	0,35	4,90
Automobiles	1,04	0,00	0,00	0,83	0,23	0,13	0,00	0,00	0,00	2,23

Source: Intra-European Cooperation compared to International Collaboration of the ERA Countries, processed by EY

As shown in the table above, the order of areas in which issuing of scientific publications represents a higher scientific contribution, is incompatible with the order, based on the number of publications issued in individual areas. In general, the DR countries issued publications with the highest contribution in the following areas:

- **Other transport technologies**
- **Energy**
- **Aeronautics**
- **Security**

Nevertheless, attention should also be paid to areas in which the DR did not distinguish itself as a whole, but was represented by the strengths of individual countries; for example, Austrian publications regarding materials and nanotechnologies, German publications regarding biotechnologies and nanotechnologies, Hungarian publications regarding construction industry and building technology and Romanian publications regarding food production, agriculture and fisheries.

We recommend that in the phase of sorting and determining priorities, these areas are considered important mainly with respect to determining the DRRIF vertical priorities.

[63] Intra-European Cooperation compared to International Collaboration of the ERA Countries. European Commission. Brussels 2013. ISBN 978-92-79-32714-8. Available at: < http://ec.europa.eu/research/innovation-union/pdf/intra-european_intern_collab.pdf> p.60

5.3.1.7 Patents

The analysis of patents was realized due to their close linkage to innovation in the private sector. The data was processed into the form of a table by countries and areas of patent applications and their total for 2006 to 2010.

Table 15: Total patent applications in EPO for 2006 to 2010

Section	BG	CZ	DE	BW	BY	HU	AT	RO	SI	SK	HR	Total DR
Section B - Performing operations; transporting	13,23	160,97	25 670,73	6 794,15	6 023,66	108,80	1 632,13	14,44	36,01	34,47	4,91	27 675,69
Section F - Mechanical engineering; lighting; heating; w eapons; blasting	12,35	122,44	16 570,94	5 376,11	4 165,18	57,78	1 066,68	12,99	39,39	26,65	11,58	17 920,80
Section H - Electricity	9,66	102,04	15 994,19	4 069,16	5 308,58	212,84	1 139,74	43,80	39,87	32,45	1,00	17 575,59
Section A - Human necessities	14,00	119,71	14 980,34	3 180,61	2 791,97	169,00	1 232,32	11,94	214,09	17,34	24,03	16 782,77
Section G - Physics	21,85	110,93	14 399,87	4 127,67	3 935,58	90,96	954,96	39,92	58,15	19,82	11,73	15 708,19
Section C - Chemistry; metallurgy	5,83	132,16	12 301,88	1 719,14	2 012,23	108,71	902,10	8,16	103,40	24,29	17,58	13 604,11
Section E - Fixed constructions	4,47	60,14	4 921,24	954,54	975,41	29,57	645,53	2,92	31,68	5,80	7,00	5 708,35
Section D - Textiles; paper	0,59	33,20	2 033,95	600,36	321,29	4,23	156,68	0,46	6,34	3,56	0,00	2 239,01

Source: Eurostat, processed by EY
The national distribution of patent applications has been assigned on the basis of a respective inventor's residence. Should one application include more than inventor, the application is divided equally among all of the included inventors and subsequently, among countries of their stay, thereby preventing double counting.

The analysis of patents applied at the European Patent Office (EPO) shows that the highest number of patents was in the following areas:

- **Transportation**
- **Engineering**
- **Energy**

As mentioned in the previous subchapter Danube-INCO.NET performed analysis[64] on DR co-patents for 2003 to 2013 - based on the EU Patent Office's PATSTAT database – with highest co-patent activity identified in the following areas:

- **Mechanical engineering**
- **Textiles**
- **Operations and transport**

We recommend that in the phase of sorting and determining priorities, these areas are considered important mainly with respect to determining the DRRIF vertical priorities.

[64] For more information refer to: Danube-INCO.NET: *Co-publication and co-patenting analysis among countries in the Danube Region*

5.3.1.8 Technology hotspots

The report of the European Commission "*R&I performance in EU Member States and Associated countries",* analyses which areas of science and technology represent the strengths of the countries. These strengths are identified on the basis of scientific publications and patents produced by authors from the selected countries. The report analysed the following countries from the DR:

Table 16: Key technology hotspots

Country	Key technology hotspots
Germany	Automobile technologies, environment, energy technologies, new production technologies
Austria	Energy, environment and transport
Czech Republic	Automobile technologies, transportation, construction, materials, energy technologies, eco-technologies
Slovakia	Nutrition and agriculture, energy technologies, ICT, materials
Hungary	Health, environment, automobile technologies and biotechnologies
Slovenia	Health, nutrition and agriculture, ICT, materials, new production technologies, environment
Romania	Automobile industry, ICT, new production technologies, nanotechnologies, security
Bulgaria	Agriculture, nanotechnologies, biotechnologies, ICT, Energy
Croatia	Health, food processing and agriculture, energy technologies, electronics and modern materials, digital technology

Source: R&I performance in EU Member States and Associated countries, processed by EY
Countries not analysed in the report: Bavaria, Baden-Württemberg, Serbia, Bosnia and Herzegovina, Montenegro, Moldova, and Ukraine

The table above shows that the main strengths of the DR countries in the area of science and technologies are as follows:

- **Energy**
- **ICT**
- **Automobile industry**
- **Environment**

These areas confirm the outcomes of our previously-performed analyses. Therefore, we recommend taking them into consideration in filtering and determining the DRRIF thematic areas.

5.3.2 Identification of potential horizontal priorities

On the basis of analyses which were performed in Chapter 2 (outcomes of the analysis of indicators, SWOT analyses, analysis of selected programmes in the DR and PESTEL analysis), we identified a list of areas which we recommend supporting and developing in the DR. The list of these areas was submitted to the representatives of the DR countries to determine priorities of individual areas.

Analyses performed in Chapter 2 provide information about the existence of absorptive capacity in the DR; accordingly, they do not focus on identifying specific thematic areas in the fields of science, R&I. These areas cannot be regarded as specific thematic areas, but as potential horizontal (cross-cutting) priorities, which DRRIF could address in the future.

The list of potential horizontal priorities of DRRIF:

- To improve human capital development and its use.
- To instruct R&D institutions and assist in submitting applications for financial contribution in countries with a low success rate in the EU programmes.
- To raise awareness of the EU programmes in the countries with a low rate of success/participation
- To increase the participation rate of students and young scientists in R&D projects.
- To connect scientists and scientific institutions with the private sector by means of joint projects, events or their involvement in administrative authorities.
- To increase the total number of patents and co-patents.
- To support SMEs innovative activities in the DR and to increase the number of SMEs in the region.
- To collect missing data in the states outside the EU and to obtain new data from the countries outside the EU (e.g., the share of international projects).
- To improve cooperation mechanisms of scientists from upstream countries with scientists from downstream countries,
- To oversee the framework conditions for cooperation and contribute to elimination of administrative burden.

The selected horizontal priorities will be taken into consideration in sorting and filtering the thematic areas.

5.3.3 Identification of potential societal challenges

Societal challenges may be identified from questionnaires sent to contact persons. We recommend that the integration of the social challenges identified for EUSDR (lifelong learning and mobility, improving quality and efficiency of education and training, promoting equality, social cohesion and active citizenship, enhancing creativity and innovation, including entrepreneurship, at all levels of education and training) into the DRRIF vertical and/or horizontal thematic areas is discussed in workshops following the selection of potential thematic areas.

5.4 Phase 2: Sorting and filtering of ideas and information

In this phase, every identified thematic area was attributed information (quantitative and qualitative) to allow evaluation of the potential of the (vertical and horizontal) thematic areas. The pre-selection includes areas, which on the basis of currently available data, seem to have the highest potential.

The sorting and filtering phase has not been closed yet, as answers to the questionnaires have not been obtained from all the DR countries, SWOT analyses of all countries have not been verified and specialization strategies are not available for all the DR countries. The data and conclusions are to be updated in the course of the project.

5.4.1 Examples of vertical priorities

This activity aimed at identifying – from the set of collected ideas about potential thematic areas – examples of scientific and research themes with the highest potential, which DRRIF could support with its activities. The objective was to find thematic areas in which, based on analyses of absorptive capacities, the DR countries have the highest penetration in their current abilities and with respect to their strategic objectives, and whose support would present the highest added value to R&D in the DR.

We based the identification of the thematic priorities with the highest potential on the following data and inputs by using the combination of the top-down and bottom-up approaches:

- Top-down: national RIS 3 strategies, conclusions for SWOT analyses (partial conclusions in sub-chapters 3.3.)
- Bottom-up: participation in FP7, CE and SSE programmes (partial conclusions in sub-chapters 3.4.)
- Data on patents and co-publications (partial conclusions in sub-chapters 3.2.7. and 3.2.4)

Using this data and inputs, we performed the following steps:

- Gathering of all information about each country
- Confirmation of the correctness of information with relevant contact persons
- Identification of thematic areas which are common for the greatest number of countries.

Based on the analysis, the thematic areas with the greatest overlap – **which we recommend incorporating in the selection of vertical thematic areas** – were derived (note: thematic areas are in the alphabetical order):

- **Automobile industry and transportation**
  - Selected sub-themes identified within the strengths of the countries or the national R&D priorities: new production technologies, transport (means of transport, transport technologies, green transport)
  - *Linkage to the EUSDR priority area: PA 1B | Mobility and PA 08 | Competitiveness*

- **Information and communication technologies**
  - Selected sub-themes identified within the strengths of the countries or the national R&D priorities: computing, digital technologies, robotics, electronics (computers and electronic equipment, basic electrical features), optics, nanoscience and telecommunications
  - *Linkage to the EUSDR priority area: PA 08 | Competitiveness*

- **Materials, engineering and manufacturing**
  - Selected sub-themes identified within the strengths of the countries or the national R&D priorities: materials and new production technologies, new materials, advanced materials, innovative materials, material research, raw material, minerals, metals, petroleum products, advanced production technologies, textiles, footwear, wood products, electrical engineering, engineering – machinery and equipment.
  - *Linkage to the EUSDR priority area: PA 08 | Competitiveness.*

- **Environment**
  - Selected sub-themes identified within the strengths of the countries or the national R&D priorities: eco-technologies and activities, eco-systems, environmental sciences, climate changes, natural science, natural resources
  - *Linkage to the EUSDR priority area: PA 02 | Sustainable energy and PA 05 | Environmental risks*
  - *Linkage to the JRC The Danube Water Nexus, Land and Soil Nexus and Air Nexus*

In the course of consultations held, the officially-nominated contact persons of the DR countries, as well as the DRRIF WG members, **highlighted the following facts** that must be taken into consideration in the final determination of the thematic areas:

- Unless there is clear definition of the DRRIF mechanism to be used, and how it will support drawing from European funds, it is not reasonable to focus on specific research areas. From the very beginning, the thematic areas should cover a wide range of interests.
- The thematic areas should reflect the efforts of the DR countries to develop and utilise human potential, thus preventing “brain drain” to areas which are nowadays more attractive for science and research.
- Only by means of strong political support and an ongoing dialogue with the DR countries, is it possible to achieve a broad compromise regarding the orientation of DRRIF in the future.

As we identified several and diverse potential vertical thematic areas, the **next recommended step is either to identify** a **limited number of final DRRIF thematic areas or to group DR countries according to prioritisation of thematic areas to clusters. Each** cluster has a specific set of thematic areas, an approach which enables support of **more** horizontal thematic areas.

The potential approach to support more vertical thematic areas is **"variable geometry"** – an operating system of DRRIF in which each country financially supports only selected areas and the financial contribution of each country may vary (based on available resources).

The above vertical thematic areas are examples which resulted from our analyses and we recommend launching a broader debate, regarding the vertical priorities proposed (in the form of a questionnaire and workshops with scientists, the independent scientific community, representatives of the public and private sectors as well as in the form of meetings and workshops with financing institutions and entities responsible for grants and other schemes and programmes). **The final selection of vertical areas should be harmonized with the selected horizontal priorities.**

5.4.2 Examples of horizontal priorities

This activity is aimed at identifying, from the set of collected ideas about potential areas, examples of cross-cutting (horizontal) themes with the highest potential. DRRIF could support them with its activities and could bring the highest added value to R&I in the DR and simultaneously complement the selected vertical priorities.

We based the identification of the horizontal priorities with the highest potential on a combination of quantitative and qualitative information and positions of representatives of the public administration from the DR countries:

- Analysis of absorptive capacity: analysis of statistical indicators, analysis of participation in individual programmes and SWOT analysis (Chapter 3: Analysis of absorptive capacities)
- Conclusions from consultations with the Ministry of Education, Science, Research and Sport of the SR
- Consultations during a meeting with nominated contact persons and the DRRIF working group (the meeting was held on 1 September 2014)
- Outputs from the questionnaire sent to the nominated contact persons and members of the DRRIF working group

In the simple questionnaire, the nominated contact persons had the chance to express their views on potential horizontal priorities in the following dimensions (the full text of the questionnaire is included in Annex 6):

- **Opinion**
  - Expressing dis-/approval with each of the recommended horizontal priorities which were identified in individual parts of the absorptive capacity analysis
  - The objective was to find areas where the greatest consensus is likely to be reached.
  - Nevertheless, please note that the outcomes from voting are not binding and do not represent any commitments in the future.
- **Priority**
  - The objective was to identify a priority with respect to individual themes – in particular for the purposes of determining the order of the horizontal priorities where an approval of representatives of the DR countries was expressed.
- **Complexity**
  - The objective of the last answer was to familiarize with the view on the complexity of the given priority implementation – and finally, to identify a mix of long-term objectives (more complex priorities) and short-term objectives – quick wins (the less complex priorities).

The results of the votes as of 22nd January 2015 are as follows [65]:

Table 17: Questionnaire vote of the DR representatives

DRRIF should focus on the following:	Opinion *	Priority **	Complexity ***
Supporting the innovative activities of SMEs in the Danube Region and increasing the total number of SMEs in the region.	1,58	1,83	1,72
Connecting scientists and public institutions with the private sector via joint projects, events or even in its administrative bodies.	1,50	1,78	2,11
Mentoring R&D institution and facilitate submission of proposals for grants by countries with low success rate.	1,67	2,14	2,50
Improving development and exploitation of human capital.	1,92	2,31	2,33
Increasing the participation rate of students and young scientists in R&D projects (e.g. each project should have a part devoted to education of students in the scientific area of the project).	1,81	2,11	2,86
Increasing the total number of patents and co-applicants from other countries.	2,14	2,67	2,17
Promoting and spreading awareness about EU programs in countries with low success rate.	1,78	2,19	3,50
Collecting missing data in non-EU states and gather new data in EU and non-EU states (e.g. share of international projects).	2,47	2,67	2,53
I do believe that despite the differences between DR countries, a compromise on DRRIF focus will be reached.	2.10		

* I ... with the following statement: 1 - Strongly Agree; 2 - Agree; 3 – Neutral; 4 - Disagree; 5 – Strongly Disagree
** Solving this issue should have: 1 – Extreme Priority; 2 – High Priority; 3 – Medium Priority; 4 – Low Priority; 5 – No priority
*** Solving this issue: 1 – Very Complex; 2 -Complex; 3 - Manageable; 4 – Less Complex; 5 – Not Complex
The outputs from the voting are not binding and do not represent any commitments in the future.

In their answers **the respondents highlighted the following:**

- The priorities have solutions which will be difficult and will take a long time to implement; however, they will make a significant contribution.
- The involvement in the identified areas should not only be a priority with respect to DRRIF, but also for other institutions over the longer term.
- It is essential to take into account the existing initiatives which have been addressing the given objective.
- Institutions in the DR are aware of the funding opportunities under the EU programmes. Accordingly, support and raising awareness do not have to pose the main problems with respect to the low participation of the DR countries in scientific and research projects. Human and financial resources, necessary to increase participation in projects, are often missing.

The outcomes of the absorptive capacity analysis – confirmed by the votes of officially-nominated persons – resulted in the following priority areas with the highest potential **which we recommend including in the selection of the horizontal thematic areas**:

- **Making contributions to support the innovative activities of small and medium-sized enterprises** in the DR and increasing the number of such enterprises
- **Connecting scientists and public institutions with the private sector** – by means of projects, joint events or within their own managing bodies
- **Facilitating and assisting in submitting applications** for financial support of countries with a low success rate or with a low number of submitted applications
- **Improving human capital development and use**
- **Increasing participation of students and young scientists in R&D projects** (e.g., every project should contain a part devoted to inclusion of students in science)
- **Supporting higher activity in patent** applications and co-patent applications

[65] Thirteen answers collected for the following countries: Austria, Baden-Württemberg, Bavaria, Bosnia a Herzegovina, Croatia, Czech Republic, Germany, Moldova, Montenegro, Romania, Serbia, Slovakia and Slovenia. Missing answers are for the following countries: Bulgaria, Hungary and Ukraine.
Note: Three answers of officially nominated persons from German federal level and federal countries (Bavaria, Baden-Württemberg and federal level of Germany) were modified so as to have the weight of two votes in the final voting – i.e., each vote had a weight of 0.67, while votes of other countries had weight of 1. This modification reflects the voting procedures in EUDSR which state that two federal countries have two votes.

One of the statements expressing approval or disapproval was: “I believe that despite the differences of the DR countries, a compromise regarding the orientation of DRRIF will be achieved.” The outcomes showed lower agreement with this statement than with individual horizontal priorities. That means that the representatives of the countries are more convinced of the accuracy of the identified priorities than that a consensus will be reached in the future.

This fact has confirmed our conclusion from Chapter 3.6. that **in order to arrive at a necessary compromise on the future orientation of DRRIF, strong political support and an open dialogue among the DR countries will be required**. As we identified several and diverse potential horizontal thematic areas, the **next recommended step is either to identify** (from shortlisted thematic areas) a **limited number of final DRRIF thematic areas or to group DR countries according to prioritisation of thematic areas to clusters** with each cluster having the specific set of thematic areas. Such an approach would enable support of **more** horizontal thematic areas.

A potential approach to support more horizontal thematic areas is **“variable geometry”** – an operating system of DRRIF in which each country would financially support only selected areas and their financial contributions may vary (based on available resources).

The above horizontal thematic areas are examples which resulted from our analyses and we recommend holding a wider debate about the priority horizontal areas. This should take the form of a questionnaire and workshops with scientists, representatives of public and private sectors and meetings and workshops with financing institutions and entities responsible for grants and other schemes and programmes. **The final selection should be harmonized with the selected vertical priorities. The c**ontent of the workshops should take into account the activities already performed by Danube-INCO.NET.

5.4.3 Conclusion

All the recommendations with respect to vertical and horizontal priority areas will be subject to a commenting procedure and discussions with the representatives of the DR countries in a joint workshop. We will deal with the final definition of mission, objectives and thematic areas of DRRIF in the next steps of our analysis (Phase 3: Validation, specification and prioritisation of sorted thematic areas, Phase 4: Selection of priority areas and Phase 5: Formulation of strategy for thematic areas) and in Chapter 6: Proposal of DRRIF objectives and mission.

5.5 Phase 3: Validation, specification and prioritisation of sorted thematic areas

5.5.1 Validation of our results with JRC analysis of RIS3 strategies

To verify the results of our identification of overlapping thematic areas, we compared our results with the results of JRC initiative " Mapping of the Danube S3 priorities[66]." JRC mapping was based on the data from the Eye@RIS3 database and the analysis comprised in total 108 priorities (of which 80 are from 13 countries and 28 are from four regions). **S3 priorities mapping revealed the four most prevailing sectors:**

- **Advanced materials and manufacturing (KETs)**
  - Advanced Manufacturing: five countries (AT, CZ, HU, SI, SK) and three regions (DE, CZ, SK)
  - Advanced Materials: four countries (RS, MN, MD, UA) and five regions (DE, CZ, SK, HU, RO)
- **ICT and digital agenda**
  - ICT: eight countries (AT, BG, CZ, HU, SI, SK, MN, RS) and six regions (DE(2), HU, RO, SK, RS)
  - Digital Agenda: eight countries (AT, BG, HU, RO, SK, MN, RS, UA) and eight regions (DE(2), CZ(3), HU(2), SK)
- **Sustainable innovation**
  - Twelve countries (AT, BG, CZ, HR, HU, RO, SI, SK, MD, MN, RS and UA) and six regions (DE(2), CZ, HU, RO and RS)
- **Health**
  - Public Health and Security: 10 countries (AT, BG, CZ, HR, HU, RO, MD, MN, RS and UA) and six regions (DE, CZ(3), HU and SK),
  - Healthcare technologies / Medical sciences: eight countries (BG, CZ, HR, HU, SI, BA, MD, MN and RS) and two regions (DE and HU).

JRC also concluded that "there is room for higher impact of R&I activities in the Danube macro-region on the selected EUSDR priority actions, especially in the vertical priorities."

We noted strong overlap with our priorities and our conclusions identified. S3 national and regional strategies were developed by countries after deep analyses of R&I state and strategic direction; therefore we consider this overlap to be significant and it should not be neglected.

Further validation of thematic areas identified in this analysis is possible, and it should be decided which other thematic areas, not mentioned in this analysis, have to be taken into account.

5.5.2 Specification and prioritisation of thematic areas

The discussion at the Steering Group on 10 December 2014 showed that so far, the country representatives do not want to limit themselves to certain horizontal or vertical priorities.

Generally, **it was believed that not limiting the thematic areas to a shortlist would be a more feasible option to ensure the political consensus** and would more effectively support the DR R&I activities (broad range of topics, different and changing priorities) than defining the closed shortlist of thematic priorities.

We believe that leaving the vertical priorities undefined (at least at the start of DRRIF operation) is a feasible option but has a risk typically associated with broad strategies - **the intention to support too many things can result in immaterial impacts.**

To minimize such risk, we recommend **defining a structured process for proposing, discussion, evaluation and approval of new thematic areas** (e.g., using scientific advisory board), during both the development phase of DRRIF and its operation. This process should ensure that DRRIF supports thematic areas, which mirror the actual needs of R&I stakeholders in the DR and are supported by necessary R&I personnel as well as technical resources.

Also, we believe there should be a defined and agreed upon continuous **process to monitor new emerging thematic areas** (for example new trending topics as bioenergy, agrifood, bio-economy). The newly-identified, evaluated and approved thematic areas can be then supported by DRRIF activities.

[66] Full presentation: http://danube-inco.net/object/news/14498/attach/S3P-Gnamus-Vienna_12_14.ppt

5.6 Phase 4: Selection of priority areas

The conclusions of Phase 4 will be finalised, if the countries involved managed to reach a consensus before the completion of this study on the proposed outcomes and conclusions from the previous phases. The results of this consensus will become inputs for Phase 4 (e.g., selection scientific thematic priorities, cross-cutting priorities and societal challenges) and outcomes of subsequent steps of Phase 4 (outcomes of workshops with scientists and public and private sector representatives).

5.7 Phase 5: Formulation of strategy for thematic areas

The conclusions of Phase 5 will be finalised upon completion of the previous phases, mainly phase 4 - if the countries involved managed to reach a consensus before the completion of this study on the proposed outcomes and conclusions from the previous phases.

6. Proposal of DRRIF's goals and mission

6.1 Goals and mission of DRRIF in the Danube Region

The definition of the DRRIF's goals and mission is one of the most crucial decisions for the operation of the Fund, as they determine its long and short-term direction and recognition by the scientific community, along with the private and public sectors.

The goals and mission are not the only strategic planning elements which must be taken into consideration. A comprehensive approach to developing an organisation's strategy includes the formulation of vision and mission as well as strategic, tactical and operational goals.

All these elements are interconnected and must be agreed as a whole. This approach is also depicted in the following draft scheme of the DRRIF vision, mission and goals.

Figure 1: Draft scheme of the DRRIF's vision, mission and goals

Source: EY illustration

The following chapters deal with individual elements of strategic planning. As of January 2015, DRRIF and its orientation were not defined. Therefore, the rate of progress with respect to the vision, mission and goals of the DRRIF is based on its current phase.

6.1.1 DRRIF's vision

"If one does not know to which port one is sailing, no wind is favourable" (Seneca). The vision focuses on the future, providing a source of inspiration and motivation. It often describes the future of the organisation as well as the future of the industry or society which the organisation aims to develop. To define the DRRIF vision it is essential that the stakeholders realize what DRRIF should be (a Fund or a Support Centre) and what it should change (its impact on R&I).

The DR covers 14 countries and is home to more than 120 million people. The countries differ in terms of their economic strengths as well as their cultural and natural assets. The European Union Strategy for the Danube Region[67] (EUSDR) revealed that the DR predominantly suffered from a lack of **cooperation among its countries, environmental pollution** and the twin **dangers of recurring floods and dependence on external energy suppliers**.

The EUSDR also states that the **competitiveness** of the region **depends** on joint action in the areas of **SME support, labour market policy, education** and **security**. It also includes six countries outside the EU, which have been developing in various directions of political, socio-economic and sector interconnection with the EU and need to strengthen institutional support at all levels. In order for the DR to progress, it is important that the problems above are gradually removed and therefore, any initiatives which help to achieve this objective are of great importance both for the DR and the EU as a whole. Accordingly, the DRRIF vision should focus on these problems and be sufficiently bold to motivate people to act.

In defining the DRRIF vision the following questions must be taken into consideration:

- What changes must be implemented in R&I?
- Why exactly must these areas of R&I change?
- What are the strengths of DRRIF?
- What is the envisaged end state of changes to R&I?
- What is the expected end state of DRRIF implementation?

Neither the precise orientation of DRRIF nor its thematic areas had been defined as at the completion of this document (January 2015). Consequently, it is not possible to define the final and detailed version of the vision which would address the future orientation of DRRIF and simultaneously, answer all the questions above. This subchapter includes examples of the visions from other programmes. In the conclusion, we present a draft vision of DRRIF, reflecting its current state.

EUSDR vision:
"By 2020, all citizens of the Region should enjoy better prospects of higher education, employment and prosperity in their own home area. The Strategy should make this a truly 21st century region, secure and confident, and one of the most attractive in Europe."

BONUS EEIG vision:
"An economically and ecologically prosperous Baltic Sea region, where resources and goods are used sustainably and where the long-term management of the region is based on sound knowledge derived from multi-disciplinary research."

South East Europe Programme vision:
"The South East Europe Programme aims to develop transnational partnerships on matters of strategic importance, in order to improve the territorial, economic and social integration process and to contribute to cohesion, stability and competitiveness of the region. For this purpose, the Programme seeks to realize high quality, result-oriented projects of strategic character, relevant for the programme area."

We were not able to identify visions of other programmes analysed in this study.

The visions above have the following features in common:

- They explicitly define all the areas on which an organisation plans to focus.
- They define in which region these areas are planned to be supported and who should benefit from the resulting improvements.
- They clearly define the ideal state which they aim to achieve.

[67] EUSDR (2012), *Reflection paper*, available online at: http://www.danube-region.eu/about/key-documents

Conclusions

- **Draft vision 1:** The DR, internationally recognized as a centre of new ideas, innovation and research, which positively affects people's lives.
- **Draft vision 2:** Exploiting the full R&I potential of the DR collectively for the benefit of all citizens.
- After defining the orientation and specific thematic areas, we recommend revising the vision according to the needs of DRRIF.

6.1.2 DRRIF's mission

The mission statement specifies the purpose of the Fund, briefly describing the reason for its existence and actions taken to accomplish its vision.

The following questions need to be answered in determining the DRRIF mission:

- Why should DRRIF exist? (problems/needs of the region)
- What widest possible description can be used for the orientation of DRRIF activities?
- What are the scope and the potential strengths of DRRIF?

For illustration, below are some examples of the mission statements of other programmes:

EUSDR mission:
"The Strategy seeks to create synergies and coordination between existing policies and initiatives taking place across the Danube Region".

BONUS EEIG mission:
"To integrate the Baltic Sea system research into a durable, cooperative, interdisciplinary and focused multinational programme in support of the region's sustainable development."

South East Europe Programme mission:
"The South East Europe Programme helps to promote better integration between the EU Member States, candidate and potential candidate countries and neighbouring countries."

SEE.ERA-NET mission:
"... enhance the research cooperation in Europe by supporting integration of South East Europe into the expanding European Research Area (ERA)."

Central Europe Programme mission:
"To strengthen territorial cohesion, promote internal regulation and enhance the competitiveness of Central Europe."

The missions above have the following features in common:

- They are specific in determining the area and region on which they focus.
- They define how an organisation plans to achieve its goals.
- They give meaning to the functioning of an organisation and highlight how the organisation makes a difference.

Conclusions

- The DRRIF mission may be based on its primary objective which is currently presented to the public as follows: *"to identify, mobilise and distribute funds in order to support the development of R&I activities in the countries of the Danube Region".*
- An alternative DRRIF mission could be "*Better coordination of national, regional and EU funds to stimulate R&I excellence and facilitate cooperation, in areas specific for the Danube Region"*.
- The above alternatives serve as examples. After defining the orientation, activities and specific thematic areas, we recommend revising the mission according to the needs of DRRIF.

6.1.3 DRRIF's values

The main values of an institution represent those principles, determining its code of conduct. The values help in confirming whether an organisation is on the right track to meet its goals. The common values must be shared by all the DRRIF stakeholders. The values form the DRRIF's culture and priorities and provide a framework for taking decisions. Moreover, they must reflect the DRRIF's orientation.

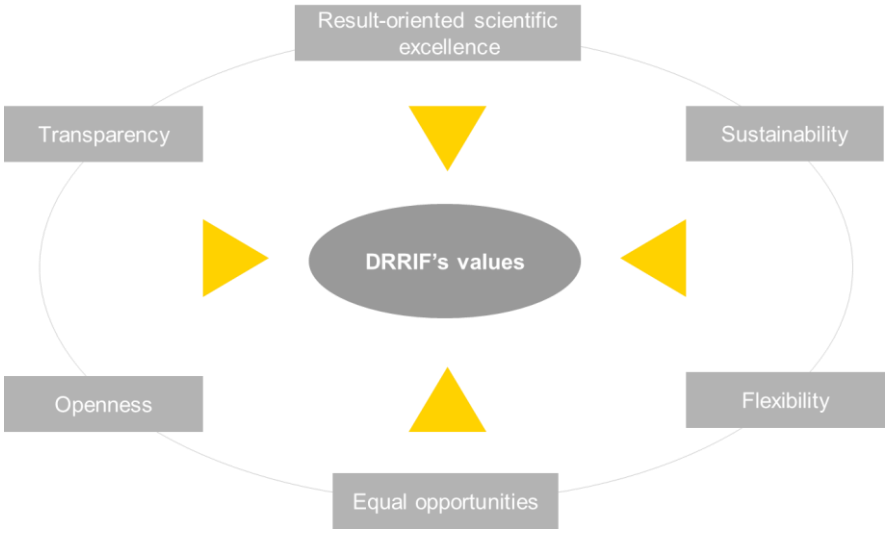
For illustration, below are examples of values upheld in the Bonus EEIG programme:

- **Openness** – We operate and communicate openly both internally and externally. We are service-minded and fair in undertaking our tasks.
- **Transparency** – We follow the principles of objectivity and transparency in our processes. Documents are prepared and managed transparently with respect to confidentiality.
- **Internationality** – We operate in an international environment and take this into account in our tasks.
- **Confidentiality** – We respect and value any confidential information submitted to or prepared by us. Confidentiality is guaranteed through secure IT-systems and strict Conflict of Interest regulations.
- **Scientific excellence** – We require high scientific quality in research projects.
- **Environmental consciousness** – We follow the principle of ecologically responsible behaviour.

Considering the proposed vision and mission, we recommend that the DRRIF values are as follows:

1. **Equal opportunities** – Every DR country may participate in DRRIF projects, irrespective of whether it is a member of the EU or not. There will be no discrimination of gender or nationality during this participation and DRRIF management. Several DR countries will be involved in every DRRIF project. The DRRIF will connect gifted people from various DR countries on common projects.
2. **Result-oriented scientific excellence** – To support high-quality projects which will raise the level of R&I in the DR. To reduce the administrative burden on projects, thereby providing more room for project implementation and to build capacities enabling scientific excellence.
3. **Sustainability** – In defining DRRIF goals the emphasis will be placed on long-term orientation.
4. **Openness** – To be open to new entities that wish to participate in DRRIF.
5. **Flexibility** – DRRIF will actively search for opportunities in the area of R&I in the DR and adapt challenges to actual needs.
6. **Transparency** – Maintaining transparency in launching calls, approving applications and managing DRRIF.

Figure 2: Scheme of DRRIF values



Source: EY illustration

Conclusion

- After defining DRRIF orientation, plus concrete thematic areas and objectives, we recommend revising the proposed values according to the needs of DRRIF and discussing them with the stakeholders.

6.1.4 DRRIF's strategy and objectives

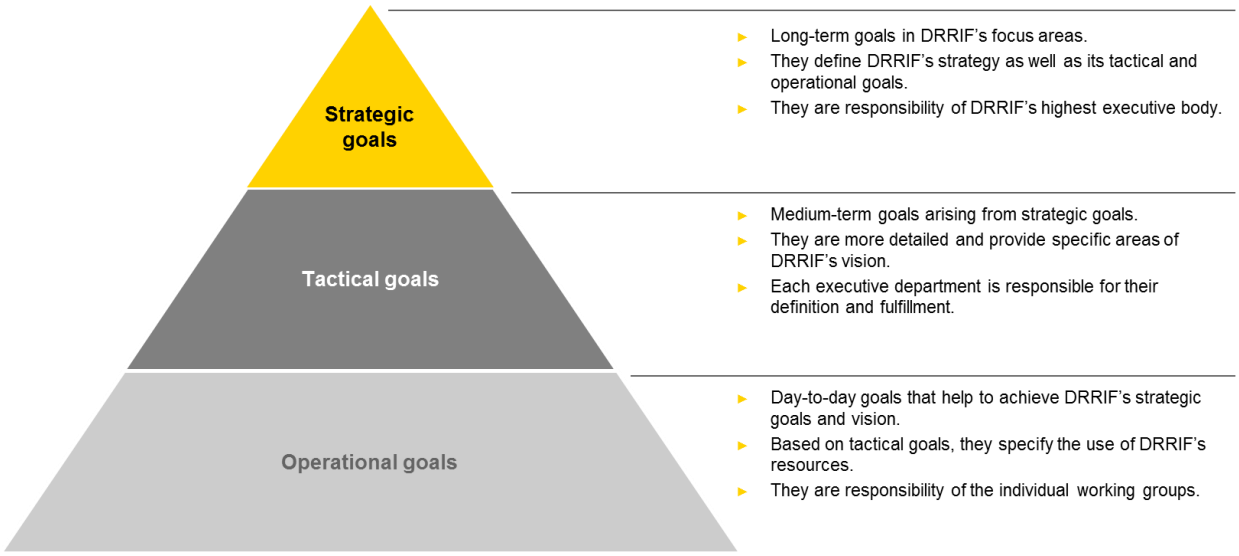
The analyses from the previous parts of this study and other strategic documents revealed several needs within the region on which DRRIF should focus. For these needs to be addressed effectively, a clear DRRIF approach – defined by means of its strategy and objectives – is required.

In general, a strategy represents the means by which the stated goals and the DRRIF's mission are to be accomplished. A strategy ensures that the DRRIF is on the right track to meet the set goals and vision.

DRRIF will operate in a competitive environment and therefore, how it "competes" with similar grant schemes for funds must be clear. After defining the DRRIF form and priority areas, we recommend **defining the DRRIF's strategy** which will reflect **the competitive method of accomplishing the set goals.**

The DRRIF goals should be defined and divided into the most general and most specific, reflecting the level of responsibility of the stakeholders. Therefore, we suggest the following hierarchy of goals:

Figure 3: Hierarchy of DRRIF goals



Source: EY illustration

Strategic goals
Strategic goals should be determined on the basis of the DRRIF's priority areas considering the transnational strategies – Europe 2020 and EUSDR, as well as the national strategies of individual DR countries. At the same time, they should specify the DRRIF's orientation over the period of the next three and more years.

Each of the strategic goals should be related to a specific horizontal or vertical priority area of DRRIF. The strategic goals should be built on the insights with regard to the current situation in a given area and be directed towards achieving the ideal situation.

The responsibility for strategic goals lies with the DRRIF's top management level (e.g., the Steering Committee composed of the representatives of the DR countries, Independent Scientific Board).

Tactical goals
Tactical goals are derived from the strategic goals and help to accomplish them. They are defined in the medium term (one to three years).

The responsibility for tactical goals lies with middle management. In the case of DRRIF we recommend defining the tactical goals for individual working groups that would be responsible for a selected area.

Operational goals
Operational goals are at the lowest level and they include day-to-day tasks leading to the fulfilment of tactical goals.

The responsibility for operational goals lies with employees from individual working groups.

All three categories of goals should meet the criteria of the SMART model, thereby contributing to the effectiveness of their definition, implementation, monitoring and supervision. The criteria are as follows:

- **Specific** – Every objective must be specific, avoiding general statements.
- **Measurable** – Defined goals must be measurable in order to monitor and evaluate their level of accomplishment.
- **Agreed** – Goals must comply with other activities and must be accepted by all the stakeholders.
- **Realistic** – Defined goals must be set in a manner that enables their accomplishment.
- **Time-bounded** – Every objective must have a defined time limit in which it is to be accomplished.

6.1.4.1 Cycle of goals

The environment in which DRRIF will operate is highly dynamic and subject to constant changes (e.g., political changes, expansion of the EU). Therefore, the goals set by DRRIF at its commencement should be considered as neither static nor immovable. It is necessary to reassess and modify goals at all levels, depending on the situation, conforming as far as possible to the needs of stakeholders and effectively using available means.

The diagram below shows the draft process – which we have called the cycle of goals – ranging from the definition to supervision of goals.

Figure 4: Draft cycle of DRRIF goals

Source: EY illustration

Definition and approval

In defining goals (mainly tactical and operational), it is important to take into consideration the particular implementation phase of DRRIF. In the first implementation phase – selecting DRRIF priority areas, its seat location and ensuring institutional support reflecting its needs – **goals mainly focused on the DRRIF's operation and internal processes** will be defined. In the later stages, as soon as DRRIF starts fulfilling its mission, the first calls are announced and the first projects realized, **the goals will be primarily project-oriented**.

Whenever goals are modified and new ones defined, it is necessary to consider how they overlap with other goals. As outlined in Chapter 6.1.1, to ensure the DR's progress, it is necessary to assist in removing major problems identified within the region. In order to evaluate whether individual DRRIF goals help to alleviate these problems, we recommend applying the scheme below, which is based on the Bonus EEIG programme.

Figure 5: Illustration of DRRIF's goals and needs alignment

Societal challenges in the Danube region	DRRIF's strategic goals														
	Strategic goal 1			Strategic goal 2			Strategic goal 3			Strategic goal 4			Strategic goal 5		
	DRRIF's vertical priorities (research areas)														
	1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	5.3
Pollution of the natural environment	○	●	●								○	○			
Threats arising from recurring floods				○	●	○									
Dependency on energy suppliers outside the region															
Promoting small and medium enterprises		○	●						○	○	●	●			
Improving labor market policies						●							●	●	○
Improving education			●	○											
Increasing security								●	○						

Example

Source: Bonus EEIG, processed by EY
● – helps directly
○ – helps indirectly

An important question is the responsibility for approval of goals and its assignment. To a large extent, the answer will depend on the governance model discussed in the following chapter 8 – Proposal of institutional forms. However, to maintain impartiality and segregation of responsibilities, this function should be reserved for an independent body (e.g., an independent scientific board), which has impact neither on the definition, implementation and monitoring of the goals nor on their supervision.

When approving new goals it is necessary to consider several aspects, such as following:

- Strategic goals of individual countries – Does a particular objective comply with the national strategies of individual countries?
- DRRIF mission and vision – Does the objective comply with the DRRIF mission and vision?
- Financial aspect – Does DRRIF have enough funds at its disposal to achieve its goals?
- Impact on DRRIF organisational structure – Is there a need to establish new departments in order to accomplish the objective?

The organisation of the process of approving new goals as well as other key documents will prevent the emergence of potential conflicts. It is necessary to consider the active involvement of the scientific community or representatives of the private sector in the process.

Implementation

The process of implementing DRRIF's goals is the most crucial part of the entire cycle of goals because an objective without implementation is just a vain effort. Implementation cycles of individual goals should also be borne in mind – if an objective is simpler, its implementation may be single-phased; conversely, in the case of more complex goals, a rolling implementation split into two phases may be more appropriate.

Figure 6: Illustration of DRRIF implementation cycles

Source: Bonus EEIG, processed by EY

Monitoring
An important prerequisite of monitoring of goals is represented by regular collection of data, as well as the provision of information on meeting goals and their benefits, in a standardized structure. To fulfil this task correctly, it is necessary that goal indicators are clearly defined and the SMART model is adhered to.

Review
The supervision of achieving goals is linked to their hierarchy. Strategic goals should be evaluated less frequently, for example, on an annual basis, whereas tactical goals may be evaluated on a semi-annual basis and the fulfilment of operational goals on a monthly basis.

The responsibility for supervision of goals lies with the respective management level. In this respect we recommend introducing a system of multi-stage supervision, thereby strengthening DRRIF's transparency and effectiveness.

In line with the proposed DRRIF values, **the accomplishment of main strategic goals should be communicated to all internal and external stakeholders** (for example, by means of a report on DRRIF goals accomplished). Provision of information to external parties and their feedback will contribute to achieving several DRRIF values simultaneously (transparency, effectiveness, flexibility and openness).

Where goals are not met, it is necessary to **identify the reason** why (e.g., poor activity, change of external environment, lack of funds, improperly set goals).

Conclusions

- The process of defining, implementing, monitoring and supervising objectives is crucial for the proper operation and progress of DRRIF and therefore greater attention must be paid.
- The selected objectives and respective activities leading to their accomplishment must comply with DRRIF values so as to be recognized by all the stakeholders

6.1.5 Example of a scheme covering DRRIF vision, mission and goals

We have synthesized information from the previous parts, vision, mission and goals along with the findings from our analyses and used them to complete the scheme of vision, mission and goals from Chapter 6.1.

In defining the strategies, vision and mission we have reflected the results from **the following analyses**:

- Absorption capacity
- SWOT
- PESTEL
- Participation of the DR countries in selected programmes
- Thematic areas

On the basis of the completed analyses we preselected cross-cutting and vertical priorities (scientific disciplines) which we reflect in the proposed DRIFF vision, mission and goals.

Examples of preselected horizontal priorities from Chapter 5.4.2**:**

- Support innovative activities of small and medium-sized enterprises in the DR and increase the number of such enterprises
- Connect scientists and public institutions with the private sector – by means of projects, joint events or within their managing bodies
- Assist in submitting applications for financial support of countries with a low success rate and a low number of submitted applications
- Support and raise awareness of EU programmes with a low success rate
- Increase participation of students and young scientists in R&D projects (e.g., every project should contain a part devoted to inclusion of students in science)
- Improve development and use of human capital

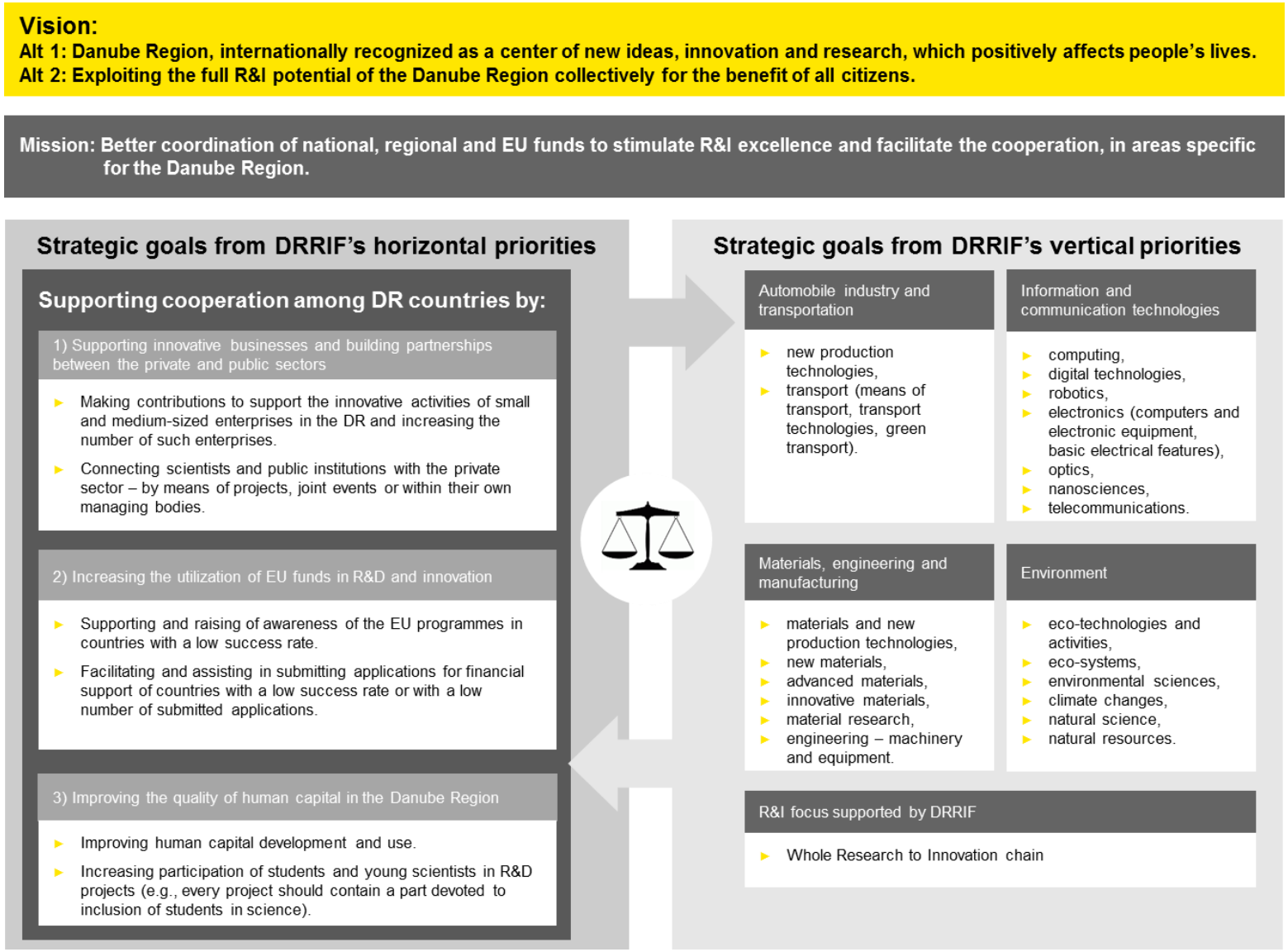
Examples of preselected vertical priorities from Chapter 5.4.1**:**

- Automobile industry and transport
- Information and communication technologies
- Materials, engineering and manufacturing
- Environment

As DRRIF is the flagship project of the Danube Strategy under Priority Area 7, which also has its goals defined, it is necessary that the DRIFF vision, mission and goals comply with them.

The following scheme connects the previous findings and shows a close linkage between the vision and the mission, which together establish strategic and tactical goals.

Figure 7: Illustrative scheme of DRRIF vision, mission and goals



Source: EY illustration

6.2 Conclusions of the proposal for DRRIF goals and mission

There are several complex societal challenges in the DR which need to be addressed in order for the entire region to progress. What rather complicates the situation is a different degree of integration in individual countries, as well as their specific needs in the area of political and socio-economic development. Moreover, the fact, that there are several other programmes and grant schemes in the geographic region, must also be taken into consideration.

If DRRIF wants to succeed in this environment, it is vital that the areas and goals to which it intends to pay attention are clearly predefined. Clearly set visions, which will define the desired state, and the mission, which will indicate how the DRRIF wants to accomplish this state, are also crucial to its success. Both aspects should be derived from the DRRIF's orientation and priorities, which were agreed upon by all the stakeholders. Simultaneously, the mission and vision should be specific enough so the DRRIF's functioning makes clear sense to its stakeholders and general public and so they are able to motivate people.

Equally important are the DRRIF's goals and its strategy by means of which DRRIF is to accomplish its vision. In terms of the complexity, time horizon and responsibility with respect to the goals, we recommend dividing the goals into strategic, tactical and operational. Nevertheless, all the goals should comply with the criteria stipulated by the SMART model and they should be periodically assessed and modified in accordance with the existing DRRIF needs and the situation within the region.

The day-to-day functioning of the organisation as well as its accomplishment of goals should be in line with the values that define what is right and wrong and simultaneously, form the culture and framework for taking decisions.

The final formulation of the mission, vision and goals will also depend on whether DRRIF is to operate as a fund/ support centre, or as a structure which supports the funding without legal independence. The individual potential institutional forms are dealt with in Chapter 7 and Chapter 8 below.

7. Analysis of potential legal forms

7.1 Description of performed analysis

In terms of its institutional support and organisational structure, DRRIF could operate and accomplish its goals in the form of a fund/ support centre, or a structure which supports funding**. In this chapter we deal with alternatives to DRRIF's establishment as an independent legal entity** (i.e., a Fund or Support Centre), and analyse various legal forms under which it could operate.

DRRIF as a structure which supports funding does not necessarily need an independent legal form – this alternative is featured in chapter 8.

We performed the analysis of potential legal forms using a procedure in which several steps were interlinked.

The first step was represented by the finding that a legal form should follow the DRRIF goals. This means that DRRIF's legal form may vary, depending on whether it is to operate as a Fund reallocating funds, or as a Support Centre, essentially providing advisory services to applicants and beneficiaries.

At the commencement of the analysis we identified the following three potential legal forms of DRRIF:

- Entity established by means of an international treaty
- European entity
- National entity

Each of the listed options consists of several sub-types (specific legal forms) which we deal with in the following parts of the chapter.

We also explored the options for **DRRIF's seat,** as this factor may also significantly affect the selection of a legal form.

We also provide **a general overview of legal forms** in the selected DR countries. We focused on an overview of institutions similar to DRRIF by comparison of their legal form, whether as a Fund or a Support Centre.

In the last part of the analysis of potential legal forms, the following were evaluated for suitability:

- Entity established by means of an international treaty
- European entity:
  - European Grouping of Territorial Cooperation
  - European Economic Interest Grouping
  - Joint Programming Initiative
  - European Research Infrastructure Consortium
- National entity under Slovak conditions:
  - Organisation financed/co-financed by state budget (budgetary/contributory organisation)
  - Interest association of legal entities
  - Limited liability company
  - Joint-stock company

In general, we based our analysis of potential legal forms on **the national regulations of selected countries, located in the DR, as well as European and international legal regulations**.

The key aspects which we considered and evaluated with respect to legal forms are as follows:

- Requirements resulting from other steps of the performed analysis (e.g., provision of resources to the DR countries, the possibility of having employees)
- Best practice (experience from other funds)
- Simplicity of governance and risk management
- Optimum number of entities
- Country / countries where the fund will be seated
- Potential institutions, which will be responsible for the establishment of the fund

Preliminary outputs of the analysis of potential legal forms were included in a workshop programme and discussed with the representatives of the DR countries at the DRRIF working group meeting (17 March 2015).

In the conclusion of the chapter, **we have summarized several alternative** legal forms with their advantages, disadvantages and justification for their recommendation. The analysis is neither comprehensive nor detailed in legal terms; however, it assesses the possibilities at conceptual and strategic levels within the process of determining the legal form of DRRIF.

7.2 Analysis of DR countries for DRRIF's seat

As noted at the beginning of the chapter, we identified three types of legal form (entity established by an international treaty, European entity and national entity).

Particularly in the case of the legal form as a national entity, it is crucial to identify the country where DRRIF should have its seat, as national legislation of the DR member countries differ.

As for the European entity, it must be established in an EU Member State.

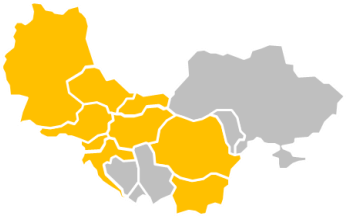
The entity established by an international treaty has no such limitations; however, its incorporation is more demanding in terms of time, processes and logistics.

It follows from the above, that prior to defining and analysing the recommended legal forms for DRRIF, it is necessary to identify options for its seat.

We performed a short analysis, assessing the suitability of the countries, based on criteria to which were assigned various weights. This resulted in a list of countries, ranked by suitability for DRRIF's seat – set out below.

The assessed criteria:

- **Memberships of the EU –** The majority of DR countries are also members of the EU. Considering the importance of DRRIF's seat, this criterion has added weight, not just due to simpler options of establishing the legal form, but also due to greater potential opportunities for funding. However, the weight is less significant, taking into consideration the equality of all countries which fall under EUSDR.



- **PA7 EUSDR coordination** – PA7 EUSDR has two coordinators: Slovakia and Serbia. These countries were appointed to manage the areas on which the priority axis wants to focus, which include DRRIF. We assigned a weight of medium importance to this criterion.

- **Geographically central location** – Distance is still an important factor and needs to be taken into consideration. The significance of geographic clusters is increasing. Moreover, the European territorial cooperation programmes should also strive to geographically centralize their management. Accordingly, the objective is to minimize the average distances from the DRRIF management seat to the other DR countries. We assigned a weight of medium importance to this criterion.

- **Above-average R&D state** (according to IUS) – This criterion is based on the prerequisite that the countries with developed R&D will be able to manage DRRIF activities more effectively than those lagging behind in this area. Nevertheless, in many respects this correlation is questionable, and therefore, this criterion was determined to be less significant.

- **Activities and level of cooperation with respect to DRRIF creation** – This criterion was evaluated on the basis of our six-month experience of communicating with the DR countries and their representatives. The activity in creating the DRRIF leads to the precondition that these countries will be similarly active in its management. Therefore, this criterion was evaluated as important.

As a result of the analysis, the most suitable countries for the seat of DRRIF (in English alphabetical order) are Austria, Germany and Slovakia.

- Austria is one of the most suitable countries because of its **geographically central location** within the DR (the capital Vienna), **active cooperation in creating the DRRIF** and the fact that **R&D development is better than average**.
- The same characteristics also apply to Germany (and/or federal Länder: Baden-Württemberg and Bavaria). **However, a disadvantage is its location** in the upper stream part of the Danube river, in the north-western corner of the DR. We believe that in order to strengthen the cohesion and level of R&D in the DR, it would not be beneficial to place the DRRIF seat in the region which has the highest level of science, research and economy.
- Slovakia – similarly to Austria – has a central location within the region (the capital Bratislava is accessible from Vienna and local airports). Moreover, **it is also a member of the EU** and furthermore, **one of the two coordinators of PA7**.

In the following part of the document, the general analysis of legal forms will therefore feature these three countries. As the final decision on DRRIF's form and activities which significantly influence the DRRIF's legal form and seat, had not yet been made at the moment of finalization of the study, we analysed, as an example, only the Slovak legal forms in more detail (Slovakia was selected on the basis of the above performed DRRIF seat analysis, with emphasis on the fact that Slovakia is one of two PA 7 coordinating countries). More detailed analysis should be performed after the final decision on DRRIF's form and activities – both on its seat and its legal form.

The final decision about the location of the DRRIF's seat, along with the determination of DRRIF goals and orientation, **depends on the political agreement** of the DR countries. What is also required is the chosen country's real interest in having the DRRIF's seat within its territory.

The **criteria** for the DRRIF seat determination **may be reassessed** in the future based on the requirements and consensus of the DR member states. The above presented idea of DRRIF **seat analysis is set to be open to discussions and amendments**.

7.3 Analysis of selected legal forms

This chapter provides an overview of potential legal forms of DRRIF in the selected DR countries and at international level.

- International treaty, involving:
  - The creation of a new entity on the basis of an international treaty at intergovernmental level
  - A responsible authority, such as a ministry covering research in a given country
  - All the DR countries interested in participating in DRRIF activity, as signatories

- European entity:
  - European Grouping of Territorial Cooperation
  - European Economic Interest Grouping
  - Joint Programming Initiative
  - European Research Infrastructure Consortium

We assessed the legal forms as national entities for those countries evaluated to be the most appropriate for DRRIF's seat (on the basis of the evaluation in the previous chapter): Slovakia, Austria and Germany (Baden-Württemberg and Bavaria).

- National entities:
  - Under Slovak jurisdiction
  - Under Austrian jurisdiction
  - Under German jurisdiction

In assessing the potential legal forms it is necessary to take into account whether DRRIF is to operate as a Fund or as a Support Centre. The tables below provide **an overview** of the legal forms which we identified with respect to these two options. Moreover, regarding the European entities and Slovak legal forms, a detailed analysis was performed and is described below the table.

Table 18: Overview of DRRIF's potential legal forms

Fund	Best potential alternative	Potential alternative	Unlikely alternative
European entity	EGTC – European Grouping of Territorial Cooperation. Example: http://www.istergranum.hu/index_sk.html (cooperation among citizens)	EEIG – European Economic Interest Grouping Example: BONUS	ERIC - European Research Infrastructure Consortium Example: BBMRI (Biobanks and Bimolecular Resources of Research Infrastructures)
Slovakia	Fund established by law Example: Fund to promote education	Interest association of legal entities Example: Slovak Business Agency	Non-investment fund
Austria	Fund established by law Example: Austrian Science Fund https://www.fwf.ac.at/en/	Gesellschaft mit beschränkter Haftung – GmbH	Foundation
Germany	Gesellschaft mit beschränkter Haftung - GmbH Example: European XFEL (X-Ray Free-Electron Laser Facility)	Registered Association (e.V.) Example: German Research Foundation (http://www.dfg.de/en/) German Aerospace Centre (www.dlr.de)	Foundation Example: Robert Bosch Stiftung (charitable institution)

Support Centre			
European entity	EGTC – European Grouping of Territorial Cooperation Example: http://www.istergranum.hu/index_sk.html (cooperation among citizens)	EEIG – European Economic Interest Grouping Example: BONUS	ERIC - European Research Infrastructure Consortium Example: BBMRI (Biobanks and Bimolecular Resources of Research Infrastructures)
Slovakia	Agency established by law Example: Slovak Research and Development Agency (http://www.apvv.sk/)	Interest association of legal entities Example: Slovak Business Agency	Civic association
Austria	Agency established by law Example: The Austrian Research Promotion Agency (https://www.ffg.at/en)	Association	Foundation
Germany	Gesellschaft mit beschränkter Haftung - GmbH Example: European XFEL (X-Ray Free-Electron Laser Facility)	Project Management Agency f.ex. Registered association (“Verein”) Example: German Federation of Industrial Research Associations (AiF) (http://www.aif.de/en/about-aif.html) German Aerospace Centre (www.dlr.de) Research Centre Jülich (www.fz-juelich.de)	

Source: EY illustration

On the basis of the analysis of the most suitable seat for DRRIF, as well as the above general analysis of legal forms, we selected the following three alternatives for a detailed analysis of legal forms:

- Establishment by means of an international treaty
- Legal form at the EU legislative level
- Legal form under the conditions of Slovak legislation

The selection of a suitable legal form is one of the important steps in defining the form of DRRIF in the future, its functioning or its further development. It is a comprehensive process of identifying a flexible and transparent structure, in which it will be necessary, inter alia, to specifically modify mutual rights and responsibilities of the DRRIF members. This will also enable funds to be obtained from national, international as well as private sources, to be distributed further into R&I projects, irrespective of the place of their realization within the EU.

The proposal has been prepared as a brief analysis of the following legislation of the EU and the Slovak Republic:

- Regulation No. 1082/2006 of the European Parliament and of the Council (EC) of 5 July 2006 on a European Grouping of Territorial Cooperation (EGTC)
- Council Regulation (EEC) No. 2137/85 of 25 July 1985 on the European Economic Interest Grouping (EEIG)
- Act No. 177/2004 Coll. on EEIG
- Act No. 90/2008 Coll. on EGT
- Act No. 523/2004 Coll. on Budgetary Rules of Public Administration and on the amendment to certain acts, as amended
- Act No. 40/1964 Coll. the Civil Code
- Act No. 513/1995 Coll. the Commercial Code
- Other relevant legal forms

7.3.1 Establishment by means of an international treaty

By means of an international treaty it is possible to set up an international organisation (IO), aimed at aligning the activities and procedures of states in order to accomplish common goals, i.e., support of R&I. Such an organisation will also strive to ensure the realization of tasks in establishing and developing international relations in the relevant areas.

IOs are established on the basis of international treaties and contracts which define the programme, goals and structure of bodies as well as their competence. Additionally, treaties establishing an IO stipulate: (i) the rights and responsibilities, and (ii) the establishment of an organisational structure, the voting methods in bodies, budget or membership conditions.

IOs create their conditions and rules separately – within the limits of their competence and statutes – and on their basis they accept new members. In most cases there are three membership types: (i) original (ii) full (iii) associated

The disadvantage of an IO for the purposes of DRRIF is that it is a time-consuming and burdensome political process which requires each Member State to ratify the treaty of establishment. On the other hand, a very positive aspect is its flexibility and the possibility to adjust the structure and manner of its operation.

Examples of IOs which have proved to be effective are as follows:

- OECD
- International Chamber of Commerce

7.3.2 Legal form at EU legislative level

For the purposes of cooperation of several countries at the EU level, we identified the following legal forms:

- European Grouping of Territorial Cooperation
- European Economic Interest Grouping
- Joint Programming Initiative
- European Research Infrastructure Consortium

European Grouping of Territorial Cooperation

The European Grouping of Territorial Cooperation[68] (EGTC) is a type of European legal form, aimed at facilitating cross-border, transnational and/or interregional cooperation. In each member state an EGTC has legal capacity accorded to legal persons under the member state's national law.

An EGTC must be made up of members located in the territory of at least two EU Member States; an association consisting of entities belonging to one or more of the following categories: Member States, regional authorities, local authorities.

In the case of applying this European entity for the purposes of DRRIF, there is one disadvantage – members of an EGTC may only be public bodies of EU Member States. Consequently, an EGTC would have to conclude contracts with non-member states.

As an example – the European programme INTERACT and INTERREG projects operate using the EGTC form.

During the DRRIF WG meeting discussions in March 2015, serious doubts were presented over the limitations of the EGTC in integrating non-member states. However, on the basis of further investigation, it was found that third countries can be involved in an EGTC if their legislation and agreements between Member States and the concerned third country allow it, and if the concerned Member States do not exclude this possibility.

[68] Regulation (EC) No. 1082/2006 of the European Parliament and of the Council of 5 July 2006 on a European grouping of territorial cooperation / Act No. 90/2008 Coll. on a European grouping of territorial cooperation and on the amendment of Act No. 540/2001 Coll. on state statistics, as amended

European Economic Interest Grouping

Another European legal form is a European Economic Interest Grouping[69] (EEIG), aimed at facilitating and developing the economic activities of its members as well as improving and increasing the results of these activities. However, the purpose of the EEIG is not to make profit for itself.

EEIG has its own legal personality and capacity and a minimum **of two different EU Member States are needed to establish the grouping**. Members can be of different structure, i.e., liberal professions, companies, public entities or associations. Membership of an EEIG is limited to EU members; however, statutes may allow associated members which can be from non-EU countries.

An EEIG may not exercise, directly or indirectly, power of management or supervision over its members' own activities or over the activities of another undertaking, in particular in the fields of personnel, finance and investment.

Although there are **no capital requirements**, the appointment of an auditor for the evaluation of non-monetary contributions of members is mandatory.

Disadvantages of EEIG:

- Complex model
- Mandatory unlimited joint and several liability of each member of EEIG for the debts of EEIG. Therefore, if an EEIG member is a public entity, this liability could be in conflict with its national public laws and if a member is a private entity, the liability could be in conflict with its rules and/or by-laws

Joint Programming Initiative

The Joint Programming Initiative (JPI) is an initiative of the EU which aims to combine the scientific efforts of Member States to better use public resources for science and research. It is a structured and strategic process in which the Member States agree on a common vision and a strategic research agenda in order to address common problems.

The disadvantage of a JPI is that it has no legal personality and is characterized as an initiative among the Member States.

Examples of JPIs which have proved to be effective are as follows:

- The Joint Programming Initiative on Agriculture, Food Security and Climate Change
- Joint Programming Initiative on Antimicrobial Resistance

European Research Infrastructure Consortium

Pursuant to EU legislation[70], the European Research Infrastructure Consortium (ERIC) is a legal form with the principal task of establishing and operating a research infrastructure. States as well as intergovernmental organisations may become members of an ERIC. The members have the freedom to modify and create their own process of public procurement which, however, must respect the principles of transparency, non-discrimination and competition.

An ERIC must be established by at least three EU Member States, which express their consent to jointly establish and operate research infrastructure. The statutory seat of an ERIC must be located in a Member State or in a country associated within the EU framework programmes. Nevertheless, associated countries, third countries as well as intergovernmental organisations may also become its members. Members agree, on the statute, intellectual property rights, funding and submit an application to the European Commission that assesses – with the help of independent experts – whether the requirements laid down in the ERIC Regulation are met. Subsequently, the Committee composed of representatives of the EU Member States decides about a particular application by a qualified majority.

[69] Council Regulation (EEC) No. 2137/85 of 25 July 1985 on the European Economic Interest Grouping / Act No. 177/2004 Coll. on the European Economic Interest Grouping

[70] Article 171 of the EC Treaty

The advantages of an ERIC are as follows:

- Spirit of the right European undertaking
- Simplicity
- Legal personality accepted in all EU Member States
- Flexibility to adjust specific conditions with respect to individual infrastructures
- Privileges given to certain intergovernmental organisations
- Process which is incomparably faster (four to eight months) and more cost-effective than establishing an international organisation

The disadvantage which makes an ERIC practically inapplicable for DRRIF is that its establishment may only result in a mere scientific infrastructure and its use will be in the form of a project or consortium and not in an entity supporting R&I.

The examples of ERICs which have proved to be effective are as follows:

- BBMRI - Biobanks and Bimolecular Resources of Research Infrastructures ERIC
- ECRIN - European Clinical Research Infrastructure Network ERIC

7.3.3 Legal form under the conditions of Slovak legislation

In analysing the legal forms under the conditions of Slovak legislation[71], we took into consideration our current knowledge of the planned DRRIF operation. The following parts include the main characteristics of legal forms under the conditions of Slovak legislation.

The following legal forms are dealt with in the analysis:

- Budgetary/contributory organisations
- Common interest association
- Limited liability company
- Joint-stock company

Their combination may result in the so-called hybrid structure which is also described in this chapter.

Budgetary/contributory organisation

A budgetary or contributory organisation is defined by law[72] and regulates these types of organisations as a state legal entity. These organisations may be established by law or by the decision of an establisher that is a central governmental administration authority, municipality or higher regional unit.

A budgetary organisation has a high level of credibility because of the methods of its establishment. However, its disadvantage lies in the fact that budgetary organisations – with the exception of ministry and organisations established by the decision of an establisher, cannot establish or found another legal entity.

The examples of budgetary and contributory organisations which proved to function effectively are as follows:

- Slovenská akadémia vied (Slovak Academy of Sciences – budgetary organisation)
- Agentúra na podporu výskumu a vývoja (Slovak Research and Development Agency – budgetary organisation)
- Centrum vedecko-technických informácií Slovenskej republiky (Slovak Centre of Scientific and Technical Information – contributory organisation)

Common interest association[73]

To protect their interests or to achieve another purpose, legal entities may create a common interest association (CIA). A CIA may be established solely by legal entities; this, however, in no way limits the future operation of DRRIF. Experience has shown that the principal activity of a CIA is the satisfaction of eligible interests and needs of its founders (members) and provision for cooperation of some joint activities, professional services, and goals in the area of humanity or development programmes. A CIA may be found by means of Articles of Association or a resolution made by a general meeting.

[71] Slovak legal forms were used as an example on the basis of the above performed DRRIF seat analysis, with emphasis on the fact that Slovakia is one of two PA 7 coordinating countries
[72] Act No. 523/2004 on Budget Rules of the Public Administration and of Change and Amendment of Some Acts
[73] Act No. 40/1964 Coll. the Civil Code (Articles 20f - 21)

The advantage of a CIA is its simplicity and speed of establishment. The origin of an association has two phases – expression of will on the side of its founders (the first phase) and expression of will on the side of a state authority (the second phase) which grants a legal personality to the association.

Examples of CIAs which have proved to function effectively are as follows:

- Slovak Business Agency (NADSME)
- Združenie podnikateľov Slovenska (Entrepreneurs Association of Slovakia)

Limited liability company[74]

A limited liability company (LLC), *spoločnosť s ručením obmedzeným (s.r.o.),* is one of the most frequent legal forms in the Slovak Republic. It is a capital company which may also be founded for other than business purposes, i.e., to support science, R&I.

A big advantage of an LLC is its flexibility and the possibility to adjust mutual rights and responsibilities of owners (members) of the LLC, by means of individual modification of the Memorandum of Association. Additionally, potential changes in the Memorandum of Association may be performed sufficiently quickly. It is possible to establish a supervisory body (supervisory board) in an LLC, with the responsibility of supervising the due performance of activities of a company.

An example of an LLC which has proved to function effectively as a fund is as follows:

- Národný holdingový fond, s.r.o.

Joint-stock company

A joint-stock company (JSC), *akciová spoločnosť (a.s.)*, is a capital company which, like an LLC, may be founded for other than business purposes. The number of shareholders in a JSC is unlimited.

The disadvantage of a JSC is its organisation, which is demanding in terms of administration and economy. We recommend this type of legal form in particular for safe-keeping of funds and provided that the private sector is incorporated within DRRIF. A big advantage of a properly set-up JSC is its transparency and supervision over its activities. A JSC has a legal obligation to form – at the time of its establishment – a supervisory board as the supervisory body of a company.

Examples of JSCs which have proved to function effectively as various funds are as follows:

- Slovenský rozvojový fond, a.s.
- Slovenský rastový kapitalový fond, a.s.
- Fond inovácií a technológií, a.s.

Hybrid structure

In the case of funding flowing from different legal entities (private, public) there is an option to create a hybrid (more complex) legal structure. Such a structure would ensure that adequate checks are in place to provide a governance structure for accountability. Such a structure could be a combination of several legal forms described above. **The creation of the hybrid legal structure is also possible as a combination of European and national legal forms**. Please refer to the Slovak Business Agency, which holds funds that support innovation, technology or start-ups. Nevertheless, in selecting the more complex legal structure, at least the following aspects must be taken into consideration:

- Origin of funds (national, European, private)
- The method of supervision of the founding members over other entities
- International element of investing/providing grants

Despite the fact that Slovak legislation does not recognize the “hybrid structure”, under this term a network of several legal forms is understood, which would be incorporated according to the special requirements of the contractual parties / partners of the DRRIF.

[74] Act No. 513/1991 Coll. the Commercial Code

In other countries (e.g., United States[75]), the term “hybrid structure” means a legal entity that combines the legal and tax flexibility of a traditional LLC, the social benefits of a non-profit organisation, and the branding and market positioning advantages of a social enterprise.

Following the hybrid structure of the Slovak Business Agency, the following steps would be needed to create a hybrid structure for the purpose of DRRIF:

1. The local and foreign government bodies / partners incorporate a “Common interest association of legal persons” (CIA)
2. The CIA incorporates a fund in the form of a Limited Liability Company (LLC) and is the sole owner of the LLC
3. If private investors participate in the DRRIF, a third legal entity is created, either in form of a Joint-stock Company, Limited Partnership or Limited Liability Company

Advantages of the hybrid structure:

- Contractual flexibility in terms of amending mutual rights and obligations in each legal entity
- If incorporated correctly, very broad supervision and flexibility is possible
- Possibility of choosing from several entities in each of the above steps

Disadvantages of the hybrid structure:

- High financial cost of the incorporation of legal entities and their management
- Difficult administration
- Need for broader organisation structure – more staff

[75] A special entity was created by the US legislation, called L3C.

7.3.4 Not-for-profit association under Belgian law

During the DRRIF WG meeting in March 2015 an additional potential alternative for DRRIF legal form was suggested for consideration. This is a **not-for-profit association under Belgian law** (utilised by COST Association).

The COST Association was presented by the DRRIF WG members as one of the options of legal structure that DRRIF might follow. The following are selected facts about COST legal arrangements that are intended to help the decision-making process:

- The COST Association was established as an **international not-for-profit association** and now includes all 35 COST Member Countries (both EU and non-EU)
- It is ruled by Belgian law **with the aim of ensuring the intergovernmental nature** of COST and its European dimension

Establishment and governance of an international association under Belgian law has the following advantages and disadvantages[76]:

Advantages:

- The location in Belgium considering the neutrality of this country towards the partners
- No initial capital needed
- Flexibility when defining the Articles of Association
- Limited liability
- Full legal personality
- Tax exemption
- Fast creation/foundation process (about two months after submission to Belgian Ministry)
- International image and European character
- Flexible governance structure, reallocation of shares, non-profit status and benefits
- Personnel regulations that can be applied to all kinds of employees and allow for staff prerequisites

Disadvantages:

- Needs a statute in French language
- Headquarters address must be in Belgium
- Not suitable for big investment

If there is a need for establishment of the legal entity we recommend performing a broader analysis and including this legal form in the decision-making process of the DRRIF WG during the later stages of DRRIF's implementation.

[76] Source: Legal forms of a European Research Infrastructure http://www.copori.eu/1384.php

7.4 Summary of the analysis of potential legal forms

On the basis of the performed analysis we have summarized several recommendations.

- **The establishment of DRRIF by means of an international treaty would bring benefits** in the form of a clearly determined structure, processes, competencies and responsibilities. Moreover, it would help to avoid any problems arising from the different stages of EU integration among the DR countries.
- **The obstacle may be a politically and procedurally demanding scenario** as the wording of such a treaty should be supported by the broad political agreement of all the DR countries which are interested in DRRIF.
- Organisations such as the International Chamber of Commerce or OECD were established by means of an international treaty.

- **As a European legal form,** neither of the analysed possibilities seems to fit the expected DRRIF requirements perfectly.
- EGTC faces obstacles in contracting non-EU members.
- EEIG contractual partners should be business entities (or natural persons) but not countries; moreover, there is a mandatory unlimited joint and several liability of each member of EEIG for the debts of EEIG.
- JPI and ERIC were assessed as unsuitable, based on the analysis performed.

- **If it was decided to establish DRRIF under the national legislation conditions,** the hybrid structure would seem to be an appropriate form (based on the analysis of the Slovak legal environment). The hybrid structure could be based on an interest association of legal entities which would subsequently set up an LLC (appropriate for DRRIF as a Support Centre) or a JSC (appropriate for DRRIF as a Fund).
- The disadvantage is governance by legislation of only one DR member state and a potential risk of less supervision and monitoring of the entity's activities, compared to conditions under an international treaty or European entity.
- The Slovak Business Agency is an example of a hybrid structure under the conditions of Slovak legislation.

- In addition to the options above, DRRIF may be **established as a structure without its own legal form**. Either the Support Centre might be established in the form of a project in its initial phases, without a legal structure, or it could operate as a funding network. This type of structure is discussed in Chapter 8.

Based on discussions of country representatives in the DRRIF Working Group meeting in March 2015, preferences for a simple entity were expressed. This means that DRRIF might also operate without any legal form (in the case of DRRIF as a Funding Network or Support Centre – project funded under Danube Transnational Programme). A decision on establishment of DRRIF with or without its own legal entity is highly dependent on the final decision on the DRRIF's activities and form. **The determination of DRRIF's seat is a politically highly sensitive question that will also affect its legal ruling**.

- The DRRIF establishment form should be determined so **that, along with thematic areas, mission, goals and selected organisational structure, it creates a coherent whole**.

- **Prior to establishing DRRIF, legal advisors** who will actively participate in the establishment process **should be appointed**. Similarly, prior to the establishment, we recommend holding consultations with the European Commission and agreeing on the selected establishment form with the representatives of the DR countries.

- **Should DRRIF be established as an independent legal entity, the establisher of DRRIF should have** a legal personality in the national legislation (for example, the possibility of establishing other legal entities). It can either be a state administration entity (for example, a responsible ministry) or a newly-established entity as agreed by the stakeholders.

- Establishment of DRRIF within the territory of one DR member state, however, cannot influence the fact that **an international team of professionals, with representatives from all DR countries,** which decide to participate in the DRRIF's activities, **should be in its supervisory as well as executive functions**.

8. Potential institutional forms of DRRIF[77]

DRRIF could support and promote the goals from the thematic areas identified in the previous chapters (5. Analysis of thematic areas and 6. Proposal for DRRIF's objectives and mission) in many different ways and with various tools. **The operating model of such an initiative will, to a large extent, depend on the tools selected for the support of R&I**. At this point we consider the alternative of DRRIF as a fund, the least feasible due to limited financial resources in the countries, the complexity of the set-up of such an endeavour and the lack of political prioritisation for the fund. The remaining two proposed alternatives, Funding Network and Support Centre, are feasible. However, they depend on goals selected, consensus regarding the future direction and the expectations of the stakeholders. Each of the alternatives can have a positive impact on R&I in the DR.

After consultations with the DR representatives, we have designed the three **most likely alternatives** of DRRIF's potential forms:

- **Alternative 1: Fund**
- **Alternative 2: Funding Network**
- **Alternative 3: Support Centre**

We have detailed the individual alternatives in the following form**:**

- Proposed organisational structure, or governance model
- Identified staffing needs
- Example of life cycle
- Identified material and technical requirements necessary to fulfil DRRIF's goals and objectives

Where examples from existing institutions were available, **we included schemes and lessons learned**, which have been used in the process of designing the individual alternatives.

We **compared the alternatives based on the following criteria**:

- Goals
- Activities
- Life cycle
- Financial resources

The following aspects will have to be taken into account when **deciding on the most suitable form of the institution**:

- Political support for the given alternative
- Funding options
- Final selection of thematic areas – horizontal/vertical

The alternatives are described individually; however, they can also be (partially) combined.

[77] Under the abbreviation "DRRIF" we understand any future form of this institution, not only a fund (this applies to the whole chapter except for the part 8.1.1)

8.1 Governance model

We provide only a basic design of the organisational structure, or governance model, rather than detailed organisational rules and descriptions of tasks and processes. We consider each alternative proposed as DRRIF's potential governance model.

8.1.1 Alternative 1: DRRIF as a fund

Danube Region Research and Innovation Fund (DRRIF)

The fund's goal should be to obtain financial resources from European, national and private sources to finance projects in accordance with its selected vertical and horizontal thematic areas, which help to increase the R&I level and cohesion among the DR countries.

BONUS programme is an already existing institution that is similar both in its terms as well as geographic scope.

We have identified the following **main activities for the fund founder during the fund's establishment phase**:

- Definition of goals, vision and mission
- Selection of thematic areas
- Obtaining financial resources for establishment
- Preparation of internal documents governing the fund's operations (internal directive, memorandum of cooperation, scientific plan)
- Establishment of headquarters and space necessary for the fund's operations
- Recruitment of new employees
- Nomination of members of supervisory and executive bodies
- Contacting potential members of an independent scientific advisory board
- Addressing administrative and statutory necessities
- Setting up the organisational structure, governance model and internal rules, including the internal control system

We have identified the following **main activities for the fund administrator during the fund's operational phase:**

- Obtaining financial resources for funding of calls and day-to-day operations
- Preparing and announcing calls
- Administering and evaluating submitted proposals
- Project implementation monitoring and evaluation
- Project oversight
- Reporting
- Marketing activities (preparation and distribution of advertising materials, organisation and participation in workshops and R&I awareness raising activities)
- Communication and coordination with the founders

Our goal was to propose such a governance model that would take into account its goals, tasks and interested parties while ensuring effective and transparent functioning of individual processes. In our proposed model, we have included best practices and lessons learned from existing programmes which already command finances for R&I support, such as INTERREG, EUREKA, BONUS and SEE ERA.NET[78]. The founder and administrator of the fund could be an institution from the DR (ministry or agency fostering R&I) selected by the DR representatives. Alternatively, a new institution might be established which could be in charge of establishing and operating the fund, or a combination of alternatives.

In the following section, we present the lessons learned and best practices arising from the analysis of the three programmes above:

[78] Lessons learned from SEE ERA.NET programme are described in part 11.1.3

INTERREG

- Simple and well-functioning organisational structure
- Independent audit body
- Information centres in four different countries
- Defined national contact centres in participating countries

EUREKA

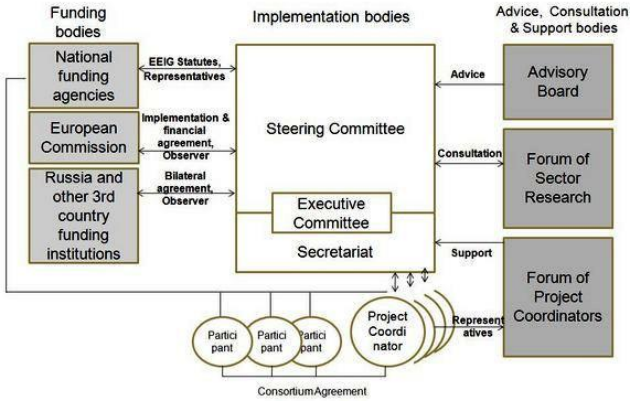
- Annually-rotating chair
- Chair programme for the year is based on the activities from the previous year and takes into account the activities for the upcoming year (so called Troika)
- Defined fund bodies which are responsible for communication with the public sector – ministry conference, antiparliamentary conference, „high-level“ group
- National contact centres in participating countries

In our opinion, the BONUS programme's governance model is the most analogous to DRRIF's potential model and that is why we analyse it further in the upcoming chapter.

BONUS programme

The BONUS programme supports R&D in the Baltic Sea region and is a part of the Baltic Sea macro regional strategy. Its funding comes both from EU as well as national resources. It has been in operation for some years and has transformed from an ERA-NET project to an Article 185 initiative, adding additional sources of financing. Due to this, we perceive BONUS as the most analogous structure to DRRIF and believe that it would be useful to consider BONUS good practices. However, different preconditions for establishment of BONUS EEIG in comparison with DRRIF have to be taken into account. These include already established networks between involved organisations in the Baltic Sea Region, specific research theme (R&D in the Baltic Sea), partners from EU member states, active involvement of the Nordic Council and high level of R&D in most of the involved countries. There was also a different attitude and opinion of the EC towards initiatives under Article 185 at that time.

Figure 8: BONUS governance model and organisational structure



Source: Bonus EEIG

Key BONUS take-aways relevant for DRRIF:

- **Clearly defined financing, implementation, advisory and support bodies**
- **Secretariat with legal personality** (EEIG) which serves the programme's implementation purposes. Its executive employees have R&D education and experience.
- Steering Committee serves as the ultimate decision-making body of the fund and consists of BONUS member organisation representatives. It determines the organisation's budget and strategic direction and **its chair changes every year.**
- **Advisory Board composed of experts** (scientists/researchers/academics) provides independent advisory, information and recommendations regarding scientific and political issues related to BONUS.
- **Annual Forum**, where current issues and fund's direction are discussed.
- Organizing forums for project coordinators under BONUS in order to promote best practice sharing and ways of dealing with issues arising during project implementation.

8.1.1.1 Proposed governance model of DRRIF fund

After considering fund's potential activities and governing bodies of similar institutions, we propose the following documents, bodies and governance model.

Forming and managing documents (which serve as a basis for the fund's effective and transparent governance):

- **Internal directive** (defines steering committee – process of appointing, structure and responsibilities of its members, meetings – frequency and required documents, decision-making mechanism, conflicts of interest and transparency; further, provides description management's tasks and responsibilities – appointment, resignation and withdrawal; additionally states financial provisions, code of conduct, rules of procurement, intellectual property rights and other if required)
- **Memorandum of cooperation** (between DRRIF and its partners)
- **Scientific plan** (defines strategic direction of the fund and serves as a supporting document for decision-making and sustainable funding of projects with long-term impact)

Proposed DRRIF fund bodies:

Non-permanent bodies:

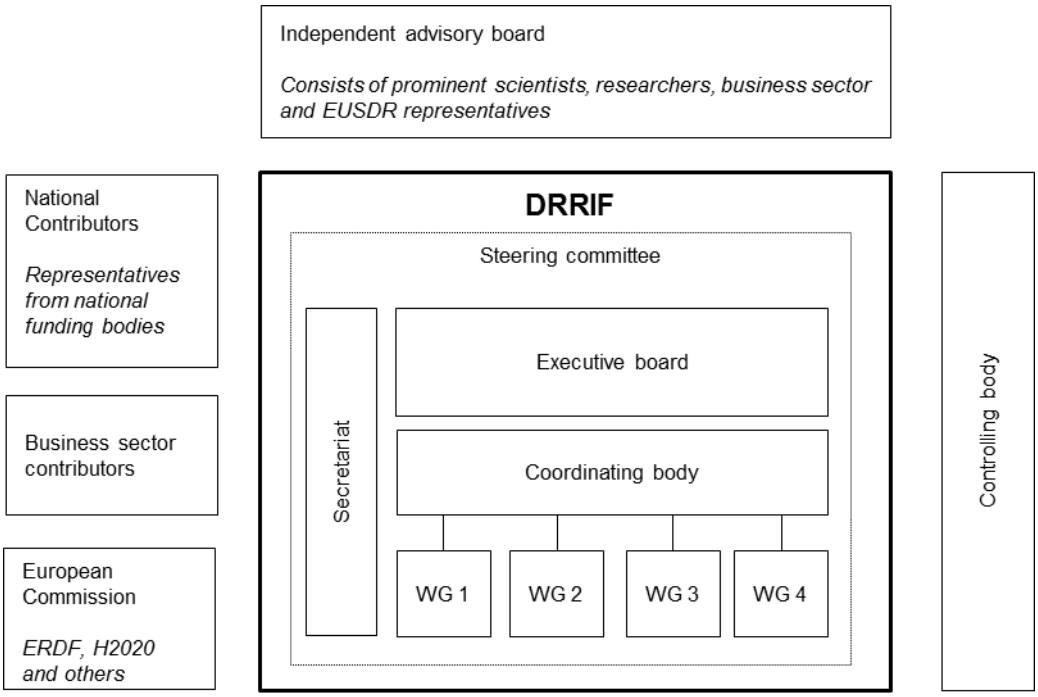
- **Steering committee –** consists of nominated national representatives who oversee the fund's strategic direction. We recommend an annual change of chairmanship. Steering committee holds the annual meetings with funding contributors in order to agree on supported project areas for upcoming period.
- **Independent advisory board –** consists of sound scientists, business sector and EUSDR representatives and advises steering committee and executive board on R&I topics.
- **Controlling body –** representatives of parties providing funding, who oversee proper and transparent use of funds on an annual basis.
- **Funding contributors** (National contributors, Business sector contributors, EC) – act as partners providing funding. They monitor whether invested sources are supporting the right projects, which are in line with agreed conditions. Representatives from funding institutions are members of the controlling body and attend the steering committee meetings, where they contribute to decisions on supported project areas.

Permanent bodies:

- **Executive board** – comprises the fund's management and provides support to the steering committee, tasks for secretariat, recruits employees, prepares calls for projects, negotiates agreements, monitors supported projects, fosters PR and marketing activities.
- **Secretariat –** in charge of administrative matters related to fund's operation, calls, receiving proposals, providing assistance to applicants etc. Suggested staffing:
  - Executive director
  - Financial director
  - Project manager
  - Call manager
  - Marketing manager
  - Communication manager
  - Assistant

  If there is no will to establish a new institution for the secretariat, this function can be dedicated to an existing R&D agency in the DR.
- **Coordinating body** – comprises project managers from each working group.
- **Working groups** – teams with project managers in charge, which focus on specific thematic areas, prepare materials for calls, monitor the supported projects and their results.

Figure 9: Proposed governance model of DRRIF fund



Source: EY illustration

The detailed organisational structure, number of employees as well as the governing documents will depend on:

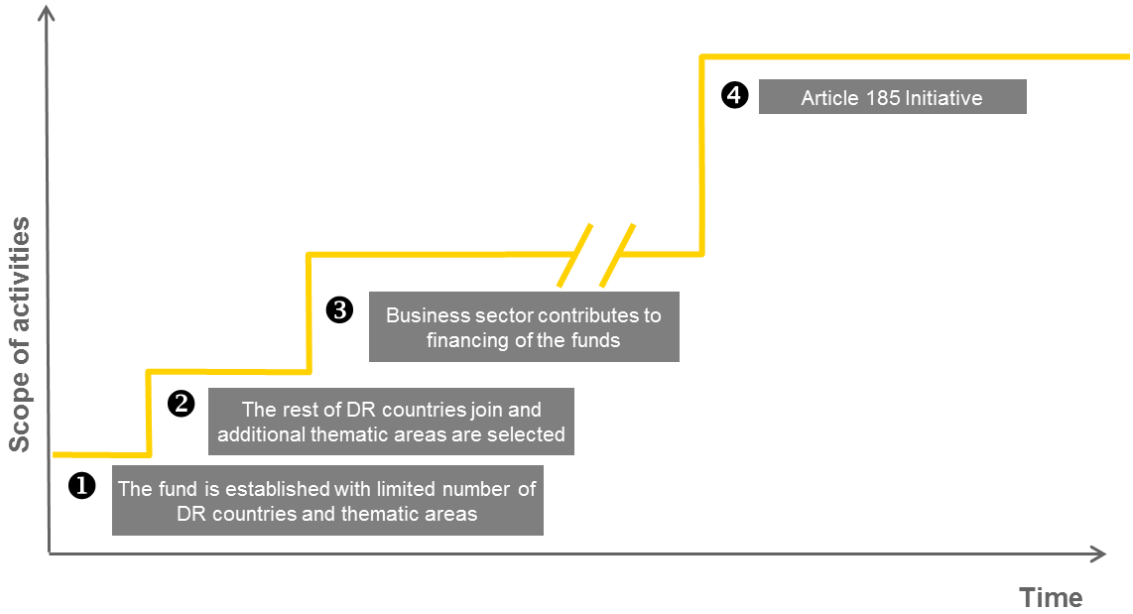
- **Number and focus of priority areas** – the number of working groups (project teams), which are in charge of individual projects and activities, will depend on the number of DRRIF's priority areas.
- **Sources of funding** – these influence the number of representatives in the fund's governing bodies.
- **Legal form** – some types of legal form have mandatory managing and controlling bodies that must be established.

Once the above-listed points are settled, the organisational structure and governing documents need to be specified further.

We expect that the DRRIF fund will develop further, with more countries joining and intensifying its activities. Therefore, we recommend gradually building DRRIF while taking into account characteristics typical for the DR – number of diverse countries, various political attitudes, existing clusters and variable geometry.

The development of the DRRIF fund and its activities will have a direct impact on the number of its bodies and employees who will be responsible for its operation. As the fund grows, the number of its activities will increase, which in turn will create the need for additional personnel, equipment and controlling bodies. We have illustrated the potential milestones of DRRIF's development in the following scheme.

Figure 10: Life cycle example of DRRIF fund



Source: EY illustration

Material and technical requirements

The DRRIF fund's necessary material and technical resources depend on its size and development phase. However, the following items are essential and are to be expected:

- Administrative and IT cost of DRRIF bodies
- Personal expenses of employees and experts, possible outsourcing costs
- Required services of audit and certification body
- Cost of developing and maintaining monitoring system
- Promotional and informative materials

Financial requirements

The required funds can be divided into two parts. The first is needed for the fund's operation – personal, material and technical necessities. Its volume will depend on the fund's size, number of supported areas and development phase.

The second part (considerably greater) is for financing of the projects supported by DRRIF – this topic is more thoroughly discussed in chapter 5 Analysis of DRRIF thematic areas.

Conclusions:

Alternative 1: DRRIF as fund – pros:

- Potentially the greatest impact on R&I in the DR
- Filling the gap of R&I funding in the DR

Alternative 1: DRRIF as fund – cons:

- Significant political and lobby support is necessary
- Unclear funding possibilities
- Relatively high equipment, technical and financial requirements

Based on discussions at the DRRIF Working Group meeting on 17 March 2015, it was agreed that a fund is currently an unrealistic scenario. Therefore, EY work will focus in more detail on Alternative 2 Funding Network and Alternative 3 Support Centre[79].

[79] Minutes of the 3rd Meeting of the PA 7 Working Group Coordination of National Funds within the Danube Region and DRRIF17.03.2014, Vienna: „ *All of the present countries/regions (AT, BiH, DE/BAY, CZ, ,HR, HU, SK, SRB) agreed that with view to the results of the analysis the further work of EY should focus on developing Alternatives 2 and 3 in more detail as for the moment they seem to have higher chances for implementation*."

8.1.2 Alternative 2: DRRIF as a funding network

Danube Region Research and Innovation Funding Network (DRRIFN)

The network's goal would be to identify existing national, bilateral and regional project, call or programme opportunities of funding and research performing institutions active in R&I in the DR which can be interlinked across borders to provide added value to the DR in the area of research, development and innovation.

The following **main activities during the network's establishment phase** have been identified:

- Defining goals, vision and mission
- Identifying existing national and international funding schemes and institutions' networks with the potential to be expanded across borders
- Contacting the above institutions
- Appointing members of the funding network[80]

The following **main activities of participating institutions (i.e., network members) during the network's operational phase** have been identified:

- Developing pilot calls / calls or other joint activities for the DR within their existing funding schemes and instruments
- Contributing to the opening up of national programmes or bilateral activities and initiatives towards multilateral cooperation
- Cooperating with bilateral and multilateral schemes in the DR
- Organizing workshops with the DR and EC representatives
- Active communication with organisations which map R&I in the DR
- Identifying R&I funding opportunities based on information available from national / regional or EU-level sources and relevant information platforms and sources (Danube-INCO.NET etc.)
- Identifying and prioritizing potential R&I cooperation areas in the DR countries
- Supporting establishments of successful partnerships
- Promoting the DR R&I agenda in DR countries

The goal is to design a network of funding opportunities, which would bring together representatives of institutions that want to promote and develop transnational R&I cooperation within the DR. These institutions would discuss cooperation needs/opportunities in the DR as well as thematic priority setting and identification of potential financing instruments for implementation.

A continuous exchange of information among the funding network, institutions and initiatives such as the JRC, Danube-INCO.NET, Danube Rectors Conference, Ulm Follow up Working Group and the representatives of the selected EUSDR priority areas, is key to the network's success.

The JPI-Initiative Joint Programme Neurodegenerative Disease Research (JPND), which focuses on identifying funding opportunities for joint R&I projects at the level of macro-regions might be an example for such a joint undertaking. The lessons learned are listed in the following section.

[80] It is assumed that the network members would – in an ideal case – be the same as the nominated members of the current DRRIF Working Group. There may be some re-nominations to reflect the current responsibilities in the different countries and to ensure a maximum representation of Danube Region countries.

8.1.2.1 Example – Joint Programme Neurodegenerative Disease Research

JPND was established as a pilot project based on the European Commission's *COM(2008) 468 final* and its goal is to address grand challenges faced by the EU, in this particular case – neurodegenerative diseases. Since these challenges are beyond the scope of any one country, JPND aims to improve the coordination of involved countries in this specific area. It aims to add value to national investments through coordinated action, to encourage the development of national research strategies in neurodegenerative diseases and engage in partnership to reach the full potential of JPND.

Joint Programming initiatives in general are quite large in scope, financial volume and number of participating countries. The initiatives usually also involve a governance structure consisting of several non-permanent bodies and permanent secretariat. Joint Programming Initiatives could serve as an interesting example for a funding network insofar as they also try to pool different types of funding sources. They also identify appropriate cooperation mechanisms for their activities, including "in kind" contributions, access to joint research infrastructures, joint capacity building activities, promoting the alignment of research activity across Europe.

Key JPND take-aways relevant for a DRRIF network:

- **Simple and clearly defined organisational structure** comprised of:
  - Management board – composed of member country representatives (max. two per country) and decides on JPND's goals and strategic direction. Each country has one vote.
  - Executive board – responsible for network's day-to-day operations, providing support to the management board and implementing its decisions.
  - Scientific advisory board – consists of experts from patient representatives and academic, public and business sector from diverse disciplines.
  - Secretariat **–** ensures everyday functioning of the organisation and fulfils administrative and support tasks assigned by executive and management board.
- Explicitly-stated **strategic research agenda** and **implementation plan** divided into individual phases.

8.1.2.2 Proposed governance model of Danube Region Research and Innovation Funding Network (DRRIFN)

Based on the currently established DRRIF Working Group within Priority Area 7, the formally-nominated representatives of each country would gather in this group to discuss issues of cross-border cooperation. Once a specific topic/area for cooperation as well as the potential implementation scheme/programme is decided upon:

- Contact will be made with the coordinating and operational bodies of the scheme/programme that might be suitable for implementing the activity.
- The national representatives of the group will report back to their administrations and get a formal decision on whether the country or respective implementing organisation / funding body would like to join this activity (variable geometry principle).
- Financing commitments will be secured, for example by:
  - Committing parts of the available funding within a certain funding scheme to DR specific activities
  - Committing specific in-kind contributions to the activity
  - Committing additional funding sources to the proposed scheme/activity
  - Jointly applying for additional funding sources e.g., at the EU level

Cooperation with the following organisations/projects could be beneficial:

- National Science Funds and/or research funding organisations
- Bilateral and multilateral programmes
- Danube Rectors Conference
- JRC
- EUSDR PAs
- Danube-INCO.NET
- Ulm follow up Working Group
- European Institute of Innovation and Technology (EIT)
- Danube Transnational Programme
- Danube Strategic Point
- EUREKA
- WISE Facility
- CEEPUS

The cooperation with the above organisations/projects should be based on communication regarding ongoing R&I initiatives in the DR and current funding possibilities for R&I projects.

Depending on the meeting frequency of the network's members, the organisations/projects could prepare a brief report on the current state of their R&I area, which would then serve as a basis for discussion during the network's meetings.

Upon identification of areas for potential cooperation, each country would decide whether it wants to participate in the specific networking activity and the network would then try to find funding options for the project. The preparation, submission and implementation of the activity would be the responsibility of countries that decided to participate as well as the agreed programme/scheme holders selected for the implementation, not that of the network members.

Currently ongoing initiatives resulting from cooperation with existing programmes and projects

During the preparation of this study two important international initiatives were developed with the contribution of some of the DRRIF Working Group members, also as a result of well-established cooperation with EUREKA and the Ulm follow up Working Group:

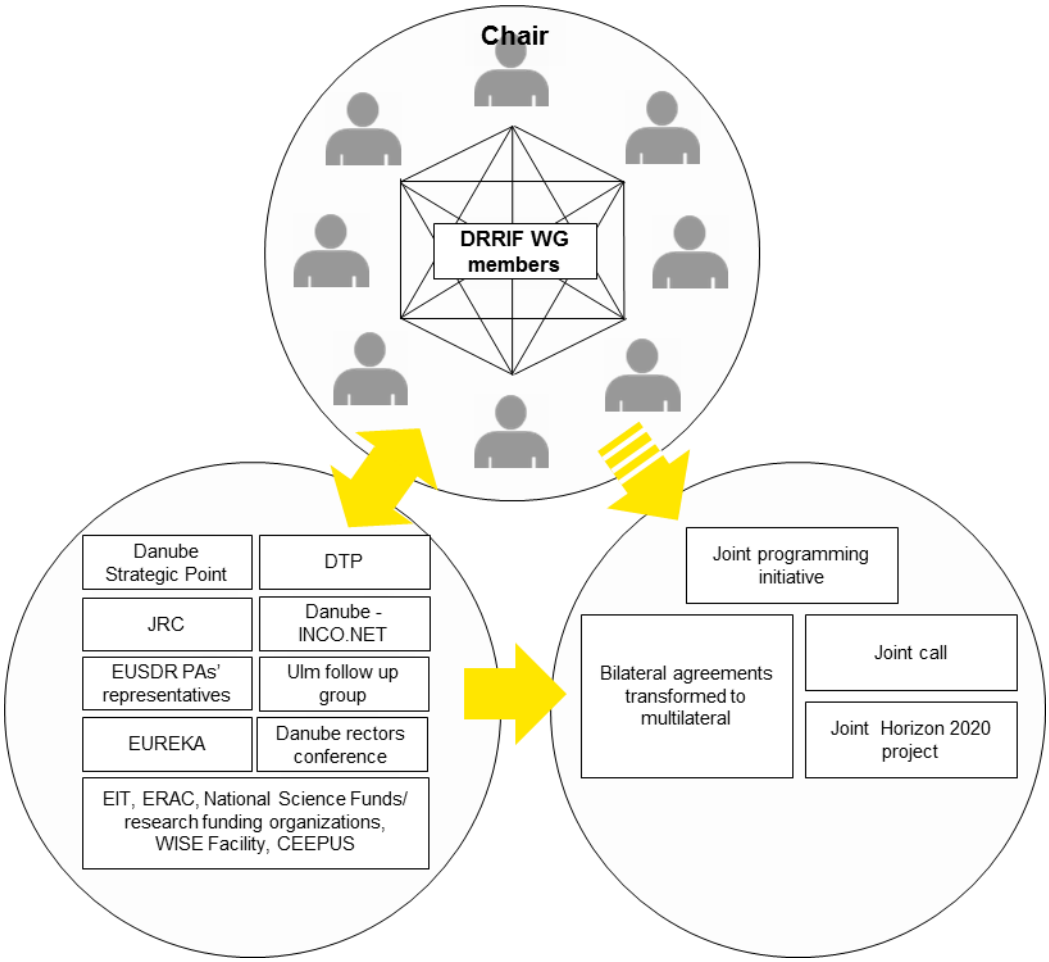
- **EUREKA Danube Region Multilateral Call 2015 for Cross-border Co-operative Projects** (E!DI Eureka Danube Initiative Call 2015)[81] with the following participating countries in the initiative: Austria, Bosnia and Hercegovina, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Montenegro, Romania, Serbia, Slovak Republic
- **Danube Region call - a pillar of the German research cooperation with Central Eastern and South Eastern European Countries.** The call aims to encourage stronger links between the leading innovative regions upstream and the developing regions downstream. The following DR countries participate in the initiative: Hungary, Moldova, Serbia

These initiatives prove that active cooperation of DR representatives with programmes and institutions may bring benefits, and developing such cooperation further may result in new calls and opportunities for the whole DR.

[81] The initiation and implementation of this call was supported by the Danube-INCO.NET project within the frame of Task "T6.1- Support to the Funding Parties Platform (FPP)" in Workpackage "WP6 - Scaling up Danube Funding Mechanisms". For more information about call please refer to: < http://www.eurekanetwork.org/danube-region-call-for-projects>

The proposed governance model is illustrated in the following graphic:

Figure 11: Proposed organisational structure of DRRIF network



Source: EY illustration

The detailed set-up of the organisational structure including whether permanent coordination and administrative support is necessary, cannot be defined at this point, but will depend, among others, on the number and focus of priority areas, the available funding sources and the final definition of its tasks.

No secretariat or coordination body is envisaged at this time and the Funding Network should be operating similarly to the current DRRIF Working Group (a regularly rotating chairmanship could be envisaged in order to ensure the coordination of activities of network members and organisation of meetings), with focus on the activities listed under this alternative. However, if the scope of activities grows in the future, establishment of a coordinating body or secretariat will be considered.

Once the above-listed points are settled, the organisational structure and the governing documents need to be finalised.

Activities of the network are not expected to change significantly (e.g., significant growth of activities, launching calls) over its life span. If such a substantial change and increase in activities occurred, then it would probably require a transformation towards a more complex structure with a legal personality.

DRRIF network's material and technical resource requirements

This proposed organisational structure does not have any material or technical requirements.

Meetings should take place at institutions, where the members of the network are active. The costs arising from organizing these meetings could be borne by the given ministry or split evenly among the network's members.

Financial requirements

The funds required are the lowest among all the governance models. Detailed budget is presented in chapter 11 of this document.

Conclusions:

Alternative 2: DRRIF as a funding network – pros:

- The organisational structure provides a high degree of flexibility and adaptability
- Ability to support R&D projects without having to create a fund
- Enables building of strong relationships with existing programmes
- Legal entity is not required
- Low cost of operation

Alternative 2: DRRIF as a funding network – cons:

- Changing group of DR representatives
- Additional workload for representatives in the DRRIF Working Group
- Lower executive and financial power
- Some DR countries do not have sufficiently developed infrastructure for implementation of some of the proposed activities
- Does not take into account different institutional functioning in the downstream countries, compared to Austria and Germany.

8.1.3 Alternative 3: DRRIF as a Support Centre

Danube Region Research and Innovation Support Centre (DRRISC)

The Support Centre's goal would be to indirectly support R&I cooperation in the Danube Region by supporting establishment of new successful partnerships of applicants and by interlinking the existing funding and research institutions.

The Support Centre will not directly finance any R&D projects.

The ambition of DRRIF as a Support Centre is to address issues resulting from the absorption capacity analysis performed as a part of this study – specifically low success rates in the R&I funding programmes, low international cooperation, low SME innovation intensity and underfinanced R&D which are considered as a challenge in the majority of the DR countries.

Thus, the proposed model of the Support Centre includes **activities to support the establishment of new successful partnerships among applicants for the EU (or other source) R&I funding** during the preparation phase of their projects and helping them to prepare more competitive project proposals, which may directly increase their chance of obtaining additional funding.

Based on discussions with relevant stakeholders, the current support of applicants in the majority of DR countries is insufficient. Existing structures and tools (e.g., NCPs) do not have capacities to provide support to applicants in such a way which would directly contribute to their success in the application process (e.g., scientific writing, scientific review, preparation phase support).

In order to create a sustainable structure it is estimated that a dedicated team of four to five FTEs (full time employees) is needed to cover activities of the Support Centre. A possible source of initial funding is the Danube Transnational Programme, where the interested countries may apply for funding through joint project proposal.

The alternatives 2 (Funding Network) and 3 (Support Centre) are not mutually exclusive. If representatives of DR countries expressed the need for more formalized coordination of the activities of the Funding Network, this task could be fulfilled by the Support Centre.

In case of establishment of both these alternatives, we recommend close cooperation of the Support Centre with Funding Network in order to utilise the valuable knowledge of DR representatives of R&I conditions and opportunities in their countries. The cooperation would consist of holding joint workshops, sharing information about potential DR projects in the field of R&D, sources of funding and thematic areas.

We have identified the following **main activities during the Support Centre's initial phase:**

- Obtaining funding from the Danube Transnational Programme[82]:
  - Commitment of countries willing to participate in joint DTP project proposal
  - Creating and submitting DTP project proposal by participating countries
- Establishment of the Support Centre:
  - We recommend using the existing structures, such as Danube Strategy Point, Ministries of participating countries, Funding agencies.

The main activities during the operational phase:

- Support of applicants – the aim is to increase the success rate in R&I funding programmes of the DR countries by active support during the very first stages and preparation phase of the projects (specifically described later in the chapter)
- Cooperation with the funding network (e.g., on preparation of Pilot Joint Transnational calls, common position in the Programme committees of Horizon 2020, setting up of a possible Danube ERA-NET, discussions on cooperation for a possible Art. 185.)

[82] Financial support from DTP is dependent on DTP calls announced and project's success in the application process

Support of applicants) will be performed by:

- Creation of "**Joint Projects Platform**":
  - Creating and supporting communication platforms of project applicants focused on specific thematic areas or projects (organizing thematically focused R&I workshops for applicants)
  - Funding the meetings of international consortia **in the preparation phase of projects**, which is a limiting factor to the active cooperation of the DR countries
  - **Supporting identification of partners** for joint R&I projects (innovative SMEs, start-ups, universities)
  - Sharing good practice for **establishment of successful partnerships** and **recommending** options regarding **funding opportunities**

- Providing consultations in the area of **scientific review** of proposals or **scientific writing:**
  - Directly or via third party, **in order to increase the quality of proposals** with excellent R&I ideas prepared by applicants with less experience
  - Organisation of workshops, where applicants can present their proposals with direct feedback from experienced evaluators
  - Boosting knowledge transfer in R&I

Our aim was to identify the best practices of existing support centres. However, no existing organisations were identified in the DR with similar R&I activities as a support centre with the exact overlap of activities. Therefore, we used best practices and lessons learned relating to the organisational structure from organisations that have at least some or similar activities in their agenda such as the Research Executive Agency, Science Europe and the European Institute of Innovation and Technology.

Below are listed lessons learned and best practices from these three analysed institutions:

Research Executive Agency

- Departments divided according to thematic area
- Organisational units within departments that focus on specific EU programmes
- Organisational structure which allows effective logistical and administrative support to applicants for funding

Science Europe

- Two-year (renewable) working groups dedicated to a particular thematic area
- Members of the executive committee are chosen from member organisation representatives
- Scientific advisory committees specialized in specific scientific areas and representing the interests of researchers and scientists

European Institute of Innovation and Technology

- Members of the governing board are representatives from the higher education, research, business and innovation fields
- Separate department dedicated to support organisation's operation
- Multiple national partner centres within Europe

8.1.3.1 Proposed organisational structure – DRRISC

Based on good practices and lessons learned from the analysed institutions, as well as DRRISC's activities, we propose the following managing documents and organisational structure.

The following **forming and managing documents are necessary** for the effective and transparent management of the Support Centre:

- **Project plan**, which should already be developed in the DTP project proposal (defines Support Centre's strategic direction and serves as a supporting document for decision-making and Support Centre's direction, defines objectives translated into specific activities).

Suggested bodies of DRRISC:

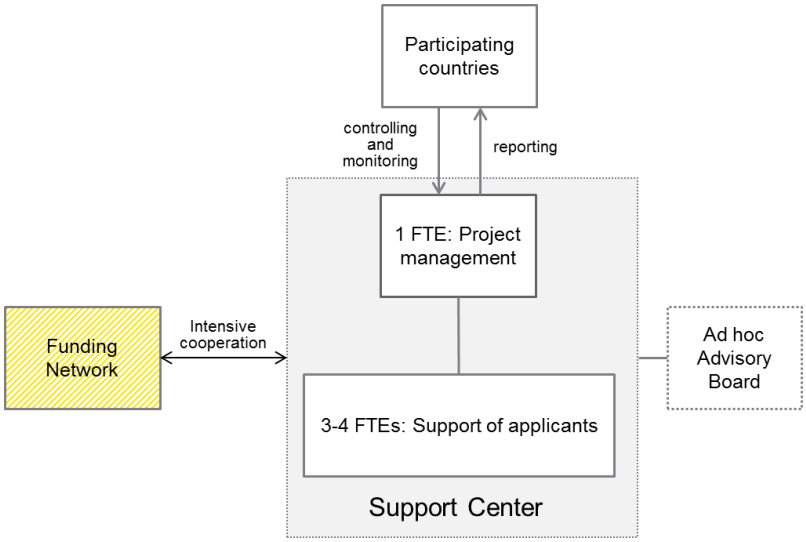
- **Project manager** (1 FTE (Full Time Equivalent)) – responsible for management of the DTP project of the Support Centre, oversees the activities and ensures effective fulfilment of goals defined in project plan, decision making power for day-to-day operational tasks.

- **Team for support of applicants** (3-4 FTEs) – execution of activities as listed under operational phase of the DTP Support Centre project (e.g., supporting the Joint Projects Platform and scientific review and writing).

Other stakeholders:

- **Representatives of countries participating in the Support Centre** – acting as a control and monitoring body. The project manager of the Support Centre will be responsible for reporting of activities to the representatives of participating countries. The participating countries will review the activities of the Support Centre on an annual basis and advise on activities for the upcoming period. All key decisions regarding the activities of the Support Centre are in the hands of the representatives of the participating countries.
- **Funding network**[83] – performing activities as described in the previous chapter. In the case of set up of both forms of DRRIF, we expect close and intensive cooperation between the Funding Network and the Support Centre, where the Funding Network focuses on providers of funding whilst the Support Centre focuses on potential funding recipients (applicants).
- **Ad Hoc Advisory Board –** comprises R&I experts from institutions such as JRC, DG R&I. The body advises on (executes) the selection of excellent projects, which will be supported by the Support Centre (e.g., in the form of scientific review or scientific proposal writing) in order to support applicants in preparing successful proposals to funding programmes.

Figure 12: Proposed organisational structure of DRRISC Support Centre[84]



Source: EY illustration

Support Centre's material and technical requirements

Material and technical requirements will mainly depend on the number of DRRISC's activities. However, the following items are essential:

- Administrative and IT cost of DRRISC's bodies, rent
- Personal and travel expenses of employees in the Support Centre and experts in ad hoc Advisory board, possible outsourcing costs (scientific reviewers or scientific writers)
- Promotional and informative materials
- Organisation of meetings and workshops

Financial requirements

Financial requirements are expected to be lower than for the Fund (Alternative 1), but higher than that of the Funding Network (Alternative 2). The scope of DRRISC activities is heavily dependent on the actual amount that would be obtained from the DTP. **Detailed financial requirements will be analysed in chapter 11: Definition of steps for implementation**.

[83] If there is no functioning Funding Network, DRRISC would either perform chosen activities itself or it would cooperate with DRRIF WG / EUSDR SG instead.
[84] For purposes of project and project application, every country should delegate a representative that would be responsible for performing dedicated tasks (e.g., Ministry, funding Agency etc.). This could be based on a variable geometry.

Conclusions:

Alternative 3: DRRIF as a Support Centre – pros:

- This alternative supports the cohesion of the DR by taking into account the different levels of R&I development and differences in functioning of national R&I support structures across the region
- Lower financial requirements than DRRIF as a Fund
- Lower staffing needs than for DRRIF as a Fund, material and technical requirements necessary to carry out initiatives in order to increase success rate in EU programmes
- Focus on applicants, which may contribute to successful acquisition of additional R&I funding
- Provides opportunity for additional specialized manpower dealing with R&I issues in DR on daily basis

Alternative 3: DRRIF as a Support Centre – cons:

- Unable to directly support R&D projects
- More complex than Funding Network
- Higher financial requirements than DRRIF as a Funding Network
- Higher coordination effort needed regarding the proposed activities in order to avoid overlaps with existing institutions.

Danube Region Research and Innovation Support Centre establishment - example of Proposal outline for the Danube Transnational Programme

Objective of the Support Centre: Coordinating and supporting joint R&I activities of the DR countries with the aim of addressing the region's challenges of the utmost importance and achieving R&I cohesion by supporting the establishment of new successful partnerships of the recipients.

Examples of work packages[85]:

WP1: Management and coordination

- Supporting the Steering group – producing and distributing documents, etc.
- Managing communication among the individual WP
- Transmitting information

WP2: Strategic tasks

- Creating a stakeholder database
- Cooperating with the Danube Strategic Point, Danube-INCO.NET and other relevant institutions and initiatives

WP3: Implementation

- Organizing R&I workshops
- Setting up a Joint Project Platform or platforms according to thematic areas for proposals of joint projects (examples of areas: innovative SME and start-ups, education)
- The goal is to promote technology transfer
- Supporting the organisation of joint transnational calls (support of the Funding Network full-time by fulltime employee)
- Areas of support will be based on the needs identified within the DR (listed in this study as examples of vertical and horizontal thematic areas which were determined and confirmed with DR countries and are aimed at addressing the issues EUSDR faces)

WP4: Dissemination of information

- Mapping of activities and calls relevant to the DR
- Distributing information to the individual stakeholders
- Raising awareness and promoting the DR as a SMART region

WP 5: Monitoring and evaluation

- Monitoring of past, current and future events, and evaluating their impact on R&I in the DR

WP 6: Long-term sustainability

- Devising a proposal of the Danube Region R&I Support Centre's long-term sustainability

[85] For purposes of project and project application, every country should delegate a representative that would be responsible for performing dedicated tasks (e.g. Ministry, funding Agency etc.). This could be based on a variable geometry.

8.2 Conclusion of proposed forms of DRRIF as an institution

In the previous chapters we have listed three potential forms of DRRIF as an institution. Each alternative has pros and cons and thus **we cannot recommend a single ideal form**. Additionally, DRRIF's future form could be a **combination of the listed alternatives** or its **gradual transformation** from a less complex form, such as a network, towards a more complex fund later in its life cycle.

As time progresses, **DRRIF may develop regardless of its form** and the scope of its activities might increase as well, which in turn can increase the staffing needs, material and technical requirements. This needs to be taken into account even upon its establishment and when choosing the most suitable form, in order to avoid selecting an alternative that would be inflexible and unable to **fulfil the stakeholders' expectations**. The following table provides a brief overview of the alternatives according to a specific set of criteria:

Table 19: Comparison of potential alternatives

Criteria	Alternative 1: **Fund**	Alternative 2: **Funding Network**	Alternative 3: **Support Centre**
Political support needed	High	Low	Medium
Financial resources required – overall budget	High	Low	Medium
Financial resources required – operations only	High	Low	High
Flexibility	Low	High	Medium
Legal difficulty to establish	High	Low	Low[86]
Potential R&I benefits in the DR	High	Medium	Medium
Quick wins potential	Low	High	Medium
Snowball effect[87] possibility	High	Low	Medium
Potential to use funding from the private sector	High	Low	Medium
Level of trust required to acquire additional funding	Low	Medium	Medium
Sustainability	Low	Low	Medium

Source: Processed by EY

As stated at the beginning of this chapter, even though the alternative of DRRIF as a Fund was analysed and an operating model was proposed, the F**und alternative is at this point not supported by stakeholders and further debate should focus on alternatives DRRIF as a Funding Network and DRRIF as a Support Centre.**

We suggest the following course of action:

- Final selection of horizontal and/or vertical areas
- Clearly stated ability to obtain financial resources from national funding bodies
- Definition of strategic direction
- Selection of suitable governance model
- Selection of suitable legal form (if necessary)

The decision regarding the most suitable form should be supported by stakeholder consensus, taking into consideration thematic areas and goals and should result in a politically feasible scope and type of funding. The chosen alternative and its specifics should be defined in such a way that allows the most effective fulfilment of selected tasks and goals.

[86] Depends on need for own legal form
[87] A situation in which something increases in size or importance at a faster and faster rate

9. Potential funding sources

The crucial aspect in performing activities for any of the identified potential forms of DRRIF (Fund, Funding Network, and Support Centre) will be the raising of funds, the ability to continuously raise them and their most flexible utilisation. In the absence of funds and appropriate conditions for their utilisation in place, the implementation of DRRIF will not be possible.

Securing funds and the system of their generation, however, is not only critical at the moment of establishment of DRRIF, but also over its entire existence. Therefore, it is essential that the requirements and limits pertaining to the individual sources of funding are taken into consideration as early as possible in the initial phases of its establishment. The identified sources of funding that will finally be opted for, will determine the operational model of DRRIF and will significantly influence the type and scope of activities that could be sustainably and in the long term performed by it.

This chapter deals with the following areas:

- Analysis of potential types of funding sources
- Review of funding sources utilised by similar programmes
- Analysis and identification of potential funding sources for possible forms of DRRIF
- Analysis of possible combinations of funding sources and synergies enabled by utilisation of EU structural funds
- Analysis of lessons learned from funding of macro-regional strategies identified by the European Commission
- Draft of internal audit system for DRRIF as a Fund

9.1 Types of funding sources for R&D and R&I

The regularly used types of funding sources for R&D and R&I may be classified by their origin, form and ease of settlement:

Funding sources by origin:

- **Public –** means funds from government sources, both at national and international level, through grants, tax reliefs or low-cost lending for R&I. This type of funding is typically based on a competitive system of funding which ensures that funds are allocated to the best-rated projects with the biggest added value.
- **Private –** means that sources of funding are primarily provided by foundations and businesses which focus on the support of scientific and research institutions, programmes and projects, or which do so in pursuit of their Corporate Social Responsibility.

Funding sources by purpose:

- **Bound –** means that sources may be allocated according to the purpose, e.g., only to predefined thematic priorities or geographic areas, or within a certain funding period. The utilisation of such funds is therefore often highly limited and is subject to predefined requirements.
- **Non-bound –** means, in contrast to the bound sources of funding, that their use is not limited by any specific purpose or thematic priority, which considerably simplifies their utilisation. This form of funding is rather less used in R&D.

Funding sources by ease of settlement:

- **Non-repayable –** means, in contrast to repayable funds, that the sources are not subject to the duty to repay them. Typically, they take the form of gifts, donations and grants. This form of funding is also used by EU structural funds and is the most widely used method of funding R&D.
- **Repayable –** means funds that must be repaid upon lapse of a certain period. As a rule, these are loans bearing varying interest rates, either from public or private funds. This type of funding is primarily used to support innovations in small and medium-sized businesses or projects that produce marketable solutions.

Funding sources by form:

- **Financial –** apart from the terms of drawing financial sources of funding, they are the most universal and the most easily utilizable of all the forms of DRRIF at any stage of operation. Moreover, they are the most widely used method of funding R&D and R&I.
- **In-kind contributions –** the sources of funding DRRIF do not have to be monetary. A part of DRRIF may be funded, *inter alia*, by provision of office space or required equipment. Another option is the provision of services or workforce, whether throughout the establishment or the operation of DRRIF.
- **Atypical –** Apart from traditional sources of funding, there are also atypical models of funding, such as crowdfunding, whereby the public voluntarily participates. In return for the investment, the individuals are usually rewarded, pro-rata, by outputs of the projects or stakes in the business. Currently, crowdfunding is more widely used to support marketable innovations rather than for instance funding of the basic research.

The selected source of funding (individual analyses can be found in the subchapters below) will determine the final character of funds required for the establishment and operation of DRRIF. Thus, their origin, ease of settlement and form will depend on the sources of funding and the applicable rules.

9.2 Funding sources utilised by similar programmes and projects

With the aim of identifying the most widely used sources of funding, this section deals with the sources of funding of similar programmes and projects whose substance is closest to the proposed forms of DRRIF.

Sources of funding of programmes similar to DRRIF as Fund
The programmes EUROSTARS, BONUS EEIG, JPND and STAR raise funds for their operation and calls for grant applications.

EUROSTARS[88]

- EUROSTARS is a transnational programme funded by **EU funds** and **public funds of 33 countries** participating in the EUREKA programme, with 75% funding from the countries involved and 25% funding from the European Commission under **Article 185 of the TFEU**.
- The programme operates on the principle of a virtual joint fund, i.e., each country funds its own participants according to national funding rules and the project funding is ensured by the respective government funding bodies, according to published national rules.
- Total budget: EUR 1.14bn

BONUS EEIG[89]

- The programme is co-funded by the European Commission under **Article 185 of the TFEU**.
- Funding bodies are **13 national agencies** funding research and development from the EU Member States**, Russian Foundation for Basic Research** and **the European Commission**.
- The programme operates on the principle of a virtual joint budget, i.e., each country funds its own participants according to national funding rules.
- The EU provides a financial contribution not to exceed 50 million euros for the entire period of the BONUS programme. This cap includes the financial contribution of the EU corresponding to the contribution of the participating countries.
- Total budget: EUR 100m

JPND (JPND Call for European Research Projects on Neurodegenerative Disease)[90]

- JPND started as a four-year project (JUMPAHEAD) focused on better coordination of R&D capacities and strategic research agenda (SRA) implementation, funded by **FP 7 grant**,
- Currently, the organisation is **funded mainly from national and regional funding institutions** and uses co-funding of the European Commission through **ERA-NET Cofund.**
- Total budget: EUR 30m

START – Danube Region Project Fund[91]

- The initiative is **95%** funded **by the European Commission and 5% by the City of Vienna.**
- START is a pilot initiative of the EUSDR and provides seed money for the development and implementation of DR projects.
- Total budget of the initiative: EUR 900,000

Funding sources of programmes that are similar to DRRIF as Support Centre
Science Europe and the European Institute of Innovation and Technology raise funds only for the purpose of funding their activities and operation.

Science Europe[92]

- Is focused on networking and promotion of outputs of R&D and is **fully funded by membership fees.**
- The programme associates European Research Funding Organisations and Research Performing Organisations and its budget receives **funds form national sources (budgets) of the individual countries**.

[88] Source: https://www.eurostars-eureka.eu/
[89] Source: http://www.bonusportal.org/programme
[90] Source: http://www.neurodegenerationresearch.eu/
[91] Source: http://www.danube-capacitycooperation.eu/pages/start
[92] Source: http://www.scienceeurope.org/

European Institute of Innovation and Technology[93]

- The establishment of the organisation was funded by the **European Commission** and **the European Parliament, supplemented by funds from the national budgets** of the participating countries.
- EIT continues to be funded by public funds; however, it also uses **funds from the private sector and donations** for its operations.
- Total budget: ca. EUR 2.7bn

Most of the analysed programmes and initiatives rely on funding from national resources of the participating countries, plus EU or private sources.

Initiatives implemented through projects with limited duration and a lower scheduled budget might be funded from EU funds for the major part (such as START from EC funds)

[93] Source http://eit.europa.eu/

9.3 Outline of potential funding sources

In this section, we outline potential sources of funding we have identified for each of the three proposed forms of DRRIF. The summary is based on the matrix of grant schemes (Chapter 4.2) and available data pertaining to the analysed sources.

From the potential sources identified in Chapter 4.3 below, we have analysed only those that in our opinion were the most relevant at the time of preparing this study and cooperation with which would be the most beneficial in the initial operation phases of DRRIF.

For each potential funding source for DRRIF, we have evaluated and commented on:

- **Eligibility**
  - The degree of eligibility for funding the activities of DRRIF (for all the three proposed forms) through the potential funding source
  - We took into account particularly the thematic priorities to be funded, the geographical scope and methods and procedures for obtaining funds from the funding source (calls, applications, approvals).
- **Suitability of sources for each of the forms of DRRIF**
  - Identification of means in which the funding source could support DRRIF in the form of:
    - Fund
    - Funding network
    - Support Centre
- **Final evaluation of each funding source**
  - Suggestion of the next steps in relation to the analysed potential funding source.

9.3.1 Funding sources of EUSDR

In striving to identify the potential sources, we took into consideration the analyses performed by JRC[94] that assessed the most suitable funding sources for individual pillars of EUSDR. However, from the sources suitable for the funding of the pillar "Building prosperity in the Danube Region", we only selected those that are also suitable for priority area 7 Knowledge Society. Sources we find relevant to the analysis in relation to DRRIF are circled (based on analyses performed in chapter 4 Analysis of cooperation with relevant existing grant and other schemes of this document and additional consultations executed).

Table 20: Funding sources of EUSDR according to JRC

Financing sources for the Danube countries	Connecting the Danube Region	Protection of the Environment	Building prosperity in the Danube Region	Strengthening the Danube Region
EU Member States				
European Structural and Investment Funds (ESIF)	✓	✓	✓	✓
European Agriculture Fund for Rural Development (EAFRD)	✓	✓	✓	
European Maritime and Fisheries Fund (EMFF)	✓	✓	✓	
Trans European Transport and Energy Networks (TEN-T and TEN-E)	✓			
Joint Assistance to Support Projects in European Regions (JASPERS)		✓		
EU Programme for the Competitiveness of Enterprises and SMEs (COSME)	✓		✓	
LIFE programme		✓		
Cross-border Cooperation (CBC) and Multi-beneficiary country programmes	✓	✓	✓	✓
Erasmus+	✓		✓	✓
EU Member States, EU Accession Countries and Neighbourhood Countries				
Horizon 2020	✓	✓	✓	(✓) Security part
European Investment Bank (EIB)	✓	✓	✓	✓
European Bank for Reconstruction and Development (EBRD)	✓	✓	✓	✓
Council of Europe Development Bank (CEB)	✓	✓	✓	✓
World Bank	✓	✓		✓
EU Accession Countries				
Instrument for Pre-Accession Assistance-II (IPA-II)	✓	✓	✓	✓
Western Balkans Investment Framework (WBIF)	✓	✓	✓	✓
Regional Environmental Network for Accession (RENA)		✓		
EU Civil Protection Financial Instrument (CPFI)		✓		
EU Neighbourhood Countries				
European Neighbourhood Instrument (ENI)	✓	✓	✓	✓
Neighbourhood Investment Facility	✓	✓	✓	✓
EuropeAid - Country cooperation	✓	✓	✓	✓

Source: Developing Danube R&I Projects across Borders – How to Make the Joint Use of EU-Funds a Reality?; Processed by EY

[94] JRC technical report "Developing Danube R&I Projects across Borders – How to Make the Joint Use of EU-Funds a Reality?, ISSN 1831-9424, available at: < http://s3platform.jrc.ec.europa.eu/documents/10157/559187/S3_for%20Danube%20Policy%20brief_Final%20version%209.2014.pdf>

9.3.2 Analysis of potential funding sources of DRRIF

The performed analyses of individual sources of funding of DRRIF (eligibility and suitability for all the forms of DRRIF) have resulted in the summary below[95]. A detailed analysis and description of each source can be found in separate subchapters below.

Table 21: Potential funding sources of DRRIF

Criteria / Funding sources	Eligibility for funding (any form)	Suitability				High level of difficulty in raising funds	Need for own initial capital
		Fund		Support Centre	Funding Network		
		Operation of Fund	Funding of calls				
Danube Transnational Programme	✓	✓	×	✓	✓	no	?
Horizon 2020 – ERA-NET Cofund	✓	×	✓	✓	×	yes	Yes
National budget	✓	✓	✓	✓	✓	yes	n/a
Private sources	✓	✓	✓	✓	✓	yes	n/a
ESIF	✓	?	✓	?	×	?	No
Horizon 2020 – Article185	✓	✓	✓	×	×	yes	Yes
Cross-border cooperation	?	×	✓	?	×	?	?
ENI / IPA II	×	×	×	×	×	yes	n/a
WISE / RCC / WBIF	?	?	?	?	?	?	?
Central Europe Programme	?	?	?	?	?	?	Yes
EIB / EBRD / CEB	?	×	?	×	×	yes	No
Horizon 2020 – direct funding of DRRIF calls	×	×	×	×	×	yes	n/a

Source: Processed by EY

Caption:

✓ The criterion is fully met.
? Partially met / questionable whether the criterion is met.
× The criterion is not met.

Note: the level of difficulty in raising funds in different DR countries may vary.

[95] For the analysis of different funding sources in the Danube Region related to individual R&I projects one can refer to the Danube-INCO.NET project http://danube-inco.net/informationservice/calls_for_funding_opportunities

9.3.2.1 Danube Transnational Programme

Eligibility:

One of the most suitable funding sources for the administrative operation of the DRRIF is through the calls of DTP. On the other hand, according to available data, the funding of DRRIF calls through DTP is very unlikely (based on consultations with the Slovak national contact point of DTP).

The eligibility for funding the administrative operation of the Fund is also supported by the wording of the cooperative Danube Transnational Programme, which in the section "*Strategic response by the cooperation programme to contribute to Europe 2020*" defines *thematic objective No. 1 as " Strengthening research, technological development and innovation – investment priority 1b) including the social dimension of innovation and human resource aspects to be addressed."*[96]

Part 2.1.3.2 2.A.6/P1/1b Actions to be supported under the investment priority (by investment priority) defines Investment priority 1b, applicable to DRRIF, as follows:

"*The following indicative examples of action may be considered to contribute to specific objective No 1.1 Improve framework conditions for innovation:*

- ***Contribute to developing an excellent research infrastructure in the Danube Region**, firstly in the form of joint planning and management of research infrastructures with a transnational scope (and not physical construction). Secondly the Danube Transnational Programme may also support joint efforts with regard to specific and/or smaller research infrastructures and try to raise them to excellence.*
- ***Develop and implement strategies and instruments to provide better access to innovation finance** and support for innovative start-ups. Joint efforts may be supported to improve instruments for better financing innovative SMEs, start-up support for creation of new jobs; internationalization, access to new markets. Consider innovative ways of financing (e.g., better coordination of national, regional and EU funds, crowd funding etc.). A focus may be put on the creative industries, green technologies and environmental industry, and cultural incubators.*
- ***Establish transnational networks** between appropriate partners to develop and implement products, services and models to meet social needs and create new social relationships or cooperation. For instance public health research may be encouraged aiming to provide more extensive information to decision-makers and practice."*[97]

Suitability for DRRIF as Support Centre, Funding Network or Fund:

After discussions with the representatives engaged in the development of the programme, the DTP might invest funds into the establishment and administrative operation of DRRIF in any institutional form (Support Centre, Funding Network, Fund); especially in the case of the Support Centre, it will be essential to ensure that the activities of DTP and DRRIF do not overlap.

DTP seems to be the most suitable funding tool for the administrative operation of DRRIF.

Conclusion:

Once the thematic priorities, goals, strategies, legal form and management model of DRRIF are approved, we suggest that the representatives of DTP are contacted as soon as possible with regard to the options of financial cooperation and legal requirements of potential cooperation.

[96] Only part of the subchapter to which the extract refers is quoted,
[97] Only part of the subchapter to which the extract refers is quoted. Individual sections do not have to follow the original order. Text highlighted by EY.

9.3.2.2 ERA-NET Cofund within Horizon 2020 programme

Eligibility:

ERA-NET Cofund is a funding tool for international scientific and research projects. It may fund their administration and preparatory stage or implementation directly up to 33% of total expenditure, provided that the remaining 67% is covered by national sources and not by EU funds.

The eligibility of DRRIF for ERA-NET Cofund funding is also supported by the wording of Regulation No. 1291/2013 of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020) and repealing Decision No. 1982/2006/EC. Article 26 defines the support of partnerships as follows: *„Public-public partnerships may be supported either within, or across, the priorities set out in Article 5(2), in particular through:*

- *(a) An ERA-NET instrument using grants to support public-public partnerships in their preparation, establishment of networking structures, design, implementation and coordination of joint activities, as well as Union topping-up of no more than one joint call a year, and of actions of a transnational nature;*

For the purposes of point (a) of the first subparagraph, top-up funding shall be conditional on the demonstration of the added value of the action at Union level and on prior indicative financial commitments in cash or in kind of the participating entities to the joint calls and actions. One of the objectives of the ERA-NET instrument may, where possible, be to harmonize rules and implementation modalities of the joint calls and actions. It may also be used in order to prepare for an initiative pursuant to Article 185 TFEU."[98]

There is the option to participate in the funding of not more than one joint call a year and activities of international character. There is no legal title to the funding; it is at the discretion of the Commission and depends on the budget or equipment available for calls and activities through the participating entities (own funds).

The ERA-NET tools may include, where possible, the objective of harmonizing rules and procedures for performing joint calls and actions. ERA-NET is applied through the ERA-NET Cofund actions that focus on cofunding of individual calls or R&I programmes which are primarily funded from other than EU sources. It may also support additional activities such as networking or coordination between programmes of the individual countries. Participants in ERA-NET Cofund actions must be legal entities owning or managing public scientific and research programmes (research funders). The minimum conditions for participation are three independent legal entities from three different Member States (or associated countries). Programmes may participate in ERA-NET Cofund actions only exceptionally and upon meeting additional requirements.

Public-public partnerships are also supported by Article 185 of the TFEU which we analyse in section 9.3.2.6.

Suitability for DRRIF as Support Centre, Funding Network or Fund:

A condition for this is the existence of joint activities between at least three Member States, whereby such activities correspond to any of the priorities of Horizon 2020 and have added value at the EU level (depends on the assessment of the Commission). ERA-NET Cofund actions may fund independent calls and also scientific and research programmes.

Such financial aid might be suitable for all three institutional forms of DRRIF. It is suitable for DRRIF as a Support Centre in the design of pilot calls following the purpose of potential step-by-step transformation from Support Centre to a Fund.

Conclusion:

Upon approval of the thematic priorities, objectives, strategy, legal form and management model of DRRIF, we propose conducting discussions with the top representatives of Horizon 2020 as regards the financial cooperation and legal presumptions of potential cooperation under the ERA-NET Cofund.

The utilisation of ERA-NET funds will only be possible if DR Member States agree on the initial funding of DRRIF using 67% of own resources.

Process to obtain support from the ERA-NET Cofund is not open, nor bottom-up. Suitable calls (for DRRIF to apply) have to be announced first, which may require further lobbying effort by DR countries.

[98] Only part of the subchapter to which the extract refers is quoted. Individual sections do not have to follow the original order.

9.3.2.3 National budget

Every year, DR countries support science, R&I with financial resources from the national budget. A part of these funds is typically allocated to support R&I in the home country; a part is also devoted to international cooperation.

Finances that the states invest in support of R&I in their home countries could be partially used for international cooperation within DRRIF, thereby offering the benefits of potential multiplication effects of internationally invested financial means through tools such as ERA-NET Cofund or Article 185 of the TFEU.

We conducted a research questionnaire with the aim of collecting and analysing information on **the extent of EUSDR support mentioned in national documents**, information about existing and upcoming bilateral and multilateral R&I agreements between EUSDR countries and to examine ESIF and other fund allocation possibilities. Based on the questionnaire[99] answers of representatives of the DR countries provided, the (financial) support of macro-regional strategies (including EUSDR) is foreseen in national documents of Austria and Germany, although no budget is allocated. The Czech republic, Serbia and Slovakia did not provide any national documents to be referred to.

9.3.2.4 Private sources

The chances of funding DRRIF using private sources are more realistic in the field of innovation than in basic research. Thus, the criterion for support on the part of the private sector should be marketability of the supported activities.

The private funding (provided by businesses, risk capital) typically takes the form of investments in share capital or provides repayable loans. Another possible form of support is donations from foundations that are usually lower in value than other forms of private funding.

The support of private sources in funding DRRIF seems to be more realistic once DRRIF and its activities are established. Therefore, we deem it very unlikely in the initial phases of establishing DRRIF.

[99] See questionnaire template in Appendix 7.
Note: only 5 completed questionnaires were provided from the representatives of all DR countries (Austria, Germany, Czech Republic, Serbia and Slovakia).

9.3.2.5 ESIF

Eligibility:

European Structural and Investment Funds (ESIF) represent one of the main components in supporting science, R&I in many DR countries (with the exception of Non-EU Member States and Germany). However, even in countries where ESIF are not the main component of RTDI funding (including Germany), such funds play a key role in promoting high-risk activities or innovative (and thus risky) approaches.

The options for its utilisation refer to the current funding period 2014-2020 (Regulation *No. 1303/2013* of the European Parliament and of the Council of 17 December 2013).

Compared to the previous period, the terms of the period 2014-2020 define the territory eligible for utilisation more broadly, thereby making easier the funding of international projects. Article 70 Eligibility of operations depending on location defines as eligible operations „*Operations supported by the ESI Funds, subject to the derogations referred to in paragraphs 2 and 3, and the Fund-specific rules, shall be located in the programme area.*" Based on this, the managing authority may "*accept that an operation is implemented outside the programme area but within the Union, provided that all the following conditions are satisfied:*

- *(a) The operation is for the benefit of the programme area.*
- *(b) The total amount allocated under the programme to operations located outside the programme area does not exceed 15% of the support from the ERDF, Cohesion Fund and EMFF at the level of the priority, or 5% of the support from the EAFRD at the level of the programme.*
- *(c) The monitoring committee has given its agreement to the operation or types of operations concerned.*
- *(d) The obligations of the authorities for the programme in relation to management, control and audit are fulfilled by the authorities responsible for the programme under which that operation is supported or they enter into agreements with authorities in the area in which the operation is implemented.*

For operations concerning technical assistance or promotional activities, expenditure may be incurred outside the Union, provided that the conditions set out in point (a) of paragraph 2 and the obligations in relation to management, control and audit concerning the operation are fulfilled.

Paragraphs 1 to 3 shall not apply to programmes under the European territorial cooperation goal and paragraphs 2 and 3 shall not apply to operations supported by the ESF."[100]

At the time of preparation of this section of the study, based on discussions with the national ESIF contact person, the guideline for implementing Article 70 was yet to be published and the interpretation of this article was not yet final. It is assumed that the funding of infrastructure outside the eligible location will not be possible (based on the consultations made). At the same time, it is expected that for cofunding calls/projects under Article 70, such calls/projects will have to comply with the eligibility requirements in all countries involved in cofunding. The procedures for public procurement, monitoring, audit, etc. are governed by the national rules applicable for the responsible authority chosen according to (d) above. Thus, such potential barriers could limit the options for using ESIF for the purposes of international cooperation. Other potential barriers include the fact that MS might have limited access to ESIF in cases where the funds are managed at regional level and that OP's might not provide for the implementation of Art. 70. The complexity of synchronization of calls/activities might pose another barrier to joint funding

Suitability for DRRIF as a Fund:

Structural funds would generally be a suitable source of funding calls and thus individual projects within the DRRIF fund. To a great extent, however, their suitability depends on the willingness of ESIF managers and their capacity to mitigate the potential barriers mentioned above, i.e., interpretation of Article 70 concerning eligibility of operations.

Depending on agreements, an R&D international project would be sponsored under the structural funds in their home countries, or the provided financial sources would become a part of joint sources of DRRIF (a more detailed outline of creation of grant schemes is included in the next chapter).

Suitability for DRRIF as Support Centre or Funding Network:

The use of structural funds for funding a Support Centre or Funding Network is less likely, however still possible[101]. Structural funds primarily serve to fund projects, funding activities designed for Support Centre or Funding Networks is questionable. The use for such purposes would have to be preceded by an agreement of the participating countries and the Commission or supported in the rules for implementing Article 70.

[100] Only part of the subchapter to which the extract refers is quoted. Individual sections do not have to follow the original order.
[101] It was suggested during the WG meeting in March 2015 that ESIF may allow the benefiting country to create NCP structure for scientific community support.

Conclusion:

For the current funding period, allocations to operational programmes supporting R&I in the individual countries and the options for their use in international cooperation projects – the terms under which the countries will agree with their use – need to be identified.

After publication of the implementation rules of Article 70, its interpretation should be taken into account in creating the approach to using ESIF for DRRIF (while considering valid implementation possibilities).

We conducted questionnaire[102] research with the aim of collecting and analysing information on the extent of EUSDR support mentioned in national documents, information about existing and upcoming bilateral and multilateral R&I agreements between EUSDR countries and **examining ESIF** and other fund allocation possibilities. We received only one comment regarding the potential utilisation of Article 70 (from Austria): "*According to information of the Austrian Conference on Spatial Planning - ÖROK responsible for ESIF coordination, the application of Article 70 (2) is not foreseen in the documents*".

However, without having more valid answers, we are not able to conclude whether the possibility exists for DR countries (which benefit from ESIFs) of implementing up to 15% of respective ESIF allocation outside the programme area (legal conditions), in order to support international R&D and/or R&I cooperation.

[102] See questionnaire template in Appendix 7.
Note: only 5 filled in questionnaires were provided from the representatives of the DR countries (Austria, Germany, Czech Republic, Serbia and Slovakia) and only one answer was relevant to this part (Serbia).

9.3.2.6 Article 185 of the TFEU

Eligibility:

The eligibility of using Article 185 of the TFEU for funding DRRIF is, among others, supported by Regulation No. 1291/2013 of the European Parliament and of the Council of 11 December 2013.

The terms for using Article 185 of the TFEU are defined in Article 26 (REGULATION (EU) No 1291/2013 establishing Horizon 2020 - the Framework Programme for R&I (2014-2020) that specifies the so-called public-public partnerships. Such partnerships "*may be supported either within, or across, the priorities set out in Article 5(2), in particular through:*

(b) Union participation in programmes undertaken by several Member States in accordance with Article 185 TFEU where the participation is justified by the scope of the objectives pursued and the scale of the resources required."

The use of Article 185 TFEU is proposed only *"in cases where there is a need for a dedicated implementation structure and where there is a high level of commitment of the participating countries to integration at scientific, management and financial levels. In addition, proposals for such initiatives shall be identified on the basis of all of the following criteria:*

- *(a) A clear definition of the objective to be pursued and its relevance to the objectives of Horizon 2020 and broader Union policy objectives*
- *(b) Indicative financial commitments of the participating countries, in cash or in kind, including prior commitments to align national and/or regional investments for transnational R&I and, where appropriate, to pool resources*
- *(c) The added value of the action at Union level*
- *(d) The critical mass, with regard to the size and the number of programmes involved, the similarity or complementary nature of activities and the share of relevant research they cover*
- *(e) The appropriateness of Article 185 TFEU for achieving the objectives"*[103]

Public-public partnerships are also supported by the ERA-NET Cofund tool which we analyse in section 9.3.2.2.

Suitability for DRRIF as Support Centre, Funding Network or Fund:

Article 185 of the TFEU is a suitable funding tool for DRRIF. However, its application is a very demanding process from the administrative and time points of view, requiring well-established structures that the EU should support[104] (specifically criteria (a)–(e) stated in part Eligibility have to be met).

Based on discussions, we believe that due to time-consuming compliance with all the requirements of Article 185 of the TFEU, it is unlikely that it will be used to support DRRIF as early as during the funding period 2014 to 2020.

The main presumption for the support of DRRIF under Article 185 of the TFEU is the commitment and involvement of the participating countries' own financial resources. The support is limited by 50% of the funds, meaning that the EC will only finance amounts under Article 185 of the TFEU that will be invested by the countries from their own (and not EU) national funds.

Conclusion:

For the possible application of Article 185 of the TFEU, we propose contacting the representatives of the Commission.

9.3.2.6.1 Creating an initiative under the Article 185 of the TFEU[105]

In section 9.3.2.6, we analysed Article 185 of the TFEU as one of the potential sources of funding DRRIF. A successful implementation of Article 185 is a demanding process from the points of view of time and administration. Therefore, in this chapter we specify individual terms and steps leading to successful implementation of Article 185.

Requirements for programme funding under Article 185 of the TFEU tool:

- **High commitment** to integration at **scientific, management** and **financial level**
- Need for a Dedicated Implementation Structure
- **Clear definition of goals** to be attained and their importance relative to the goals of Horizon 2020 (specific actions cannot overlap)
- **Clear definition of the financial commitment** (combination of national and/or regional investments)
- Clearly defined **added value**

[103] Only part of the subchapter to which the extract refers is quoted. Individual sections do not have to follow the original order.
[104] A detailed analysis in this respect has been made by the Danube-INCO.NET project D6.11 "Roadmap towards a possible Article 185 Programme for the Danube"
[105] http://netwatch.jrc.ec.europa.eu/web/lp/learning-platform/toolbox/smart-coordination/positioning-of-the-era-net-scheme/article-185-initiatives

- Expression of a **critical amount**
- Proven efficiency of the tool under Article 185 of the TFEU as the most suitable means for attaining goals

Steps for implementation of Article 185:

- Submission of a joint programme to the European Commission and identification of a dedicated implementation structure
- Ex-ante evaluation of the impact by the European Commission
- Dialogue with the public/stakeholders, independent experts in order to evaluate impact
- Submission of draft to the European Council and Parliament by the European Commission
- Adoption and publication of decision of the European Council and the Parliament
- Agreement between the European Commission and the dedicated implementation structure – "delegation agreement"
- Annual contributions under agreement, annual report and planning

Preparatory phase:

For a successful programme under Article 185 of the TFEU, involvement of existing national programmes, commitment of the Member States to provide funding and a high support at the national level are required. Before EU funds are available, the following must be elaborated and agreed: joint working plan, strategic research agenda, reliable management model, financial contributions from national budgets, clear assessment criteria and procedures, outputs and solutions to questions of responsibility.

- This implies that the preparatory phase of Article 185 of the TFEU is time-consuming.
- For the establishment of a programme under Article 185 of the TFEU (an ERA-NET followed by ERA-NET+ with calls[106] was successfully used by the programmes BONUS and European Metrology Research Programme.
- The programme Ambient Assisted Living used specific support action under thematic priority FP7 for the preparatory phase.

Implementation phase:

- May comprise several parts
- Throughout the strategic phase of BONUS (2010 – 2011), a strategic research agenda, platforms for dialogue with stakeholders and implementation procedures were prepared. The implementation phase is between 2012 and 2016.

Relationship and potential synergies between Article 185 of the TFEU and ERA-NET projects

- The ERA-NET tool may be used for the preparatory phase, prior to implementation of Article 185.
- In addition to the initiative under Article 185 of the TFEU, it is possible that ERA-NET calls will be announced within the given thematic priority.
- As a rule, the total budget of Article 185 of the TFEU does not exceed the budget of individual ERA-NET initiatives, *e.g.,* the total budget of BONUS was 40 million lower than "simple" ERA-NET EUROTRANSBIO, which mobilised 140 million euros within four calls (of which 30% was private equity).

Obtaining co-funding from the European Commission under Article 185 of the TFEU for R&D actions is a complex and long-term process, preceded by activities and projects implemented in this area jointly with several participating countries. A clear commitment of the DRRIF representatives (DRRIF Working Group, PA7 Steering Group or other relevant stakeholders) concerning ambitions in relation to Article 185 is crucial to the commencement of operations that will lead to compliance with the basic requirements for future implementation of Article 185.

[106] replaced by ERA-NET Cofund in the current programme period

9.3.2.7 Cross-border cooperation

Eligibility:

International cooperation among countries within the DR is also supported by so-called cross-border cooperation. This may include bilateral or multilateral treaties to support diverse fields, among others science, R&I. Financial means from the cross-border cooperation may be used in the regions participating. An important factor at the level of individual programmes is identification of the options of fund allocation to activities supported by DRRIF.

At the time of preparation of this part of the study, only the following information on cross-border cooperation programmes with potential for cooperation to the benefit of DRRIF was available on the official EU websites:

Central Europe Programme[107]

- Participating DR countries: Austria, Croatia, Czech Republic, Germany, Hungary, Slovakia, Slovenia
- Total available budget (2014-2020): EUR 298,987,026
- See section 9.3.2.9

Interreg V-A - Germany/Bavaria-Czech Republic[108]

- Participating DR countries: Czech Republic, Bayern
- Total available budget (2014-2020): EUR 121,617,825
- The programme is focused on better integration and utilisation of R&D capacities by way of joint R&D clusters and networks, increase of biodiversity and more intensive education and training.

Interreg V-A - Austria–Germany/Bavaria (Bayern–Österreich)[109]

- Participating DR countries: Austria, Bayern
- Total available budget (2014-2020): EUR 64,332,186
- The programme is focused on finding solutions to environmental challenges such as climate change and following increased risk of flooding, through joint infrastructures, joint management of protected areas and increased cooperation in tourism.

Interreg V-A - Germany-Austria-Switzerland-Liechtenstein (Alpenrhein-Bodensee-Hochrhein)[110]

- Participating DR countries: Austria, Germany
- Total available budget (2014-2020): EUR 56,554,900
- The programme is focused on the support of competitiveness, innovations, employment and education. It also specializes in environmental challenges, energy and transport. It strives to attain its goals by increasing R&D capacities and competences, human capital quality, energy efficiency and renewables. In addition, it strives to reduce pollution, conserve biodiversity and improve cooperation between institutions in the programme area.

Alpine Space[111]

- Participating DR countries: Austria, Germany
- Total available budget (2014-2020): EUR 139,751,456
- The programme focuses on strengthening R&D, reducing the use of fossil fuels in all industries, environmental protection and improvement of institutional capacity.

Suitability for DRRIF as Fund:

Support of DRRIF through the support of projects that are priorities both for DRRIF and a particular cross-border cooperation programme seems possible.

Suitability for DRRIF as Support Centre or Funding Network:

Utility in the case of a Support Centre or Funding Network is questionable – it depends on priorities of the cross-border cooperation programme and the agreement on options of fund allocation to activities promoted by the Support Centre or Funding Network. However, we have not identified any possibilities of direct cooperation so far.

Conclusion:

At the time of preparation of this part of the study, we analysed the published cross-border cooperation programmes, in which at least two DR countries participate.

We do not perceive the cross-border cooperation programmes only as a possible source of DRRIF funding. We see the potential in actions focused on better coordination in preparation of bilateral and multilateral agreements between DR countries and identifying new partnerships. These activities could be performed by DRRIF as a Support Centre or Funding Network. This approach would contribute to more efficient funding of R&D in the DR.

[107] Source: http://ec.europa.eu/regional_policy/index.cfm/en/atlas/programmes/2014-2020/Territorial%20co-operation/2014tc16rftn003
[108] Source: http://ec.europa.eu/regional_policy/index.cfm/en/atlas/programmes/2014-2020/Territorial%20co-operation/2014tc16rfcb009
[109] Source: http://ec.europa.eu/regional_policy/index.cfm/en/atlas/programmes/2014-2020/Territorial%20co-operation/2014tc16rfcb004
[110] Source: http://ec.europa.eu/regional_policy/index.cfm/en/atlas/programmes/2014-2020/Territorial%20co-operation/2014tc16rfcb024
[111] Source: http://ec.europa.eu/regional_policy/index.cfm/en/atlas/programmes/2014-2020/Territorial%20co-operation/2014tc16rftn001

We conducted a research questionnaire with the aim of collecting and analysing information on the extent of EUSDR support mentioned in national documents, **information about existing and upcoming bilateral and multilateral R&I agreements between EUSDR countries** and examining ESIF and other fund allocation possibilities. Based on the questionnaire[112] answers of representatives of the DR countries provided, we may conclude that R&I oriented bilateral and multilateral agreements exist between DR countries. The examples of the cooperation focus are:

- Supporting bilateral projects
- Funding researchers' mobility
- Emphasis on prospective participation in H2020 and other European programmes
- Development of high-quality research networking
- Exchanging existing knowledge
- Pursuing state-of-the-art science and technology through collaboration
- Internationalization of science and research

Annual budgets allocated in the agreements vary significantly – from less than ten thousand Euros per year to four hundred thousand Euros annually. In general, more wealthy countries (Austria, Germany) are more able to contribute to bilateral and multilateral agreements than the rest of the DR (Czech Republic, Serbia, Slovakia).

[112] See questionnaire template in Appendix 7.
Note: only 5 completed in questionnaires were provided from the representatives of all DR countries (Austria, Czech Republic, Germany, Serbia and Slovakia).

9.3.2.8 Potential funding sources for Non-EU Member States - ENI, IPA II, WISE (RCC), WBIF

Eligibility:

In this part, we analyse the possible support sources with geographical scope outside the European Union: ENI (for Moldova and Ukraine), IPA II (for Bosnia and Herzegovina, Serbia, Montenegro) and WISE (RCC), WBIF (for the Balkan countries). A part of the funds in these schemes/programmes is allocated to thematic areas of R&I.

Suitability for DRRIF as a Fund:

Put simply, the schemes ENI and IPA II may be seen as replacements for structural funds for Non-EU Member States. Therefore, we deem them potential sources of funding calls and hence individual projects within the DRRIF fund.

Depending on what agreements are concluded, the funds may be used either to finance scientists in the funds' country of origin or pooled with the joint resources of DRRIF (for a more detailed description see chapter below).

However, based on the consultations made, the possibilities to use the above sources for DRRIF as a Fund seem to be very limited.

Suitability for DRRIF as Support Centre or Funding Network:

The mentioned schemes/programmes basically serve for funding projects, not activities for which the Support Centre or Funding Network is designed. A precondition for their use for such purposes would be agreement of the participating countries and the funders of such schemes/programmes.

Conclusion:

According to the comments of the DRRIF WG, WISE, supported by the European Commission and the World Bank, is currently only in its set-up phase and is envisaged to fund R&I cooperation activities in the Balkan Region later. If it was to be implemented, the funds directed to WISE would be agreed upon at national level by the different countries (partially via parliamentary acts) and would become binding commitments (most likely for a specific timeframe of a few years). As a result, this may take away funds for any activities envisaged in the Danube Region but so far no detailed figures are available to verify the potential impact.

Based on the discussions during the DRRIF WG meeting held on 17 March 2015 in Vienna, we conclude that there are very limited or no possibilities to finance DRRIF by using the above sources of finance (ENI, IPA II) in the process of DRRIF establishment and its first stages of operation.

We conducted a research questionnaire with the aim of collecting and analysing information on the extent of EUSDR support mentioned in national documents, information about existing and upcoming bilateral and multilateral R&I agreements between EUSDR countries and examining ESIF and **other fund allocation possibilities**. Based on the questionnaire[113] answers of representatives of the DR countries provided, the schemes ENI, IPA II, WISE (RCC) and / or WBIF do support R&I and potential synergies between these schemes and EUSDR are foreseen (mainly for different enterprises involved in or supported by the above mentioned schemes).

However there possibilities that any of the above schemes would financially support EUSDR and DRRIF in particular were not identified, due to the fact that at this point the financial objectives of the above schemes have been already defined.

[113] See questionnaire template in Appendix 7.
Note: only 5 completed in questionnaires were provided from the representatives of all DR countries (Austria, Germany, Czech Republic, Serbia and Slovakia) and only one answer was relevant to this part (Serbia).

9.3.2.9 Central Europe Programme

Eligibility:

An option, connected with the funding of the administrative operation of the DRRIF Fund, is to partially finance it through the calls of CE. However, this cooperation would depend on existing agreements of the countries.

The drawback of the Central Europe Programme is that it does not cover the entire Danube Region. Therefore, it remains questionable whether it would be eligible to co-fund the activities of DRRIF and whether there would be enough political will to financially engage the Programme in the activities of DRRIF.

The programme document *Cooperating on innovation to make CENTRAL EUROPE more competitive,* Priority 1 (Investment priority 1b, Specific objective 1.1) includes *examples of actions:*

- *Establishing and further strengthening transnational innovation networks and clusters and supporting their internationalization*
- *Enhancing the transfer of R&D-results from research institutions to the business sector (in particular SMEs) leading to new services and products*
- *Building transnational links for improving existing and developing new services which support innovation in businesses*
- *Strengthening links between the public sector, finance institutions as well as the business sector (in particular SMEs) to design and test new structures and services that facilitate the access to financing of innovation*
- *Increasing cooperation between research, the public and private sectors to stimulate innovation and entrepreneurship (e.g., reduction of administrative barriers to innovation, public procurement of innovative products and services, social innovation, etc.).*

Financial support from the Central Europe Programme for DRRIF could be received for one of the above five supported actions.

Suitability for DRRIF as Support Centre, Funding Network or Fund:

The partial funding of the administrative operation of DRRIF is only possible after agreement of the countries participating in the Central Europe Programme.

Conclusion:

Upon approval of the thematic priorities, objectives, strategy, legal form and management model of DRRIF, we propose conducting discussions with the top representatives of CE with regard to the financial cooperation and legal assumptions of potential cooperation.

A key factor will be the willingness of the country representatives in the Central Europe Programme to use a part of the funds for the benefit of DRRIF. A barrier could be the fact that the Central Europe Programme does not cover the entire potential geographical scope of DRRIF.

9.3.2.10 European Investment Bank, European Bank for Reconstruction and Development, Europe Development Bank

Eligibility:

Financial aid from European banks may be used by Member States, acceding and neighbouring countries. However, the majority of funds provided by these banks are focused on projects with returns that result in marketable products or services.

Each project must be approved by an evaluation committee and, based on its decision, the project is granted a repayable loan. Services and products provided by banks are primarily focused on SMEs and research institutions with marketable solutions.

Suitability for DRRIF as Fund:

DRRIF as a Fund could be financed by one of the European banks on the condition that it announced calls providing repayable loans instead of non-repayable grants.

Suitability for DRRIF as Support Centre or Funding Network:

We did not identify any option for funding DRRIF as a Support Centre or Funding Network by any of the analysed banks, because all the banks provide only repayable funding facilities, directly to projects.

Conclusion:

Should DRRIF also provide repayable funding facilities, cooperation with any of the European investment banks would seem to be possible.

9.3.2.11 Horizon 2020

Eligibility:

Horizon 2020 mainly publishes calls for funding of R&I projects. The funding is allocated according to vertical areas; horizontal priorities are not separately funded.

The only identified option to utilise funding by Horizon 2020 for DRRIF is the preparation and submission of an application for funding of a specific project.

At the time of preparation of this study, however, we did not identify any open calls for funding projects similar to DRRIF. Should a call be published that enables the funding of the operation of a similar institution, an application for funding may be filed.

Horizon 2020 is aimed at funding R&I in the EU Member States and associated countries which are party to a separate bilateral agreement. All DR countries are either EU MS or have associated to H2020.

Suitability for DRRIF as Support Centre or Funding Network:

Should DRRIF be established as a Support Centre or Funding Network, there is an opportunity to participate in the programming of calls for projects in H2020, in which there is a great chance for scientists from DR to find a place and to support the preparation of project applications.

This would, however, not constitute funding of a Support Centre or a Funding Network from the funds of Horizon 2020, but activities of the funding network could use opportunities aimed at receiving funds from the Horizon 2020 programme for the benefit of the DR scientists.

Suitability for DRRIF as a Fund:

For DRRIF as a Fund, we did not identify any option for direct cooperation with Horizon 2020.

Conclusion:

Direct funding of DRRIF through Horizon 2020 (except for ERA-NET COFUND and Article 185 TFEU - these instruments were analysed separately) is not in our opinion a realistic option.

9.4 Combinations of ESIF with public-public partnerships[114]

The funding sources outlined in the previous subchapters may be combined in a variety of ways, subject to **the basic principle that no expenditure may be double-funded**. Some European sources of funding may only be combined with own funds, while others have various specific rules. We focused on the analysis of combinations of the most important public sources (instruments) of funding.

We analyse potential synergies linked to the following public-public partnerships at the programme level:

- ESIF and ERA-NET Cofund
- ESIF and Article 185 of the TFEU

The rules for combining sources of European structural funds at the programme level differ, depending on the second source in the combination. In this chapter, we focus on the analysis of potential combinations and synergies of ESIF with two of the potential DRRIF funding possibilities.

Combination of ESIF and ERA-NET Cofund

The use of ESIF within the context of ERA-NET Cofund activities is possible under the following terms:

- Member States may use ESIF for the purposes of financial securing of a (joint) call. However, co-funding from Horizon 2020 (under which the ERA-NET Cofund tool falls) cannot be applied to such sources. The ERA-NET Cofund only serves as a "top-up", in relation to the own funds of the Member States.
- Hence, Member States with access to ESIF must decide whether to use their own funds:
    - As their own source of funding to obtain co-funding under Horizon 2020 (through ERA-NET Cofund activity) – up to 33% of the total amount = up to 50% of the invested own funds
    - As their own source of funding without using funds from Horizon 2020, but using "leverage" under ESIF, *e.g.,* 50% or 75% call funding = 100% or 300% of the used own funds
- A combination is possible if a part of the projects within a single call is funded under Horizon 2020 and the rest by ESIF.
- The following limits and barriers might be relevant for DRRIF from these rules:
    - Various types of provided funding depending on various rules of the participating countries – repayable vs non-repayable funding
    - Diverse criteria for eligibility of expenditure
    - Administrative complexity of the announcement of calls, coordination of projects and monitoring of impacts

Combination of ESIF and Article 185 of the TFEU

Main rules for the use of ESIF in the context of Article 185 of the TFEU:

- ESIF cannot be used as "leverage" for obtaining funding under Article 185 of the TFEU.
- ESIF may be used as additional funding tool to top up "*50% of own resources + 50% co-funding under Article 185 of the TFEU*".
- The use of ESIF in the case of individual projects is allowed in individual cost items (subject to the rules for using ESIF).

[114] Source: Enabling synergies between European Structural and Investment Funds, Horizon 2020 and other research, innovation and competitiveness-related Union programmes. Guidance for policy-makers and implementing bodies." ISBN : 978-92-79-38599-5

9.5 Proposed system of internal audit

The high-level system of internal audit proposed by us is applicable to the option of **DRRIF as a Fund**, providing financial grants to support projects. The task of internal audit is the surveillance of transparent allocation and expenditure of funds by individual beneficiaries.

It is an independent body, segregated from the implementation body that is only answerable to funding providers.

The staffing of the internal audit body should rely on the amount of allocated resources within the Fund. An alternative is cooperation with an external company, potentially leading to savings in the area of staff and overhead costs, thanks to a smaller number of full time internal audit employees.

Proposed tasks of internal audit:

- Similar to projects under individual operational programmes funded by the EU, internal audit has the role of **first level supervision,** *i.e.,* it primarily supervises the validity of the project, its costs, attainment of project goals, compliance with laws, methodology, internal guidelines of the Fund and EU directives.
- In addition to the assurance and supervisory functions, the internal audit also fulfils the **publication/promotion function**. By publishing summary reports on the outcomes of internal audit to the providers of subsidies, it increases the credibility of the Fund, which may finally lead to an influx of finance.
- Internal audit is authorized (upon approval of the Fund management and based on findings) to suspend, **reduce or reallocate funds already provided**, in cases of misconduct that would have financial impact or in cases of unjustified, uneconomical or ineffective expenditures in relation to attaining the goals of the project.
- Apart from checking the compliance of projects with internal guidelines and manuals of individual funding providers, the internal audit also **monitors compliance with national laws and regulations in the country of the beneficiary.**

Figure 13: Standardized mechanism of the operation of internal audit – sequence

Source: EY Illustration

In addition to standard procedures for internal audit of projects financed from funds, we propose to establish a so-called **Whistle-blower Hotline**, which would, in the form of a telephone number or a website, provide the option to anonymously report various forms of misconduct.

The aim of the hotline is to enable instant suspension of funds and their reallocation to another project in cases of identified, reviewed and justified inconsistencies, thus preventing the need to collect funds already drawn in courts.

The whole proposal of the system of the internal audit (if applicable) will have to be specified and developed based on the final decisions about the institutional form, legal form and applicable funding sources.

9.6 Conclusion of the potential funding sources

We have analysed the eligibility and suitability of the sources which we consider to be the most relevant for each of DRRIF's potential forms (Fund, Support Centre and Funding Network). Identification of these sources is based on the following:

- List of all identified grant schemes prioritised by the thematic and geographical overlap in the form of a matrix (chapter 4.2)
- List of grant schemes with the potential for financial cooperation as agreed by DRRIF WG (chapter 4.3)
- Table of the funding sources appropriate for EUSDR according to JRC (chapter 9.3.1)

We have identified the following as suitable sources of funding (categorized according to DRRIF's institutional form):

We believe the following funding sources are relevant and suitable for **a Fund's calls:**

- European Structural and Investment Funds:
  - The utilisation of ESIF depends, to a large extent, on the particular possibilities of their use – i.e., the **interpretation of Article 70**, which details the possibility of allocations to operations outside the programme area, which is yet to be settled (*status at the time of preparation of this study*).
  - Another important factor is whether the country plans and is enabled (in writing in strategic national documents) to use ESIF for the purposes of international cooperation.
- Article 185 TFEU:
  - The utilisation of the Article 185 TFEU is administratively demanding and **requires already established networks and relationships between interested parties.** At the same time, it also requires significant long-term financial commitments from countries involved. However, there is a potential for DRRIF to gradually develop towards the implementation of the Article 185 TFEU.
- ERA-NET Cofund (within Horizon 2020):
  - ERA-NET Cofund is a **tool for the support of public-public partnerships** (preparation, establishment of networking structures, proposition, execution and coordination of joint activities; financial support up to 33% of total budget) and can be used **for preparation of the initiative under the Article 185 TFEU**.
  - The process to obtain support from the ERA-NET Cofund is not open, nor bottom-up. Suitable calls (for DRRIF to apply) have to be announced first, which may require further effort in lobbying by DR countries.
- CSA – coordinated support actions:
  - Project-based funding within Horizon 2020
- Cross-Border Cooperation:
  - DRRIF's activities could potentially be supported through the support of projects, which are of interest for both, DRRIF and the particular cross-border cooperation programme – in the case there is a **sufficient political will** to support a specific area and **DRRIF's priority areas are aligned with those of cooperation programmes**, part of the resources could be **used by DRRIF for funding its calls.**
- National budgets of countries involved

We believe the following are relevant and suitable for **a Fund's day-to-day operational funding or to fund a Support Centre or Funding Network:**

- Danube Transnational Programme:
  - Potential source of **funding for a Fund's day-to-day operations or for a Support Centre's / Funding Network's activities.** The DTP cooperation programme also includes examples of supported activities (Investment priority 1b) objective 1.1 – Improve the institutional and infrastructure framework conditions and policy instruments for R&I).
  - However, since **DRRIF is not explicitly mentioned in the DTP programme document**, there is a risk of the funding support being dependent on DTP calls and DRRIF's success in the application process.
- European Structural and Investment Funds:
  - The utilisation of ESIF depends, to a large extent, on the particular possibilities of their use – i.e., the **interpretation of Article 70**, which details the possibility of allocations to operations outside the programme area, which is yet to be settled (*status at the time of preparation of this study*).

Unrestricted financial resources from national budgets, or the business sector, would be **the most suitable funding source for any institutional form of DRRIF** (use-wise only and not considering the probability of obtaining the financing).

- Obtaining funding from the national budgets might be very time consuming for a new international initiative such as DRRIF. Thus, we suggest commencing these negotiations at the national level as soon as possible.
- The co-financing from public sources (including the national budgets) is also necessary in order to obtain funding from the European sources such as ERA-NET Cofund or the Article 185 TFEU.
- Based on recently expressed political will, we do not expect DRRIF's activities to be funded solely from the national budgets; nonetheless, we believe funding from national sources will have to be used, at least to a certain extent.
- Funding from the business sector is more feasible after DRRIF's establishment and stabilization of its activities. Thus, we do not assume the utilisation of these sources of funding in DRRIF's initial stages.

- Supporting the creation of DRRIF from public sources (state budgets) in a form of in-kind contributions is also an alternative. The in-kind contributions are considered to be mainly buildings, existing infrastructure or in some cases even providing staff or know-how for the agreed activities. However, before planning to engage in-kind contributions in order to substitute the obligatory percentage of co-financing from own sources, the eligible types of in-kind contributions have to be inspected, as different instruments may or may not accept such contributions.

DRRIF's goal, regardless of its form, should be the **sustainability of its activities and funding**, due to R&I being an area that requires both long-term approach and solutions. Therefore, we consider it to be critical to obtain funding which is not limited to the duration of one programming period in order to ensure the long-term sustainability and availability of funding sources for DRRIF's activities. The long-term sustainability could be also achieved through:

- Long-term commitment of countries actively participating in DRRIF
- Alignment of DRRIF's goals and activities with the Framework Programme (Horizon 2020)
- Alignment of DRRIF's goals and activities with R&I strategies of countries involved (RIS3)

When establishing DRRIF, it should be the aim (as also recommended by DG Regio) to **avoid creating any additional levels of intermediaries, which solely focus on reallocating already existing European financial resources**. On the contrary, DRRIF should closely cooperate with the existing DR structures such as Danube-INCO.NET or the Danube Strategy Point and the EUSDR Priority Areas.

The analyses carried out and consultations with the stakeholders have proved that **obtaining funding for DRRIF as a Fund supporting R&I in the DR region seems rather difficult and improbable** due to the following reasons:

- Part of the fund's finances (in the case of Article 185 TFEU – at least half) would have to come from the national budgets of countries participating in DRRIF.
- Commitments towards significant investment and joint activities are a prerequisite for highly coordinated joint efforts, which are necessary to obtain funding from European resources.
- In order to gather a considerable volume of resources for the fund (virtual common pot), a consensus among the DR countries on common goals and thematic areas is necessary.
- The interpretation of Article 70 regarding the allocation of ESIF towards international cooperation is yet to be settled on.
- The anticipated size of the fund's consequent volume of funding plays a major role and is still in question.

DRRIF as a Support Centre or a Funding Network has lower financial requirements than the Fund; thus, obtaining funding for these alternatives should be less difficult.

- The Danube Transnational Programme could be (at least in the first few years) the main funding source of such an institution.
- The national resources needed for the establishment and operation of the support centre (15% if supported from DTP) or Funding Network should be significantly lower than the Fund's, resulting in greater support and a will to participate in financing by the countries involved.

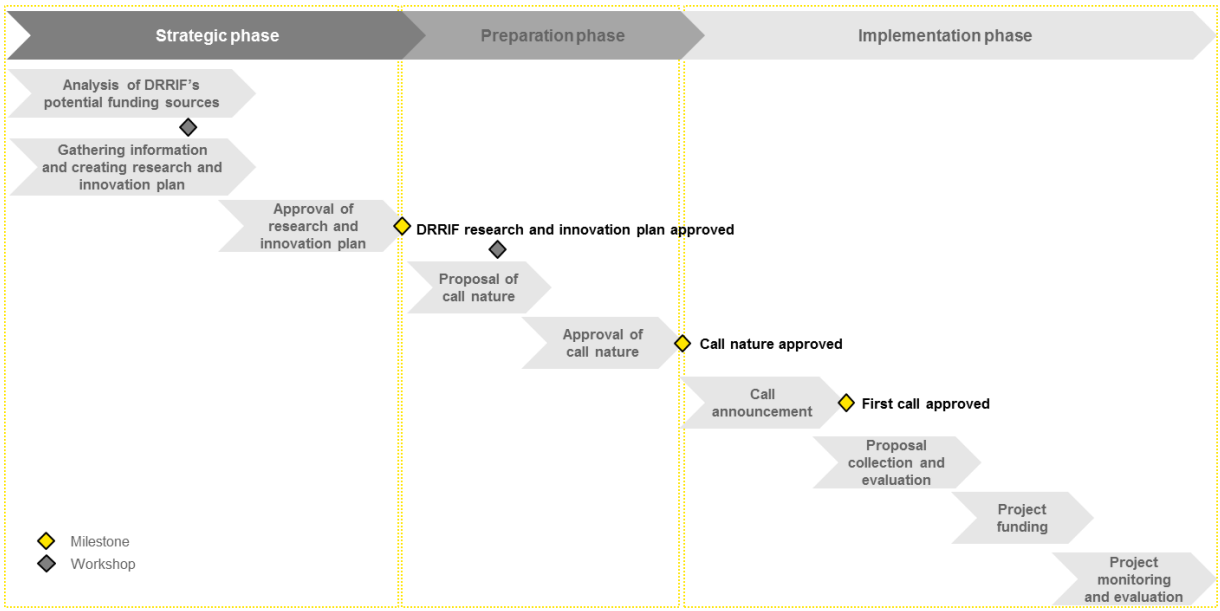
The most suitable and feasible DRRIF alternative under the current political and market conditions will be described in more detail in the chapter *Definition of steps for DRRIF's implementation*.

10. Approach to development of the DRRIF grant scheme and calls

One of the options for increasing the direct financial support of international R&I projects in the DR is the establishment of DRRIF in the form of a Fund, which would launch calls for projects. We do not consider other potential forms of DRRIF (analysed in Chapter 8: Potential institutional forms of DRRIF – Support Centre and Funding Network) as they do not focus on financing calls.

In this part, we propose and describe the approach to development of the DRRIF grant scheme and calls. Our proposal reflects conclusions from the previous partial analyses and experience gained from the best practices of similar programmes[115]. In simplistic terms, the preparation of the grant scheme may be split into the following phases and steps:

Figure 14: Phases of developing the grant scheme



Source: processed by EY

The time span – from the start of the strategic phase to the end of the preparation phase – may take from several months to years, depending on the size of the grant scheme, projects carried out prior to the establishment of the grant scheme, attitude of the participating stakeholders and the political will[116].

In the chapters below, we describe individual phases and activities leading to the development and implementation of such a DRRIF grant scheme that will launch **calls, which are attractive to applicants from the highest possible number of the DR countries in thematic areas according to variable geometry**.

[115] In particular, the BONUS EEIG programme, the form of which is most similar to DRRIF.
[116] In the case of the BONUS EEIG programme, it took five years from the establishment of BONUS as ERA-NET project to the announcement of the first call. Source: Bonus Cook Book: Building Administrative Framework for the Joint Baltic Sea Research Programme, p. 3 and 25 Juvenes Print – Ammatikuva, Tampere 2009.

10.1 Strategic phase of developing the grant scheme

A significant trend now prevailing is the strategic orientation of R&D at the European as well as national levels. This is evidenced by both the development of Europe 2020 strategy and the preparation of RIS 3 strategies in the EU countries[117].

One of the benefits of strategic planning is its long-term orientation, thereby avoiding preoccupation with insufficiently aligned short-term goals, without specifying the desired final state. Particularly with respect to funding science and research with a long-term rate of return, it is beneficial to define the anticipated final conditions and orientation upon which the partial goals will be based.

Therefore, we recommend that in parallel with **the analysis of DRRIF's available funds** (prior to launching the first calls), a **DRRIF R&I plan**, supported by vision, objectives and mission (further described in Chapter 6: Proposal of DRRIF's goals and mission), is prepared and approved. The research and innovation plan should preferably be developed as a longer-term plan, whose regular comparison with the current state will show the benefits of the activities performed.

However, consultations with the representatives of the DR countries (due to diversity and various priorities of countries) revealed a greater interest and belief in the feasibility of creating a short-term, periodically updated plan.

10.1.1 Analysis of potential funding sources for DRRIF and requirements arising from these sources

There is a different set-up of funding criteria with respect to individual potential funding sources, which may affect the selection of thematic areas to be supported from DRRIF. For example, the programme could be co-financed through Article 185 TFEU if it comes into operation, which gives great freedom in selection of the thematic areas; however, it must comply with the scope as defined in the framework programme (at present, Horizon 2020). Other sources of funding may, for instance, regulate the number of countries participating in a project, authorized applicants, authorized territory, orientation of a call (e.g., people or infrastructure), and maximum duration of a project – which primarily affects the orientation of horizontal thematic areas.

Potential funding sources for DRRIF may create a filter for the selection of thematic areas. Also, selection of funding sources based on the chosen thematic areas is an option. However, the availability of financial sources is limited and therefore we recommend interconnecting the selection of thematic areas with a comparison of available funding sources for a particular thematic area. The final selection from the pre-selected thematic areas will include those areas which could be supported from the available funds.

Nevertheless, if in defining the DRRIF strategy and thematic areas an emphasis is placed on their compliance with the already implemented national and European strategies, we do not anticipate that the pre-selected themes will be considerably limited by any conditions on drawing the available funds.

After deciding on and approving the sources of DRRIF's funding, it is necessary to decide on a model for launching calls.

The identified options, methods and sources of DRRIF's funding will also significantly affect the approach to the selection, preparation, launch and management of calls and projects. We based **our proposed potential models of launch,** evaluation and funding of calls on the best practice of Bonus EEIG[118]. Considering the DRRIF's specifics, we have proposed the following potential alternatives:

[117] A similar strategic orientation of R&D is also taking place at the non-European level. The following examples include strategic documents prepared by global R&D leaders:
- Strategic document laying down science and technology priorities of the United States of America for the FY 2016 budget (http://www.whitehouse.gov/sites/default/files/microsites/ostp/m-14-11.pdf)
- National programmes including the most important China's science and technology projects (http://www.china-un.org/eng/chinaandun/economicdevelopment/kj/t1124786.htm)
- Trends in U.S.-China Science and Technology Cooperation for the Twenty-First Century (http://origin.www.uscc.gov/sites/default/files/Research/Trends%20in%20US-China%20Science%20and%20Technology%20Cooperation.pdf)
- Strategic framework stipulating the Israel's national priorities in science and technology (http://www.science.co.il/SciencePolicy.asp)

[118] The Joint Baltic Sea Research Programme – Best Practice, Possibilities and Barriers, Kopio Niini Oy, Helsinki 2005, ISSN 951-715-529-8

Model 1: Calls are evaluated and funded at the national level

- The financing organisations involved would agree on a common research theme (on the basis of selected thematic areas in line with the strategic scientific plan).
- The overall theme is open for the national partner's special expert fields and focus areas.
- Consequently, each organisation would launch a call in the approved area and in a timely synchronized way.
- The involved organisations in the DR countries would be responsible for the evaluation as well as funding of the projects.
- Variable geometry is present.

Model 2: Calls are launched and evaluated jointly, funded at the national level

- In the case of creating a virtual common pot, the topic of a call would be agreed (based on the selected thematic areas in line with the strategic scientific plan).
- The call would be launched (managed centrally by DRRIF), with incoming proposals evaluated by an expert group, based on criteria agreed in advance in the founding documents.
- On the basis of winning proposals, each country would finance costs of the respective national applicants, either from the national budget or from structural funds.

Model 3: Calls are launched, evaluated and funded jointly

- In the case of creating a real common pot, the topic of a call would be agreed (based on the selected thematic areas in line with the strategic scientific plan).
- The countries involved would launch a common call, whereby the evaluation of proposals would be realized using the common evaluation procedures, as agreed in the founding documents.
- Proposals with the highest scores would be awarded a grant from the common pot.
- The evaluation, determination of order of proposals and funding within the scope of this model is covered by one organisation – the administrator of the pot.

The table below highlights administrative and legal aspects resulting from individual models.

Table 22: Aspects of DRRIF calls models

	Administrative aspects	National legal aspects
Model 1: Calls are evaluated and funded at the national level	▶ Complexity in reaching a consensus on the selection of a common topic. ▶ Complexity in reaching a consensus on the length of the programme by the funding institutions.	▶ Uncertain ability of funding institutions to reserve funds for the financing of future projects.
Model 2: Calls are launched and evaluated jointly, funded at the national level	▶ Complex harmonization of a common call by the funding institutions. ▶ Necessary consensus of the funding organisations with respect to organisation and funding of common steering. ▶ Necessary consensus on requirements of applications, eligibility, reporting etc. ▶ Necessary consensus on evaluation criteria and guidelines. ▶ Necessary consensus on the composition of an evaluation panel.	▶ Limited control of funding institutions on procedures used for call evaluation.
Model 3: Calls are launched, evaluated and funded jointly	▶ Complexity of reaching an agreement on common steering	▶ Limited impact of funding institutions on control of funds in the pot. ▶ Limited impact on control of funding decisions. ▶ Problematic funding of foreign applicants (from countries not involved in the programme). ▶ Necessary consensus on financing of common steering.

Source: BONUS EEIG. Modified by EY

On the basis of analyses performed and consultations held with the DR representatives, **the most feasible alternative is Model 2: Calls are launched and evaluated jointly, funded at the national level**.

Under this model, **the partners involved from various DR countries will be able to support a common call without the need to allocate funds to a common pot**. This alternative is **legally the most feasible and ensures that the funds of one country will not be used for a project in which the country does not participate**.

10.1.2 Information gathering and development of the research and innovation plan

The development of the research and innovation plan should be preceded by an analysis of the state and resources of R&I in the DR, so as to ensure that the plan reflects the strengths and weaknesses of the region, its competitive advantages and the potential for excellence in the selected thematic areas. This study provides examples of the thematic areas, supported by a thorough analysis of the state of R&I in the DR. We recommend supplementing the results of this study with consultation with potential applicants from the DR which express their interest in specific calls in terms of their capacity and specialization. The comparison of the demand for topics with the results of the analysis may represent sufficient supporting documentation for defining the areas and orientation of the first calls.

The use of information from the analysis is beneficial not only for **the preparation of calls and identification of strategic orientation**, but also for the purposes of **monitoring the success rate of implemented projects and their impact on increasing the level of R&I in the DR**.

DRRIF research and innovation plan

The purpose of the research and innovation plan is to create a framework which includes the DRRIF's vision and strategy and to ensure the definition of strategic, tactical and operational goals in the long, medium and short-term.

An inevitable prerequisite of accepting the research and innovation plan is **its compliance with the main political documents and strategies** (EUSDR, Horizon 2020, Europe 2020, etc.)

The DRRIF research and innovation plan is **important for acquiring funds**, in particular with respect to the funding efforts under Article 185 TFEU. Such a plan serves as a basis for consultations and presentation of the DRRIF project to stakeholders.

In developing the research and innovation plan, we recommend applying a combination of the following two approaches:

- **Top-down**
- **Bottom-up**

The **top-down** approach ensures that the results of respective analyses, political documents and main common calls are reflected in the research and innovation plan. With respect to this approach, we recommend applying analyses included in this study, which provide a sufficient information base. Conversely, the **bottom-up** approach reflects inputs from scientists, students, business sector and other stakeholders.

With respect to the bottom-up approach, we recommend collecting information regarding interest and preferred topics of stakeholders by means of a workshop or by dispatching a questionnaire. Using a combination of these two approaches will ensure that **the topics of calls,** to be subsequently launched under DRRIF, **reflect the current needs and real interests of a wide group of stakeholders**.

We recommend preparing the DRRIF research and innovation plan in parallel with the analysis of DRRIF's available funds, which would allow for minimizing the duration of the strategic phase.

10.1.3 Approval process of DRRIF research and innovation plan and sources of funding

The final DRRIF research and innovation plan must be approved by the DRRIF's highest steering body, consisting of the representatives of key stakeholders. We recommend discussing the draft plan with an expert group, consisting of renowned scientists and representatives of the innovation business environment, which will ensure that the plan presents a set of feasible goals and constitutes a framework to achieve the expected results.

The approval of the plan will conclude the strategic phase of preparing the DRRIF's grant scheme. At the end of this phase, the following will be defined and approved:

- DRRIF's vision, goals and mission
- DRRIF's strategy
- Thematic areas of DRRIF for the next time period
- R&I plan for the following period

We recommend placing an increased emphasis on the strategic phase as it represents the most important phase of DRRIF's formation. A thorough analysis and consultations with key stakeholders are essential for the Fund's sustainable progress.

Should there be an interest in acquiring additional funding under Article 185, it is important to develop a Strategic Research Agenda, which complies with the EU objectives, regional strategies and objectives of the R&I framework programme (H2020).

10.2 Preparation phase

The preparation phase deals with decision-making regarding calls and amounts of grants awarded. The research and innovation plan defines thematic areas, which are of interest to the stakeholders and have the potential to obtain support from the potential sources of funding. Consequently, it is essential to specify **the form of calls and their orientation, the funding rate, number, type and size of supported projects, while defining eligible beneficiaries and eligible areas for funding**.

10.2.1 Proposal of the nature of calls

In the following section, we list the attributes of calls which need to be decided before the calls are launched. However, a final decision about the DRRIF thematic areas still had not been made as of February 2015. Thus, we only provide some alternatives and options. Once the volume of funds and thematic areas are determined, it will be possible to define the specifics of the individual attributes of calls.

10.2.1.1 Form of calls

Grants awarded by means of calls may have one or more of the following **forms**:

- Provided through calls for proposals of projects in vertical thematic areas of DRRIF
- Provided through calls for applications for additional funding for existing projects
- Provided through calls for proposals of projects in the preparation phase – technical assistance

Calls for proposals of projects in vertical thematic areas of DRRIF
The performed analyses of indicators and SWOT analyses revealed that R&D in the DR is considerably underfinanced in most countries, the number of patents is low, the interconnectivity between the private and public sector in the area of R&I is at a low level and there is a need to start international cooperation among the DR countries. Direct funding of projects by means of calls under DRRIF could contribute to the resolution of these problems and could increase the level of R&I in the DR. Individual calls should reflect selected horizontal priorities and specifically focus on promoting vertical areas.

The added value of this form of funding is, for example, the possibility to directly promote specific projects in areas which are not supported by other grant schemes.

Calls applying for additional funding for existing projects
We recommend designating a certain part of calls for additional funding for the existing successful projects that contribute to the development of R&I in the DR, but where the acquired funds were not sufficient. With respect to this form of a call, we recommend placing an emphasis on the internationality of projects, and/or, a partnership of several DR countries to be stated as a condition of awarding a grant. This would result in R&I support in the DR at a lower cost.

The added value of this form of funding is, for example, the possibility of providing funds for international cooperation of two simultaneously running projects, supported from another grant scheme at the national level.

Calls for proposals of projects in the preparation phase – technical assistance
An analysis of participation of the DR countries in EU programmes and the low success rate of most countries underlined the need to support the submission of successful projects. As the funds in DRRIF will be limited, even financially less challenging calls, contributing to the preparation of high-quality proposals with the potential of success in Horizon 2020 or another grant scheme, may boost R&I in the DR.

The added value of this form of funding is, for example, the possibility to fund mentoring in preparing proposals.

It is also possible to choose a combination of different forms of calls – the ratio of funds allocated to each individual type of call should be defined by the research and innovation plan.

10.2.1.2 Orientation of calls

In the following step of preparing calls, it is necessary to decide which activities DRRIF should award grants, i.e., their orientation. The grants could be awarded for the following activities[119]:

Support of tangible investment

- Largely used for building infrastructure of different sizes (laboratories, equipment, devices).
- Grants provided in order to fund such projects are among the most expensive ones.
- Many of the DR countries have pointed out the insufficient research infrastructure and the resulting low level of R&D.
- Grants provided for tangible investments would mostly bring a high added value to countries with obsolete R&D equipment and underfinanced R&D.

Support of capacity building

- Strengthening of skills, competences, capabilities of institutions and people in order to overcome barriers and problems associated with the development of R&I excellence in the region. Networking projects are included in this category.
- Connecting excellent scientists by means of common projects which focus on sharing research, dissemination of experience in the area of innovation, or networking of talented people from various DR countries.
- Grants provided for this type of projects would be less expensive, and the number of supported projects could be higher due to lower funding requirements.

Support of planning and technical assistance

- This activity includes projects which either focus on various development possibilities or address specific problems related to governance.
- These are the least expensive projects which could be oriented towards the preparation phase of projects.
- Acquisition of financial support in the preparation phase is difficult and many existing grant schemes fail to provide such funding.
- Obtaining funds for the preparation phase may be very difficult in particular for young scientists and start-up innovators with strong potential.

It is also possible to choose a combination of calls with different orientations – the ratio of funds allocated to individual types should be defined by the R&I plan.

[119] Metis, Analysis of need for financial Instruments in EU Strategy for Danube Region

10.2.1.3 Types of call

The decision-making process regarding the nature of calls also includes choosing the right type. The individual types of call can be mixed and combined to best fit the DRRIF grant scheme.

With respect to applicants:

Open calls

- The call is publically announced and all applicants are free to submit a grant application (if they meet general requirements set by the call).

Restricted calls

- Restricted calls are aimed at a specific target group and only selected participants are invited to submit a proposal.

With respect to call duration:

Competitive calls

- The calls are funded using a competitive system, i.e., proposals are evaluated after the deadline. Only the best projects, according to ranking criteria, are selected.

Non-competitive calls

- The receipt and assessment of project applications runs continuously and the applications are usually only checked against the exclusion and eligibility criteria. All projects meeting these criteria receive funding until the financial allocation of the call has been fully drawn.

With respect to project type:

- Targeted calls: focusing on specific themes / regions / types of applicants / target groups
- Calls for classical projects: covering all areas under a given investment priority / specific objective
- Calls for strategic, innovative and pilot projects

We believe that open, competitive and target calls are the most beneficial for DRRIF; however, the final decision depends on the interests of the stakeholders involved.

10.2.1.4 Size of funded projects and share of funding

The size of funded projects represents the next criterion which needs to be addressed during the preparation of calls. As currently the potential size of DRRIF is not specified, it is difficult to determine, in terms of their funding requirements, which projects could be supported.

The following are possibilities of project funding based on size:

- **Funding of a limited number of large projects** with considerable potential benefits for the region at a high risk
- **Funding of a larger number of small projects** with less benefits and greater risk diversification
- **Balanced combination of the alternatives above** diversifying risks between larger and smaller projects with various potential benefits for the DR

The topic of calls must also be reflected when considering the alternatives of partial funding. In the case of innovation projects there is a presumption that partial funding may be interesting for applicants. However, the acquisition of additional funds to finance, for example, applied research, could be difficult. A further possibility is a combination of partial funding from DRRIF with another grant scheme, such as Horizon 2020 or structural funds. At present, synergistic possibilities are debated very intensively at both the national and European levels.

Furthermore, funding is also linked to decisions on the duration of projects, upper and lower limit of a grant, eligible costs and other areas which we consider too specific and do not address further.

10.2.1.5 Eligible applicants

We recommend that the definition of eligible applicants who will be able to apply for grants from DRRIF is based on a detailed analysis of the state of R&I in the DR. **We identified the following potential groups of applicants for DRRIF grants to finance their R&I projects:**

- Scientists and researchers
- Universities and research institutions
- Small and medium-sized innovative enterprises
- Other R&I public institutions

We recommend promoting partnership building among various groups of eligible applicants through, for example, the following orientation of calls:

- Consortia of applicants from various DR countries (or countries outside the DR) in order to promote international cooperation
- Consortia of applicants from more developed countries with applicants from less developed countries
- Consortia of applicants within the triple helix concept in order to support cooperation of various sectors

During our SWOT, indicator analyses and examples of thematic areas, we identified the following areas, which need to be taken into account when determining the eligible applicants:

- Support of small and medium-sized innovative enterprises
- Involvement of students and young scientists in R&I projects
- Establishment of partnerships between the private and public sectors in the area of R&I projects
- Support of cooperation among the DR countries in the area of R&I projects

Based on the best practices and lessons learned from the BONUS EEIG programme, we recommend that the areas described in the previous chapters are assigned and further elaborated on by working groups during the DRRIF preparation phase. It is possible to supplement or combine the listed alternatives, depending on the needs of the region and stakeholders, in order to achieve the maximum possible added value to DRRIF.

As DRRIF should aim at supporting international cooperation in the DR and connecting its scientists, we recommend launching common calls which will be agreed on by the highest number of DR countries, whereby one of the conditions will be the participation of several partners from various DR countries. Variable geometry is possible. A combination of partners from more developed and less developed countries would contribute to achieving cohesion in the region.

10.2.1.6 Comparison of the nature of calls within existing programmes

In order to compare the best practices and lessons learned in launching calls within existing programmes, we have established the following table which compares the size of a programme (the volume of funds), thematic orientation of a project and the nature of its calls. For comparison purposes, we have selected programmes which successfully operate under Article 185 TFEU and Horizon 2020, and promote R&D.

Table 23: Comparison of the nature of calls within existing programmes

Programme name	**ERC** (European Research Council)	**Bonus EEIG**	**EMRP** (European Metrology Research Programme)	**EUROSTARS** (A joint research programme for research performing SMEs and their partners)
Programme focus	R&D	Baltic Sea research	Metrology	Innovative SMEs
Total budget	13.1bn €	100 million €	64.6 million €	€ 1.14bn €
Nature of calls	► Calls for proposals of projects in any vertical area ► Calls for applications for additional funding to existing projects	► Calls for proposals of projects in designated vertical areas	► Calls for proposals for projects in designated vertical areas	► Calls for applications for additional funding for existing programmes ► Calls for proposals for projects in a preparation phase
Orientation of calls	► Tangible investment ► Capacity building	► Tangible investment ► Capacity building	► Tangible investment ► Capacity building	► Planning and technical assistance ► Capacity building
Size of funded projects	► Funding of a greater number of smaller and larger projects ► The funding limit ranges from EUR 150,000 (for additional funding of a project) to EUR 15 million for groups of researchers	► Funding of greater number of smaller projects ► Funding of projects amounts to approx. EUR 500,000	► Funding of smaller and larger projects ► The size of funded projects ranges from EUR 200,000 to EUR 3.5 million	►Funding of several smaller projects ►The amount of funding depends on the country where the applicant is located
Rate of funding	Majority funding	Majority funding	Majority funding	Depends on the country
Eligible applicants	► Individual scientist or researcher ► Groups of two to four scientists and researchers from various countries	Collaborating groups of: ► Scientists and researchers ► Universities and research institutions ► Small and medium-sized innovation enterprises	► Consortia of applicants from various EU countries in order to support international cooperation ► Consortia of applicants from more developed countries with applicants from less developed countries, consisting of: ► Scientists and researchers ► Universities and research institutions	► Partnerships of innovative SMEs, universities and/or research organisations from a minimum of two EU countries or acceding states

Source: Official websites of the programmes; processed by EY

The following trends resulted from the comparison of existing programmes supporting R&D (as depicted in the table above):

- The programmes are dominated by **calls in specific vertical areas and applications for additional funding of the existing projects**. Calls for proposals of projects in a preparation phase are supported only by one of the programmes compared.
- The projects mostly concentrate on **capacity building and tangible investment**. Planning and technical assistance for projects is funded only by one of the four programmes compared.
- **Majority funding in the form of grants** prevails in the programmes which are primarily aimed at supporting scientists and researchers; on the other hand, the EUROSTARS programme, focusing on small and medium-sized enterprises, uses minority funding to a greater extent.
- All four analysed programmes finance **several smaller projects;** however, only half of them – programmes with a budget over EUR 1 billion – finance more costly types of projects.
- The programmes are primarily aimed at supporting **scientists and researchers,** followed by support of universities, research organisations and small and medium sized enterprises. The involvement of several entities from various countries is often a prerequisite for the participation in the programme.

The comparison above demonstrates the current trends in the support of R&I by smaller grant schemes. The nature of calls is considerably influenced by the resources and size of a grant scheme. At present, it is too early to define the nature of DRRIF calls as long as thematic areas and the amount of available funds are not defined.

After deciding on thematic areas and the amount of available funds, we recommend gathering opinions (by means of a questionnaire) of stakeholders on the most appropriate form/nature of DRRIF calls.

10.2.2 Approval process of the nature of calls

The nature of grants and the method of distributing grants under DRRIF must be approved by the highest steering body. Similarly to the previous phase, we recommend consulting the proposed nature of calls with an expert group that will provide recommendations on the call set-up.

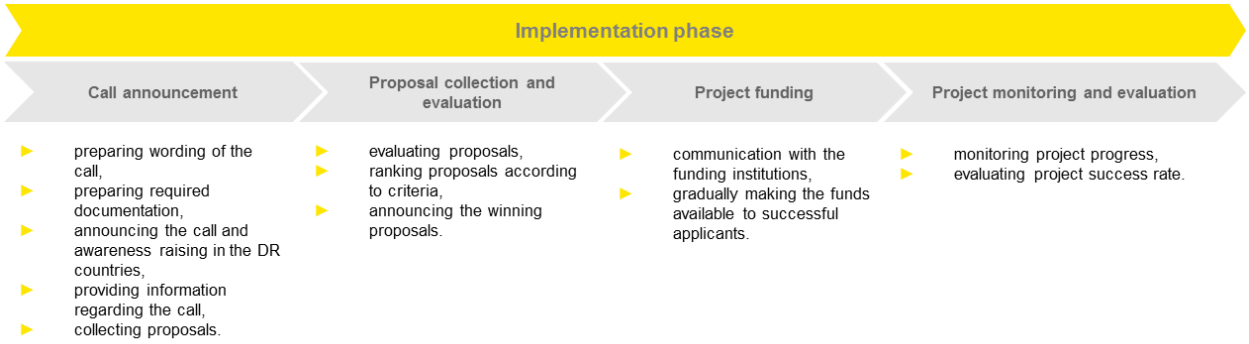
As in the strategic phase, we recommend applying the bottom-up approach for verification purposes with potential beneficiaries, whether the proposed nature of calls reflects their needs and does not create an unnecessary burden. We consider it important to involve potential beneficiaries in the process of developing a grant scheme as their interest is of key importance to valuable implementation of the DRRIF's grant scheme among other (competitive) schemes and programmes.

By approving the nature of calls, the preparation phase will be finalised, the research and innovation plan from the strategic phase adopted as well as the criteria of awarding a grant clearly specified.

10.3 Implementation phase

The implementation phase of the grant scheme includes the following cycle: announcement of calls, collection and evaluation of proposals, funding of projects, monitoring and evaluation of supported project results, collection of best practices and announcement of new calls.

Figure 15: Steps under the implementation phase of launching DRRIF's calls



Source: Processed by EY

Under the implementation phase, we describe steps only in general terms since the resolution with respect to thematic areas or the nature of DRIFF's calls has yet to be made.

- **Call announcement –** Staffing with respect to a call – its wording, required documentation, dissemination, collection of proposals, etc. – should be provided by the DRRIF's Secretariat or a specialized working group. We deal with staffing in Chapter 8: Governance model.

- **Proposal collection and evaluation –** For the purposes of proposal evaluation, we recommend creating a pool of evaluators with sufficient scientific qualifications and experience in relevant thematic areas**, from which a panel of evaluators will be selected according to incoming proposals.** When selecting the composition of a panel of evaluators, it is necessary to reflect geographical, national objectivity and gender equality, while avoiding conflicts of interest. We recommend taking into consideration the following options during the decision-making on the evaluation procedures:
  - **Evaluation of proposals in one step** – a method used with respect to smaller programmes and grant schemes. Applicants will be asked to submit their proposals in one step that will be then assessed by a panel of evaluators and ranked on the basis of the extent to which they meet the criteria, in descending order.

- **Evaluation of proposals in two steps –** a method used in larger programmes (e.g., Horizon 2020) – in the first step, applicants will submit their declaration of intention to participate in a call for proposals, with a brief description of a project. The panel of evaluators will determine the order of expressed intentions and consequently, applicants with the best rating will be contacted to submit full proposals.

- In the case of evaluating proposals in two steps, we recommend assessing the declarations of intent using the practices from BONUS EEIG based on the following criteria: relevance to a topic of call, transnational added value, scientific/innovative quality of a proposal, quality of consortium's composition and project originality.
- In the step of evaluating full proposals, we recommend assessing proposals on the basis of the following criteria, used within Horizon 2020: **excellence, impact on DR development as well as implementation quality and effectiveness**. This approach will allow support of projects that were evaluated in Horizon as excellent but which could not have been supported due to lack of capacity.

- **Project funding –** After evaluating the proposals, it is necessary to contact funding institutions from the given country with a request for financial support of their representatives if the virtual common pot is used. This step will not be necessary in the case of the common pot and projects will be funded directly from DRRIF. Considering more costly projects with duration of more than a year, we recommend releasing funds on a gradual basis over the duration of a project, in order to monitor the project and its partial results on an ongoing basis.

- **Project monitoring and evaluation –** Should DRRIF operate in the long term and be successful, it is necessary that it promotes projects which deliver the desired results with a positive impact on the DR. This should be assisted by continues monitoring of projects and evaluation of their impact and alignment with research and innovation plan after their termination.

10.4 Conclusions of the approach to development of the DRRIF grant scheme and calls

The following key findings result from the approach to developing the grant scheme:

- Development of the grant scheme represents **a medium to long-term process** that assumes **political will and long-term commitment** of several DR countries as the main preconditions.
- Development of **the DRRIF research and innovation plan** is crucial for the sustainability of the grant scheme.
- A pre-requisite for developing the research and innovation plan is **the decision on thematic areas, which is necessary for the identification of feasible funding sources**.
- In making decisions on the nature of calls, we recommend **taking into account the views and needs of potential beneficiaries,** applying the bottom-up approach.

The final decision-making process, used in all phases of developing the grant scheme, must be approved by **the highest steering body.**

11. Definition of steps for DRRIF's implementation

The aim of this chapter is to define steps for DRRIF's implementation, resulting in its establishment on schedule, within the budget and in a manner meeting the expectations of the involved (co-funding) DR countries. Tools used to achieve this mainly include the project plan of activities (in the form of a Gantt chart) and a draft of DRRIF's operation framework budget. The project plan aims to design the scope and sequence of steps for individuals and countries responsible for DRRIF's implementation. The budget, within this chapter, is aimed at supporting the decision-making process for implementation alternatives.

In Chapter 8 (Potential institutional forms of DRRIF), we suggested three forms of DRRIF, i.e., DRRIF as a Fund, DRRIF as a Funding Network and DRRIF as a Support Centre.

On the basis of DRRIF working group discussions held on 17 March 2015 in Vienna, the form of DRRIF as a Fund is currently considered the least feasible option, due to limited funds of the countries, complexity of its establishment and potential overlapping regional activities. For these reasons, we are going to define the implementation steps of just two alternatives – DRRIF as a Funding Network (11.1) and DRRIF as a Support Centre (11.2).

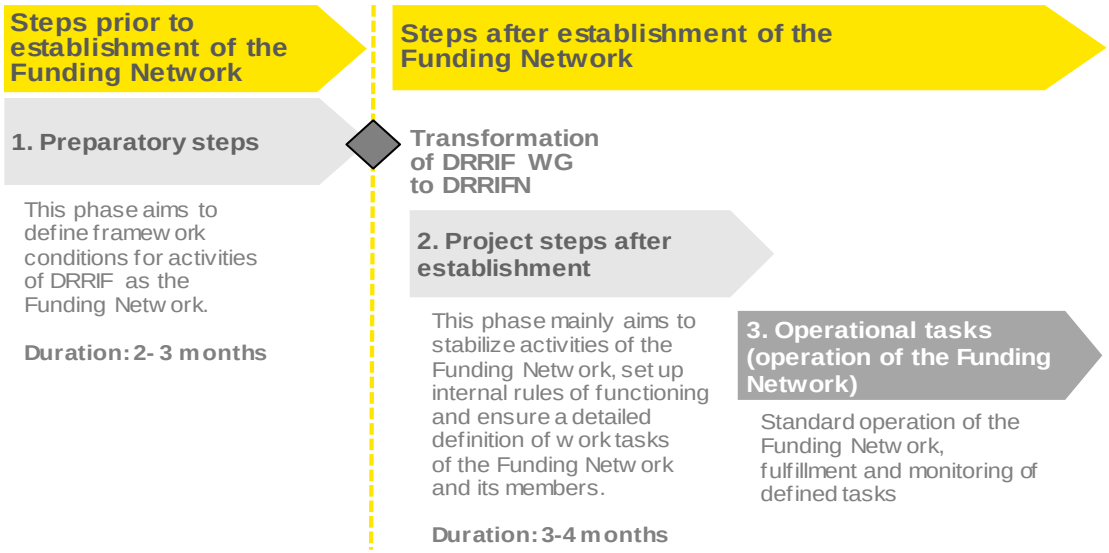
11.1 Preparation of Funding Network implementation

The following section describes preparatory steps preceding the successful implementation of the Funding Network and the main steps after its establishment.

11.1.1 Steps towards implementation

The proposal of the Funding Network's operation is based on the existing activities of the DRRIF Working Group. As a result, the steps necessary for the Network's implementation focus more on defining rules and procedures/guidelines for cooperation among the DR representatives, given the fact that the DRRIF Working Group is to be transformed into the DRRI Funding Network (DRRIFN).

Figure 16: Scheme of preparatory steps towards implementation of DRRI Funding Network (DRRIFN)



Source: processed by EY

Steps prior to the establishment of the Funding Network

As the first step prior to the establishment of the Funding Network, we recommend organizing a workshop of the DRRIF Working Group, whose agenda will be an active debate of DR representatives on the following:

- **Specifying the vision** and **defining concrete objectives** of the Funding Network
- **Rules concerning the internal organisation** of the Funding Network:
  - Proposal of model of rotating Chair,
  - Definition of powers, roles and tasks of a Chair and other members of the Funding Network
  - Regularity and form of meetings (face-to-face, video conferences, virtual teams, etc.)
  - Creation of infrastructure for efficient collection, sharing and use of information on ongoing and planned initiatives, schemes and programmes, as well as definition of means of internal communication among the members of the Funding Network
- **Members of the Funding Network**:
  - Members of the existing DRRIF Working Group
  - Potential new members from other organisations of DR countries or European institutions
- **Drafting and signing of the Memorandum of Understanding** (MoU) which would bind the involved DR representatives into fulfilling the set out tasks, in line with the objectives of the Funding Network, in the long term. In addition to the rules concerning the internal organisation of the Funding Network, the MoU should also include:
  - Division of responsibility for monitoring ongoing initiatives in the DR
  - Assigning areas of responsibility for cooperation with the existing schemes/programmes
  - Means of solving potential disagreements and their escalation

Steps after the establishment of the Funding Network

Project steps after establishment – the suggested main activities under this phase are as follows:

- **Review of fulfilment of the Funding Network's first tasks** (defined prior to its establishment) which should be performed by the country holding the Chair.
- Regular **consultations with representatives of the involved countries** to assess their satisfaction with the Funding Network's activities and development
- In terms of project management, **a detailed allocation of operational tasks** is crucial, for the purposes of streamlining cooperation within the Funding Network and creating synergies with external organisations
- Ongoing monitoring of feedback from stakeholders and continuous improvement of network operations

Operational tasks (operation of the Funding Network)

A detailed description of activities is included in Chapter 8: Potential institutional forms of DRRIF. We recommend that operational tasks also include the review of fulfilment of tasks for which the particular representatives are responsible.

11.1.2 Budget

If the activities as proposed under Chapter 8: Potential institutional forms of DRRIF are taken into account, the existing DRRIF Working Group would be transformed into the Funding Network, if established.

For this reason, we do not expect additional costs to be incurred. Costs of organizing meetings of the representatives of the Funding Network (e.g., meeting room rental) would be borne by a country organizing the particular meeting (Chair following the rotating Presidency principles).

Depending on the final definition of objectives and the plan of activities of the Funding Network, additional cost[120] may be incurred by:

- Organizing workshops with potential partners and funders
- Conducting necessary studies and assessments (related to the progress of the activities etc.)

We assume that the form and amount of co-participation of individual DR countries in such additional costs would be solved on an ad-hoc basis during meetings of the representatives of the DR countries.

11.1.3 Lessons learned from SEE-ERA.Net PLUS

SEE-ERA.Net Plus was a project aiming at furthering integration of the Western Balkan Countries (WBC) and their key research communities into the European Research Area (ERA) and enhancing bilateral R&D cooperation with the WBC to raise its activity to the European level. Through a consortium of 17 partners from 14 countries SEE-ERA.Net Plus supported:

- Execution of R&D with WBC following strategic priorities at European level
- Continued integration of bilateral RTD initiatives into multilateral, jointly agreed, activities with high level of synergy
- Reduction of duplicated effort across Europe, and avoidance of development of unnecessary parallel solutions
- Strengthening of research communities from new Member States and WBC and preparing them for participation in FP7

We see an overlap of SEE-ERA.Net Plus activities with the proposed activities of a Funding Network and therefore we recommend referring to the example of SEE-ERA.Net Plus regarding the launching a joint call[121]:

- Time schedule of the projects should be adequate, especially contract negotiations
- Rules and regulations in the Call text must be very precise to avoid misunderstanding
- Enough room for communication is crucial, more offers for virtual meetings
- Simplified reporting and accounting, if possible

[120] In case of establishment both, Support Centre and Funding Network, Support Centre will bear the cost.
[121] For more information please refer to: www.see-era.net

These are the most important basics of the implementation taken from the example of SEE-ERA.Net[122]:

- Responsibility of the Joint Call Secretariat concerning the national funds and the contribution of the European Commission
- Transparency
- Rules and regulations should be laid down in national annexes of the Call text

11.2 Preparation of Support Centre implementation

In this section, we will define steps which need to be performed prior to and after the establishment of the Support Centre, as well as a breakdown of costs over the first and subsequent years of the Support Centre's existence.

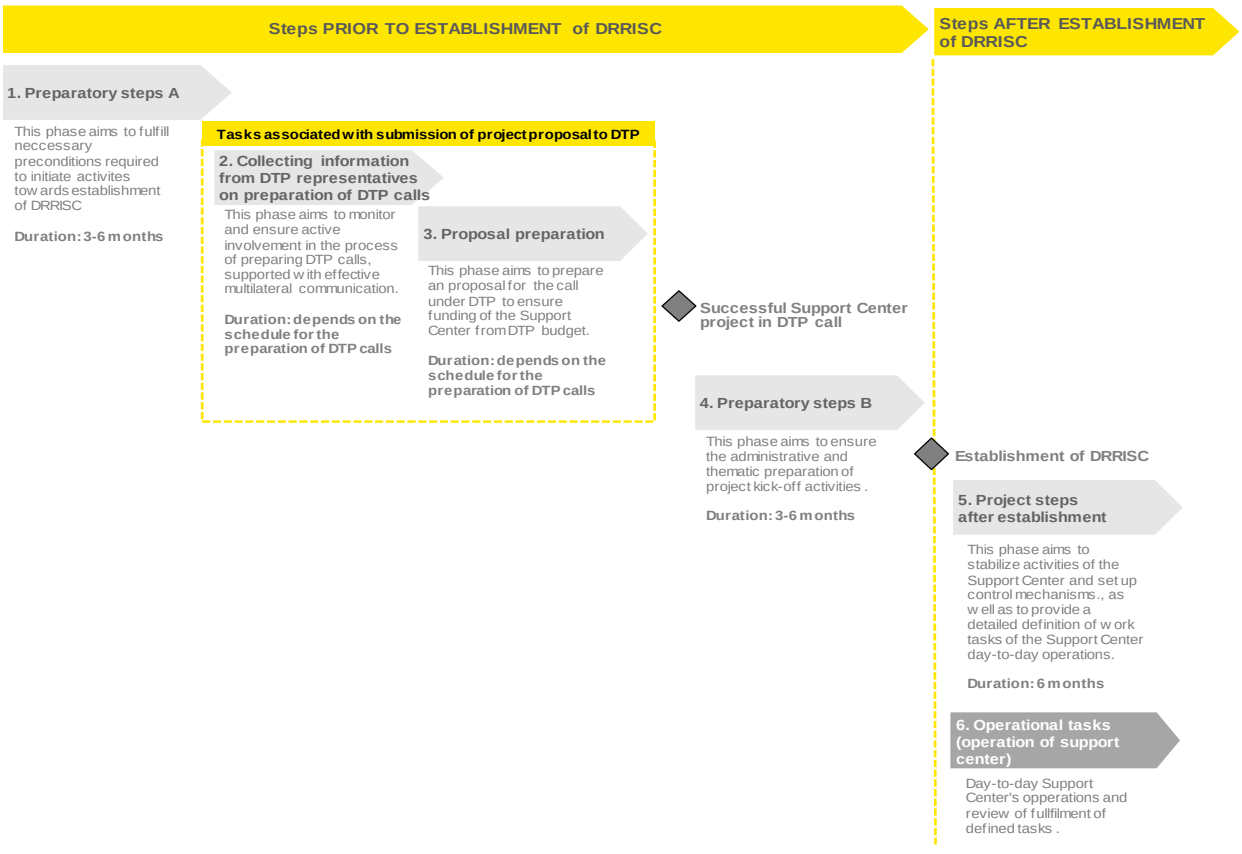
The implementation of the Support Centre does not conflict with the potential existence of a Funding Network as described above. On the contrary, it creates new possibilities of cooperation (as described in chapter 8). Therefore we have included a description of preparatory steps leading towards cooperation of the Support Centre and the Funding Network, as well as a separate budgeted activity, into this chapter (see 11.2.1 and 11.2.2).

11.2.1 Steps towards implementation

The following scheme shows the main steps recommended by us in order to successfully establish and implement the Danube Region Research and Innovation Support Centre (DRRICS), divided into steps before and after its establishment.

Prior to establishing the Support Centre, we recommend realizing preparatory steps A, collecting information on preparation of Danube Transnational Programme (DTP)[123] application, preparing a proposal and preparatory steps B.

Figure 17: Scheme of preparatory steps of DRRISC implementation



Source: processed by EY

[122] Presentation of Schache Ch., Hanatschek R., (International Bureau of the Federal Ministry of Education and Research at the Project Management Agency c/o German Aerospace Centre (DLR)) *Implementation of the SEE-ERA.Net PLUS Joint Call*, December 4, 2012 Belgrade, Serbia
[123] For more information on DTP refer to subchapter 9.3.2.1 Danube Transnational Programme

Preparatory steps A – the suggested main activities under this phase are as follows:

- **Signing a memorandum of cooperation** among DR countries that plan to participate in the implementation and consequently, participate in the Support Centre's activities. It should define framework rules and goals of the cooperation. At this stage, the memorandum should be reasonably binding for the participating countries (in order not to discourage potential participants with excessive commitments).
- **Workshop for involved countries**, aimed at specifying tasks of individual countries which will be involved in the process of the Support Centre's implementation. Prior to the beginning of the workshop, the involved DR countries will be required to appoint their responsible representatives.
- **Allocation of responsibility among countries** is important in the initial implementation phase, especially in relation to submitting the proposal in a DTP call. We recommend appointing one country which will be in charge of coordinating representatives of the remaining participating states and bear the main responsibility for the preparation of a proposal to the DTP call.
- **Decision on the form of the Support Centre and its priority areas.** During the preparatory steps, it will be necessary to specify the details on the institutional form of the Support Centre, i.e., decision on a country (organisation) in which the Support Centre will be seated and which will be responsible for coordinating the DTP project. Furthermore, it is necessary for the countries involved to agree on the priority areas to be focused on by the Support Centre (and if the Support Centre should be thematically focused) as well as on the proportion of activities in individual areas.
- **Decision on the extent of cooperation with the Funding Network**. Assuming that the Funding Network is established, it is necessary that representatives of the DR countries determine the extent and details of cooperation with it. Specific cooperation activities will depend on the final form and tasks of both the Funding Network and the Support Centre. This should be aimed at creating synergies to fulfil the mission and vision of both the mechanisms of R&I support in the DR.
- **Preliminary agreement on co-funding** should be based on the memorandum of cooperation and specify the extent of co-funding of the Support Centre's activities by individual DR states. It may be based on the principles of variable geometry; however, the co-funding mechanism should be concrete and specific.

Collection of information on the preparation of DTP calls – the suggested main activities under this phase are as follows:

- **Establishing contact with the DTP.** The DTP supports innovations and international cooperation; nevertheless, there is no specific reference made to DRRIF. Accordingly, communication with the representatives of this programme on the possibilities of acquiring financial assistance is important.
- **Verifying the possibility that in the frame of DTP a call will be launched for a comparable activity as a Support Centre and the volume of potential funding resources for the call**. Within communication with the representatives of DTP, it is necessary to focus on their option of launching a call for proposals, which would meet the needs of the Support Centre. At the same time, it is important to discuss and collect information (within the DTP) on potential funding sources for the Support Centre's project as well as the possible length of the project. These two factors may significantly influence the extent of activities which the Support Centre will be capable of performing.

Preparation of a proposal (to DTP call) – the suggested main activities under this phase are as follows:

- **Preparing a proposal concept** upon an agreement made by countries involved in the Support Centre's project. One of the countries should be given the leading role of coordinator and be responsible for the wording of the proposal's concept.
- **Review by the involved countries** may have several rounds.
- **Comments raised by the countries will be incorporated** by the country with the leading role in the preparation of the proposal concept.
- **The final agreement on co-funding** will be based on a preliminary agreement, taking into account aspects arising from the DTP requirements for preparation of an application and comments of individual DR countries in the process of preparing a proposal. If DTP project is realized, we expect 85% of funding to come from DTP and 15% from the own sources of participating countries (according to DTP funding rules).
- **Setting a specific date of the Support Centre's establishment** on the basis of an agreement made by the countries and time capacities of its founding members.
- **Setting and describing basic procedures and internal rules for functioning** of the Support Centre that will serve as a directive for employees on how to proceed with respect to individual activities, in compliance with the effective functioning of the Support Centre.
- **Submission of a proposal to DTP** will be possible upon the final agreement of involved countries on activities and extent of their co-funding.

Preparatory steps B – the suggested main activities under this phase are as follows:

If successful in DTP

- **Recruiting and selecting new members of the Support Centre's team.** The criteria for selecting the Support Centre project's employees should result from activities on which the Support Centre will focus. The nationality principle should not play a role in this respect; employees should be selected on the basis of their compliance with qualification requirements. We propose English to be the communication language of the Support Centre.
- **Establishing a medium-term plan and communication strategy**. We suggest preparing these two strategic documents at least as a framework based on which the Support Centre will function prior to its formal establishment (the official beginning of the project).

If the application for a grant to be provided from DTP is not successful – **a decision on an alternative source of funding will need to be made.**

We split the steps after the establishment of the Support Centre into project steps after the establishment and operational tasks (the operation of the Support Centre).

Project steps after the establishment – the suggested main activities under this phase are as follows:

- **Review of fulfilment of the Support Centre's first tasks,** which should be performed by the Support Centre's project manager (or externally if agreed by founding countries) with the duty of reporting results of such a review to the representatives of the founding countries.
- **Setting and stabilizing cooperation with the DRRIF working group or** Funding Network on the basis of a previous decision made on the scope and details of cooperation.
- Regular **consultations with co-funding countries and the stakeholders** to assess their satisfaction with the Support Centre's development.

Operational tasks (the operation of the Support Centre) – the suggested areas of operations[124] under this phase are as follows:

- Support of applicants
- Organisation of events
- Support in preparing selected projects
- External services – scientific writing and review, advisory board
- Management and coordination
- Strategic tasks
- Dissemination of information, communication
- Monitoring and evaluation of Support Centre's performance

[124] The fields of operation should interfere with the work packages of the project proposal in DTP. The above areas are only suggestions, and will vary according to the final project design of the Support Centre submitted to DTP

11.2.2 Budget

The draft budget is based on the description of the Support Centre's activities, as defined in Chapter 8. The number of activities and their extent may vary and we expect their finalisation during the preparatory phase A. Calculation of expenses used in the budget is set out and described on the following pages. The budget in this phase is preparatory and indicative. The level of accuracy of the calculations undertaken is around +/- 20%.

Table 24: Support Centre – budget breakdown by activity

Activity	Amount per year (EUR)	Share	Amount for the first year (EUR)	Share for the first year
Support of applicants (total per activity)	**847,440**	89%	**521,090**	74%
Personnel cost	192,000	20.1%	192,000	27.4%
Organisation of events	60,000	6.3%	15,000	2.1%
Support in preparing selected projects	360,000	37.8%	180,000	25.7%
External services – scientific writing	120,000	12.6%	60,000	8.6%
External services – scientific review	40,000	4.2%	20,000	2.9%
External services – advisory board	20,000	2.1%	20,000	2.9%
Overhead cost	55,440	5.8%	34,090	4.9%
Project management (total per activity)	**48,150**	8%	**136,960**	20%
Personnel cost	24,000	3.9%	24,000	3.4%
External services – financial services	6,000	1.0%	6,000	0.9%
External services – IT services	15,000	2.4%	30,000	4.3%
External services – recruitment of FTEs, selection of an advisory board, scientific writing, scientific review	0	0.0%	68,000	9.7%
Overhead cost	3,150	0.5%	8,960	1.3%
Cooperation with Funding Network (total per activity)	**57,780**	6%	**41,730**	6%
Personnel cost	24,000	2.5%	24,000	3.4%
Organisation of events	30,000	3.1%	15,000	2.1%
Overhead cost	3,780	0.4%	2,730	0.4%
Total per year	**953,370**	100%	**699,780**	100%

Source: processed and calculated by EY

In the case of a four-year project, the demonstration framework budget shows that the estimated expenditures of the Support Centre total **EUR 3,559,890** (699,780 + 3 * 953,370 = EUR 3,559,890).

Should the Support Centre's project be funded at 85% from the Danube Transnational Programme and 15% from own sources of the involved countries, the nominal distribution of funding would be as follows:

Danube Transnational Programme:

- 3,559,890 * 85% = **EUR 3,025,907**
- With the projected DTP budget for a seven-year period in the amount of around EUR 273 million, **the DTP contribution** to the Support Centre would be **approximately 1%** of its entire budget (3,025,907 / 273,000,000 = **1.11%**).

Own sources of the participating countries:

- 3,559,890 * 15% = **EUR 533,983**
- With an initial involvement of, for example, five countries and equal co-funding distribution, **the contribution of one country over a four-year period would be EUR 106,797** (533,983 / 5 = EUR 106,796.70), i.e., on average EUR 26,699 per year (106,796.70 / 4 = EUR 26,699.18).

We based the draft budget of the Support Centre on the following **proposed activities**:

Activity: Support of applicants

Personnel cost

- Projection of four full-time employees
- Total average monthly cost per employee projected at EUR 4,000 (total costs of labour,
- EUR 4,000 * four employees * 12 months = EUR 192,000

Organisation of events

- Organisation of four workshops per year
- Cost per workshop estimated at EUR 15,000
- Four workshops * EUR 15,000 = EUR 60,000
- One workshop planned in the first year

Support in preparing selected projects

- Preparation of eight selected projects per year
- Reimbursement of costs for meetings of consortiums, provision of premises, coaching, etc.
- Support of one project up to EUR 45,000
- Eight projects * EUR 45,000 = EUR 360,000
- Support of four projects planned in the first year

External services – Scientific writing

- Support in writing project applications (scientific writing)
- Scientific writing of eight projects per year
- Cost of scientific writing of one project up to EUR 15,000
- Eight projects * EUR 15,000 = EUR 120,000
- Support of four projects planned in the first year

External services – Scientific review

- Support in writing project applications (scientific assessment)
- Scientific assessment of 10 projects per year
- Cost of scientific assessment of one project up to EUR 4,000
- Ten projects * EUR 4,000 = EUR 40,000
- Support of five projects planned in the first year

External services – Advisory board

- Ensuring the activity of an ad-hoc advisory body
- Selection of projects for support (based on internally pre-set criteria), ad-hoc advisory services
- One call for proposals (projects to be supported) per year
- Five paid members of the advisory body
- Remuneration for one member of the advisory body of EUR 4,000 per year
- One call * five paid members * EUR 4,000 = EUR 20,000

Overhead cost

- A flat rate of 7%, i.e., 7% of the total other costs
- Maintenance of building, rent, energy, insurance, consumer goods, etc.

Activity: Project management

Personnel cost

- Projection of one employee working part-time (50% of FTE)
- Total average monthly cost per employee projected at EUR 4,000 (total cost of labour)
- EUR 4,000 * one employee * 50% * 12 months = EUR 24,000

External services – financial services

- Accounting, wages, etc.
- Projection of EUR 6,000 per year – a flat rate

External services – IT services

- IT hardware and software
- IT servicing
- Projection of EUR 15,000 per year – a flat rate
- A higher estimated amount in the first year due to initial costs (EUR 30,000)

External services in the first year of the Support Centre's existence

- Recruitment
- Selection of an advisory board
- Pooling of co-workers for the scientific writing and scientific assessment activities
- Projection of 20% from the estimated first-year costs of selected employees and external services
- 340,000 * 20% = EUR 68,000
- Amount of EUR 0 after the first year

Overhead cost

- A flat rate of 7%, i.e., 7% of the total other costs
- Maintenance of buildings, rent, energy, insurance, consumer goods, etc.

Activity: Cooperation with Funding Network

Personnel cost

- Projection of one employee working part-time (50% of FTE) who can also act as a secretariat of a Financing Network
- Total average monthly cost per employee projected at EUR 4,000 (total cost of labour)
- EUR 4,000 * one employee * 50% * 12 months = EUR 24,000

Organisation of events

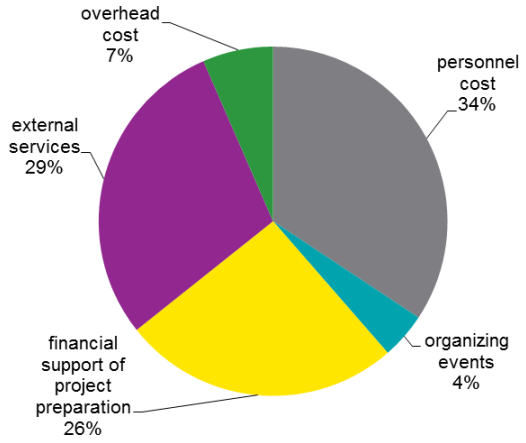
- Organisation of two workshops for Funding Network per year
- Cost of one workshop projected at EUR 15,000
- Two workshops * EUR 15,000 = EUR 30,000
- One workshop planned in the first year

Overhead cost

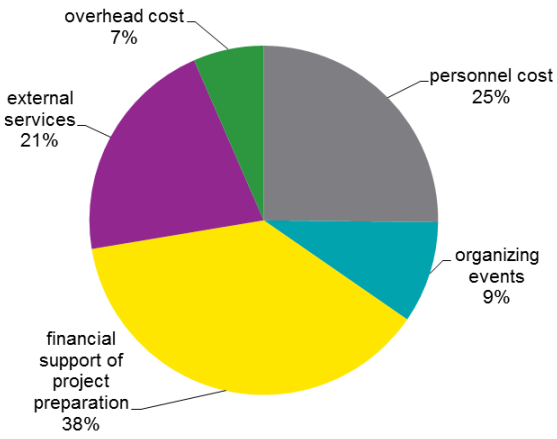
- A flat rate of 7%, i.e., 7% of the total other cost
- Maintenance of buildings, rent, energy, insurance, consumer goods, etc.

In the graphs below, we show an overview of shares of budgetary items by expenditure for the first year and for subsequent years.

Graph 18: Share of budgetary items – first year



Graph 19: Share of budgetary items – subseq. years



Source: processed by EY

The main share of total cost of the Support Centre is represented by personnel costs. In terms of the provided added value, the most important activities of the Support Centre are organisation of events, financial assistance in project preparation and part of the cost of external services (scientific writing and scientific review) – i.e., activities associated with the direct support of applicants.

In the first year, it will be necessary to spend funds on a one-off basis for the Support Centre's start-up, i.e., a relatively lower amount of the budget (41%) will be used for the direct support of applicants. However, as from the following year, we anticipate that the share of funds allocated to activities associated with the direct support of applicants will increase (up to 64%).

Activities associated with the direct support of applicants are described below. In the activities associated with the maintenance of the Support Centre, we have included all personnel costs, overhead cost and external services ensuring the selection of an advisory board, financial services, IT services and specific external services in the first year of the Support Centre's existence.

We consider the draft budget to be preliminary. Nevertheless, it sufficiently determines the amount of necessary funds for the Support Centre's establishment and operation and for promoting the decision-making process of DR countries. When the decision is taken on the Support Centre's establishment – under preparatory phase A – we recommend specifying the budget.

11.3 Summary of preparatory steps for DRRIF's implementation

The proposal of preparatory steps towards implementation of the two DRRIF alternatives shows that they differ in terms of their complexity as well as funding requirements.

Effective operation of the Funding Network requires a considerable commitment of representatives of the involved countries to actively participate in the defined activities. We assume that the success and duration of the Funding Network implementation can be considerably influenced by possible personnel changes among representatives of the DR countries. However, the cost of operation and implementation of the alternative is very low, which is favourable for countries with a limited budget for R&I and macro-regional strategies.

Conversely, the cost of the Support Centre compared to the Funding Network is higher and, to a large extent, dependent on the success of the project in a possible DTP call, or on acquiring funds from other sources. Nevertheless, we assume that, after successfully acquiring funds to finance this alternative, the implementation of the Support Centre will be less demanding for the DR representatives, as it will be provided for by dedicated employees and the direct involvement of the representatives in operational tasks will be minimal.

Both the alternatives have their advantages and disadvantages. Representatives of the DR countries must conclude which of the alternatives may, from their point of view, contribute most to addressing problems in the area of R&I in DR and which would gain the necessary political support. It is also important to take into consideration the possibility of implementing a combination of both alternatives. Each of the proposed alternatives can operate as a standalone scheme (either the Funding Network or the Support Centre), but they can also cooperate and create synergies if both of them are established.

12. Proposed approach for presentation of the DRRIF model

The aim of the following chapter is to propose a way of presenting the DRRIF feasibility study also including the presentation of possible DRRIF's forms – Funding Network and Support Centre.

We have identified four main groups of stakeholders to whom the study should be presented:

- National (and regional) bodies of DR countries
- Potential partners (European programmes, institutions, projects)
- European Commission (DG Regio, DG R&I)
- Funding institutions (DTP, national funding agencies, EC)

The presentation of the DRRIF feasibility study to each of the groups would differ based on the objective of the meetings and events. The prepared material can be modified according to the needs of each group. We advise translating the presentation material into national languages prior to presenting at the national level.

Spreading awareness about the new structure/platform is necessary in order to be able to support a wide range of stakeholders. During the implementation phase, the intensity of promoting a new initiative should be higher in the case of the Support Centre because its activities are directly linked to recipients.

We propose creating a shared online storage where all documents related to the DRRIF feasibility study would be saved, so all stakeholders could have access to the documents if needed.

The attached document contains two main parts:

- **Executive summary** - five-page wrap up of key conclusions from the feasibility study. This material should be used as reading material.
- **Presentation material itself** – contains parts dedicated to the feasibility study approach and description of each of DRRIF's potential forms which can be used separately. This material should be used as reading material and after simplification of content as presentation material.

For presentations at the meetings and events, we recommend reducing the text on the slides and highlighting the most important parts depending on the audience (e.g., when presenting the study at a national level, country results and issues important for the particular country should be highlighted).

The prepared material is just a summary of the feasibility study and therefore should be distributed together with the entire Programme Document.

DRRIF_Presentation.pdf

13. Appendices

13.1 Appendix 1a: GERD by sector

All sectors	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
European Union (27 countries)	1,86	1,83	1,82	1,84	1,84	1,91	2,01	2,01	2,05	2,08
Bulgaria	0,48	0,49	0,46	0,46	0,45	0,47	0,53	0,6	0,57	0,64
Czech Republic	1,2	1,2	1,22	1,29	1,37	1,3	1,35	1,4	1,64	1,88
Germany	2,54	2,5	2,51	2,54	2,53	2,69	2,82	2,8	2,89	2,98
Croatia	0,96	1,05	0,87	0,75	0,8	0,9	0,85	0,75	0,76	0,75
Hungary	0,94	0,88	0,94	1,01	0,98	1	1,17	1,17	1,22	1,3
Austria	2,24	2,24	2,46	2,44	2,51	2,67	2,71	2,8	2,77	2,84
Romania	0,39	0,39	0,41	0,45	0,52	0,58	0,47	0,46	0,5	0,49
Slovenia	1,27	1,39	1,44	1,56	1,45	1,66	1,85	2,1	2,47	2,8
Slovakia	0,57	0,51	0,51	0,49	0,46	0,47	0,48	0,63	0,68	0,82
Montenegro	:	:	:	:	:	:	:	:	:	:
Serbia	:	:	:	:	:	:	0,92	0,79	0,77	0,97
Baden-Württemberg	:	:	:	:	:	:	4,84	:	5,05	:
Bayern	:	:	:	:	:	:	3,17	:	3,13	:
Business enterprise sector	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
European Union (27 countries)	1,18	1,16	1,14	1,17	1,17	1,21	1,24	1,24	1,29	1,32
Bulgaria	0,1	0,12	0,1	0,12	0,14	0,15	0,16	0,3	0,3	0,39
Czech Republic	0,73	0,75	0,73	0,77	0,8	0,76	0,76	0,81	0,91	1,01
Germany	1,77	1,75	1,74	1,78	1,77	1,86	1,91	1,88	1,96	2,02
Croatia	0,38	0,44	0,36	0,27	0,33	0,4	0,34	0,33	0,34	0,34
Hungary	0,34	0,36	0,41	0,49	0,49	0,53	0,67	0,7	0,76	0,85
Austria	:	1,52	1,72	1,72	1,77	1,85	1,84	1,91	1,9	1,95
Romania	0,22	0,21	0,2	0,22	0,22	0,17	0,19	0,18	0,18	0,19
Slovenia	0,81	0,93	0,85	0,94	0,87	1,07	1,2	1,43	1,83	2,16
Slovakia	0,32	0,25	0,25	0,21	0,18	0,2	0,2	0,27	0,25	0,34
Montenegro	:	:	:	:	:	:	:	:	:	:
Serbia	:	:	:	:	:	:	0,13	0,09	0,07	0,24
Baden-Württemberg	:	:	:	:	:	:	3,85	:	4,07	:
Bayern	:	:	:	:	:	:	2,45	:	2,4	:
Government sector	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
European Union (27 countries)	0,24	0,24	0,25	0,24	0,24	0,24	0,27	0,26	0,25	0,25
Bulgaria	0,34	0,33	0,31	0,29	0,27	0,27	0,29	0,22	0,2	0,19
Czech Republic	0,28	0,27	0,27	0,28	0,31	0,29	0,31	0,3	0,32	0,35
Germany	0,34	0,34	0,35	0,35	0,35	0,38	0,42	0,42	0,42	0,43
Croatia	0,21	0,22	0,21	0,2	0,2	0,23	0,23	0,21	0,21	0,21
Hungary	0,29	0,26	0,26	0,26	0,24	0,23	0,23	0,22	0,19	0,19
Austria	:	0,12	0,13	0,13	0,13	0,14	0,14	0,15	0,14	0,15
Romania	0,12	0,13	0,14	0,15	0,18	0,24	0,16	0,17	0,2	0,2
Slovenia	0,28	0,28	0,35	0,38	0,35	0,36	0,39	0,38	0,35	0,34
Slovakia	0,18	0,16	0,15	0,16	0,16	0,16	0,16	0,19	0,19	0,2
Montenegro	:	:	:	:	:	:	:	:	:	:
Serbia	:	:	:	:	:	:	0,28	0,29	0,26	0,28
Baden-Württemberg	:	:	:	:	:	0,42	0,45	0,43	0,42	:
Bayern	:	:	:	:	:	0,3	0,3	0,3	0,3	:
Higher education sector	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
European Union (27 countries)	0,42	0,41	0,41	0,41	0,42	0,44	0,48	0,49	0,48	0,49
Bulgaria	0,05	0,05	0,05	0,04	0,04	0,05	0,07	0,07	0,06	0,05
Czech Republic	0,18	0,18	0,22	0,24	0,25	0,24	0,27	0,28	0,4	0,52
Germany	0,43	0,41	0,41	0,41	0,41	0,45	0,5	0,51	0,52	0,53
Croatia	0,38	0,39	0,3	0,27	0,27	0,27	0,27	0,21	0,21	0,2
Hungary	0,25	0,22	0,24	0,24	0,23	0,22	0,24	0,23	0,25	0,24
Austria	:	0,6	0,61	0,59	0,6	0,67	0,71	0,73	0,71	0,73
Romania	0,04	0,04	0,06	0,08	0,13	0,17	0,12	0,11	0,11	0,1
Slovenia	0,17	0,18	0,24	0,24	0,23	0,22	0,27	0,29	0,29	0,29
Slovakia	0,08	0,1	0,1	0,12	0,12	0,11	0,12	0,17	0,24	0,28
Montenegro	:	:	:	:	:	:	:	:	:	:
Serbia	:	:	:	:	:	:	0,5	0,41	0,44	0,45
Baden-Württemberg	:	:	:	:	:	0,46	0,54	0,55	0,55	:
Bayern	:	:	:	:	:	0,4	0,43	0,43	0,44	:
Private non-profit sector	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
European Union (27 countries)	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02
Bulgaria	0	0	0,01	0	0	0	0	0	0	0,01
Czech Republic	0	0	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
Germany	:	:	:	:	:	:	:	:	:	:
Croatia	:	:	0	0	0	0	0	0	0	0
Hungary	:	:	:	:	:	:	:	:	:	:
Austria	:	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
Romania	0	0	0,01	0,01	0	0	0	0	0	0
Slovenia	0	0	0	0	0	0	0	0	0	0
Slovakia	0	0	0	0	0	0	0	0	0	0
Montenegro	:	:	:	:	:	:	:	:	:	:
Serbia	:	:	:	:	:	:	0	0	0	0
Baden-Württemberg	:	:	:	:	:	:	:	:	:	:
Bayern	:	:	:	:	:	:	:	:	:	:

Total intramural R&D expenditure (GERD) by sectors of performance and type of costs [rd_e_gerdcost]
Last update: 31.7.2014
Source of data: Eurostat
TYPECOST: Total R&D expenditure

13.2 Appendix 1b: GERD by sector (graphics)

As % of GDP

Country	Business enterprise sector	Government sector	Higher education sector	Private non-profit sector	Gross domestic R&D expenditure
BW	4,07	0,42	0,55	0,01	5,05
BY	2,40	0,30	0,44	0,00	3,14
DE	2,02	0,43	0,53	0,00	2,98
AT	1,95	0,15	0,73	0,01	2,84
SI	2,16	0,34	0,29	0,01	2,80
EU 27	1,32	0,25	0,49	0,02	2,08
CZ	1,01	0,35	0,52	0,01	1,89
HU	0,85	0,19	0,24	0,02	1,30
RS	0,24	0,28	0,45	0,00	0,97
SK	0,34	0,20	0,28	0,00	0,82
HR	0,34	0,21	0,20	0,00	0,75
UA	0,70	n/a	n/a	n/a	0,70
BG	0,39	0,19	0,05	0,01	0,64
RO	0,19	0,20	0,10	0,00	0,49
MD	0,40	n/a	n/a	n/a	0,40
ME	0,10	0,20	0,00	0,00	0,40
BA	0,10	0,20	n/a	n/a	0,30

13.3 Appendix 2: Pairwise collaboration affinity between ERA countries 2008 – 2011

	AT	BE	BG	CH	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IL	IS	IT	LT	LU	LV	MK	MT	NL	NO	PL	PT	RO	SE	SI	SK	TR	UK
AT		1,86	2,08	3,30	1,30	2,89	3,80	2,15	1,91	1,79	1,90	2,02	1,43	3,01	3,48	1,63	1,92	2,55	2,34	2,39	2,56	1,55	1,71	1,44	2,13	2,04	2,19	1,93	2,05	1,99	3,80	3,88	1,44	1,39
BE	2,02		2,31	2,37	1,86	1,67	1,77	2,26	1,91	1,95	2,25	1,77	2,85	1,30	2,09	1,85	1,64	1,72	2,35	1,95	7,29	1,58	1,39	1,96	5,17	1,65	2,01	2,07	1,82	1,83	1,48	1,34	1,19	1,76
BG	2,76	2,46		1,70	5,10	4,18	2,59	1,34	6,39	5,72	2,16	3,18	1,44	5,70	6,04	2,30	1,86	1,01	2,37	7,02	2,36	5,45	16,94	2,06	1,14	1,11	5,45	2,57	6,94	1,26	2,35	5,53	3,42	0,98
CH	3,29	2,22	1,48		1,68	1,66	3,30	2,27	1,23	1,64	1,85	1,90	2,41	1,49	1,54	1,83	1,92	2,15	2,76	1,03	2,71	1,42	1,04	0,87	2,46	1,68	1,62	1,62	1,17	1,83	1,84	1,62	1,15	1,88
CY	2,92	3,01	9,24	2,85		3,28	2,35	1,45	13,66	38,76	3,83	8,46	1,65	8,11	6,89	8,85	2,95	0,83	3,94	13,45	2,37	3,22		5,23	0,86	1,03	4,31	4,44	3,49	1,03	11,39	14,00	7,68	2,79
CZ	2,40	1,27	2,52	1,38	1,14		1,53	1,39	1,95	1,59	1,24	1,63	1,26	2,62	2,75	1,58	1,52	1,05	1,41	2,24	1,33	2,44	1,24	2,33	1,27	1,48	3,44	1,74	1,83	1,47	3,02	13,33	1,18	0,96
DE	2,76	1,43	1,32	2,99	0,74	1,27		1,81	0,89	0,98	1,28	1,12	1,37	0,96	1,24	1,23	1,58	1,44	1,42	0,84	3,58	1,59	1,46	1,25	2,08	1,32	1,29	1,11	1,08	1,43	0,90	0,98	0,91	1,42
DK	1,89	1,79	0,98	1,93	0,67	1,49	1,94		1,83	1,85	1,94	3,84	1,38	1,07	1,77	1,96	1,78	9,84	1,94	1,59	1,82	2,40	1,57	0,89	2,76	6,51	1,88	1,88	1,18	5,36	1,41	1,24	0,96	1,94
EE	3,00	2,23	8,46	1,50	10,46	3,91	1,85	2,85		4,27	2,57	14,95	1,13	7,18	8,32	3,14	1,28	5,47	2,39	22,04	3,31	29,24	2,95	2,35	1,61	3,49	6,00	3,50	3,59	5,05	4,21	4,22	3,22	1,38
EL	1,44	1,48	2,95	1,39	10,66	1,53	1,32	1,67	1,74		1,86	1,73	1,25	1,68	1,77	1,78	1,60	1,32	1,91	1,72	1,85	1,32	2,20	3,31	1,45	1,53	1,78	1,85	2,54	1,43	2,13	2,49	1,82	1,63
ES	1,19	1,46	1,02	1,32	1,14	0,91	1,04	1,50	1,13	1,28		1,13	1,51	0,75	1,03	1,30	1,16	1,61	2,02	0,78	1,57	0,75	0,81	1,58	1,51	1,25	1,02	3,59	0,99	1,21	0,92	0,90	0,71	1,34
FI	1,92	1,54	2,12	1,82	3,19	1,87	1,61	4,08	8,16	2,07	1,80		1,20	1,70	2,75	2,69	1,24	6,51	1,82	3,38	2,80	4,02	1,09	1,28	2,17	4,19	2,08	1,81	1,39	5,25	2,10	2,60	1,42	1,58
FR	1,15	2,38	0,97	2,19	0,77	1,19	1,21	1,40	0,76	1,06	1,76	0,96		0,76	0,97	1,20	1,32	1,85	1,88	0,83	5,50	0,93	1,00	1,45	1,55	1,33	1,23	1,54	1,77	1,17	0,82	0,81	0,74	1,36
HR	2,49	0,89	3,65	1,10	2,97	2,69	1,12	0,94	3,61	1,94	0,97	1,56	0,70		3,98	0,97	1,23	0,98	1,58	3,58	0,66	1,28	7,85	1,32	0,86	1,02	2,48	1,58	1,89	0,66	13,23	2,45	1,49	0,64
HU	3,40	1,81	4,04	1,47	2,49	3,26	1,95	1,88	4,32	2,30	1,74	2,89	1,25	4,34		1,38	2,28	1,30	2,01	3,81	1,94	2,44	1,88	2,31	1,55	1,56	3,21	2,21	6,49	1,99	3,21	4,60	1,98	1,16
IE	1,47	1,46	1,61	1,56	3,65	1,75	1,52	1,95	1,81	2,11	1,83	2,63	1,27	1,07	1,34		1,21	3,11	1,64	1,44	2,37	2,25	0,50	2,76	2,03	1,65	1,56	1,50	1,17	2,10	1,78	2,26	0,82	2,82
IL	1,07	0,85	0,74	1,09	0,67	1,02	1,30	1,12	0,42	1,12	1,08	0,73	0,97	0,79	1,28	0,73		1,12	1,32	0,67	1,46	1,12	0,67	1,63	1,25	1,29	0,96	0,89	0,91	0,79	0,96	0,71	1,06	0,85
IS	3,12	1,44	1,17	1,85	0,59	1,68	2,04	11,54	4,82	2,69	2,57	9,62	1,79	1,64	2,12	4,32	2,73		2,63	3,39	2,25	3,12		1,72	3,49	12,90	2,13	1,85	2,22	9,11	2,29	1,99	0,86	2,25
IT	1,50	1,58	1,12	2,05	1,17	1,05	1,19	1,55	1,06	1,32	2,09	1,15	1,69	1,24	1,20	1,18	1,44	1,67		0,79	2,62	1,13	1,44	2,49	1,68	1,24	1,13	1,51	1,43	1,28	1,38	0,95	0,95	1,43
LT	2,52	1,61	5,67	0,91	5,98	2,96	1,31	1,70	13,28	2,72	1,29	4,06	0,94	4,49	4,62	1,63	1,35	2,30	1,31		2,30	25,58	1,58	2,78	0,90	1,79	4,88	2,32	2,19	2,38	3,36	1,80	2,84	0,74
LU	2,89	5,33	3,10	1,96	2,14	2,01	3,69	1,97	3,51	3,57	1,97	3,95	3,92	1,17	3,24	3,26	3,35	2,88	3,18	3,94		5,55	3,55	2,73	2,93	3,15	2,79	2,58	1,89	2,61	3,16	4,19	0,71	1,42
LV	1,60	1,10	5,41	1,01	1,95	3,30	1,90	2,37	21,90	2,29	1,00	5,05	0,75	1,81	3,41	2,65	2,30	2,65	1,50	32,23	3,64		1,84	3,30	1,20	1,99	5,53	1,45	3,05	2,74	3,92	3,89	1,50	0,67
MK	1,87	0,93	23,35	0,67		1,85	1,35	1,59	3,26	4,36	0,92	1,54	0,61	14,28	3,25	0,67	1,51		1,59	2,87	3,46	2,91		3,27	0,79	1,35	2,08	1,36	4,20	0,85	17,97	2,44	7,50	0,56
MT	2,46	1,89	4,87	0,80	9,09	5,54	1,65	1,37	4,44	10,92	2,59	2,91	1,19	3,99	6,74	5,98	5,89	3,85	3,94	8,77	4,23	8,84	5,19		2,76	2,88	3,07	4,00	4,91	2,46	9,08	6,93	4,47	2,67
NL	1,68	4,00	0,72	2,07	0,35	1,19	2,00	2,62	0,94	1,30	1,80	1,75	1,52	0,88	1,22	1,84	1,71	2,89	1,94	0,73	2,95	1,18	0,88	2,13		2,43	1,22	1,70	1,01	2,00	1,07	0,79	1,06	2,05
NO	1,78	1,28	0,79	1,40	0,45	1,57	1,45	6,38	2,14	1,71	1,63	3,92	1,31	1,14	1,46	1,63	2,04	10,27	1,58	1,62	2,66	1,88	1,19	1,66	2,55		1,65	1,55	1,42	5,75	1,41	1,51	0,87	1,71
PL	1,29	1,16	2,15	1,05	0,96	2,39	1,18	1,29	1,98	1,23	1,06	1,25	1,06	1,63	1,78	0,98	0,99	0,90	1,16	2,39	1,34	2,76	1,02	0,95	1,00	1,12		1,24	1,65	1,16	1,72	2,36	0,85	0,79
PT	1,54	1,47	1,64	1,24	1,73	1,68	1,14	1,68	1,91	1,88	4,32	1,54	1,41	1,59	1,87	1,35	1,28	1,31	1,77	1,88	1,94	1,22	1,07	2,03	1,64	1,41	1,67		1,80	1,27	1,78	0,96	1,27	1,44
RO	1,25	0,98	3,17	0,69	0,92	1,36	0,93	0,79	1,34	2,02	0,96	0,91	1,31	1,38	4,16	0,78	1,01	1,03	1,37	1,25	0,89	1,67	2,00	1,46	0,77	0,97	1,77	1,35		0,71	1,81	2,38	1,96	0,48
SE	1,88	1,64	0,95	1,78	0,48	1,66	1,70	5,93	3,37	1,62	1,74	5,16	1,34	0,79	1,91	2,25	1,32	8,25	1,79	2,27	2,73	2,96	0,96	1,85	2,37	6,42	1,77	1,55	1,11		1,03	1,09	0,93	1,81
SI	4,17	1,35	1,87	1,81	4,94	4,10	1,51	1,62	2,54	3,32	1,66	2,56	1,06	16,70	3,84	2,09	1,97	1,59	2,47	3,30	2,00	3,18	10,82	3,19	1,44	1,65	3,57	2,32	3,24	1,16		6,26	1,53	1,00
SK	4,50	1,30	4,50	1,70	6,08	19,04	1,81	1,50	2,58	4,08	1,77	3,32	1,15	3,19	5,73	2,77	1,54	1,38	1,86	1,80	2,64	3,15	1,45	2,38	1,14	1,86	5,23	1,31	4,46	1,31	6,44		1,60	0,86
TR	0,47	0,37	0,91	0,39	1,30	0,46	0,37	0,37	0,78	0,71	0,35	0,49	0,29	0,63	0,66	0,31	0,61	0,29	0,45	0,97	0,27	0,60	3,17	1,29	0,43	0,34	0,44	0,54	1,07	0,32	0,48	0,47		0,35
UK	1,01	1,37	0,60	1,60	1,21	0,81	1,10	1,82	0,87	1,21	1,40	1,13	1,25	0,63	0,80	2,44	1,03	2,25	1,42	0,60	2,02	0,81	0,94	3,44	1,91	1,60	0,80	1,44	0,59	1,44	0,69	0,54	0,82	

* The matrix is asymmetric; the numbers in each cell give the affinity of the country in the corresponding column towards collaborating with the country in the corresponding row for 2008–2011. Empty cells either reflect the fact that the indicator is not applicable (i.e., the diagonal of the matrix) or that the data could not be computed because there were not enough publications/co-publications. The scale-adjusted collaboration affinity measures whether a given country (country A) collaborates more (i.e., score above 1) or less (i.e., score below 1) than expected with another country (country B) by calculating the ratio of its observed number of co-publications with country B (based on full counting) over the expected number given the size of the scientific production of country B (i.e., its number of published papers obtained using full counting). This indicator is therefore asymmetric.

13.4 Appendix 3: Number of patents by main section of IPC (2006-2010)

Section	BG	CZ	DE	BW	BY	HU	AT	RO	SI	SK	HR	DR Total
International patent classification (IPC) - total	**81,98**	**841,59**	**106 873,14**	**26 821,74**	**25 533,90**	**781,89**	**7 730,14**	**134,63**	**528,93**	**164,38**	**77,83**	117 214,51
Section B - Performing operations; transporting	13,23	160,97	25 670,73	6 794,15	6 023,66	108,80	1 632,13	14,44	36,01	34,47	4,91	27 675,69
Section F - Mechanical engineering; lighting; heating; weapons; blasting	12,35	122,44	16 570,94	5 376,11	4 165,18	57,78	1 066,68	12,99	39,39	26,65	11,58	17 920,80
Section H - Electricity	9,66	102,04	15 994,19	4 069,16	5 308,58	212,84	1 139,74	43,80	39,87	32,45	1,00	17 575,59
Section A - Human necessities	14,00	119,71	14 980,34	3 180,61	2 791,97	169,00	1 232,32	11,94	214,09	17,34	24,03	16 782,77
Section G - Physics	21,85	110,93	14 399,87	4 127,67	3 935,58	90,96	954,96	39,92	58,15	19,82	11,73	15 708,19
Section C - Chemistry; metallurgy	5,83	132,16	12 301,88	1 719,14	2 012,23	108,71	902,10	8,16	103,40	24,29	17,58	13 604,11
Section E - Fixed constructions	4,47	60,14	4 921,24	954,54	975,41	29,57	645,53	2,92	31,68	5,80	7,00	5 708,35
Section D - Textiles; paper	0,59	33,20	2 033,95	600,36	321,29	4,23	156,68	0,46	6,34	3,56	0,00	2 239,01

Source: Eurostat; EPO patent applications by priority year, regions NUTS 3, IPC sections, total for 2006 – 2010, calculated and processed by EY,
The DR total does not include Bavaria and Baden-Württemberg – data for Germany as whole used instead.

		BG	CZ	DE	BW	BY	HU	AT	RO	SI	SK	HR	DR Total
IPC Section	**International patent classification (IPC) - total**	81,97	841,58	106 892,50	26 826,74	25 539,87	781,88	7 732,16	134,60	528,92	164,38	233,48	117 391,47
Section A - Human necessities	Medical or veterinary science; hygiene	8,48	84,04	8 784,85	2 015,44	1 557,18	115,45	620,70	6,91	144,77	8,30	16,69	9 790,19
Section G - Physics	Measuring; testing	6,28	48,91	6 363,47	1 971,10	1 517,28	22,89	403,88	14,00	20,13	3,18	1,00	6 883,74
Section H - Electricity	Basic electric elements	2,78	31,30	6 128,97	1 572,57	1 871,59	42,56	432,91	8,18	20,37	11,80	2,25	6 681,12
Section F - Mechanical engineering; lighting; heating; weapons; blasting	Engineering elements or units; general measures for producing and maintaining effective functioning of machines or installations; thermal insulation in general	0,67	46,70	5 780,19	1 873,66	1 619,25	21,54	310,43	4,04	10,05	9,01	9,54	6 192,17
ion B - Performing operations; transporting	Vehicles in general	3,41	78,45	5 818,62	1 955,96	1 398,41	30,96	186,99	6,20	4,82	7,85	2,33	6 139,63
Section H - Electricity	Electric commucation technique	2,63	37,73	5 149,75	1 103,13	1 947,97	152,77	322,49	26,26	11,30	13,14	6,33	5 722,40
ion B - Performing operations; transporting	Conveying; packing; storing; handling thin or filamentary material	3,33	12,58	3 376,31	692,06	789,74	13,79	244,13	0,68	4,07	4,04	2,40	3 661,33
Section G - Physics	Computing; calculating; counting	11,73	21,64	3 241,57	835,65	1 050,32	27,36	208,20	18,67	23,42	12,43	0,00	3 565,02
Section C - Chemistry; metallurgy	Organic chemistry	0,52	66,18	2 768,50	473,42	328,45	58,60	179,38	0,76	78,22	9,41	0,00	3 161,57

Source: Eurostat; EPO patent applications by priority year, regions NUTS 3, IPC sections and classes, total for 2006 – 2010, calculated and processed by EY,
The DR total does not include Bavaria and Baden-Württemberg – data for Germany as whole used instead.

13.5 Appendix 4: Other grant schemes and programmes

Cohesion Fund (CF) **Period**: 2014 – 2020 **Budget**: 74,9 billion EUR **Scope**: international. EU Member States with gross national pension lower than 90% of the EU average: Cyprus, the **Czech Republic**, Estonia, **Hungary**, Latvia, Lithuania, Malta, Poland, **Romania**, **Slovakia**, **Slovenia**, **Bulgaria**, **Croatia**, Spain, Greece, Portugal http://ec.europa.eu/regional_policy/thefunds/cohesion/index_en.cfm	The Cohesion Fund is a structural mechanism design to support less developed states, to help them catch up with other Member States. Furthermore it aims to reduce economic and social disparities and to promote sustainable development (activities under the Convergence goal). Cohesion Fund for major projects in areas of transportation, energy and the environment protection.

Connecting Europe Facility (CEF) **Scope**: international, EU http://ec.europa.eu/digital-agenda/en/connecting-europe-facility	CEF is devoted to stimulate and support projects of common interest for the deployment and operation of digital service infrastructures. These projects should contribute: ► To improving the competitiveness of the European economy ► To promoting the interconnection and interoperability of national, regional and local networks ► To accessing such networks, thus supporting the development of a Digital Single Market

Creative Europe **Scope**: international, EU http://ec.europa.eu/programmes/creative-europe/index_en.htm	Creative Europe is a European Commission's framework programme supporting culture and media.

European Agricultural Fund for Rural Development (EAFRD) **Period**: 2014 – 2020 **Budget**: 95,6 billion EUR **Scope**: international, EU http://ec.europa.eu/agriculture/rural-development-2014-2020/index_en.htm http://ec.europa.eu/agriculture/index_en.htm	EAFRD is a structural fund specifically focused on agriculture.

European Maritime and Fisheries Fund (EMFF) **Period**: 2014 – 2020 **Budget**: 5,8 billion EUR **Scope**: international, EU http://ec.europa.eu/fisheries/cfp/emff/index_en.htm	EMFF is a structural fund specifically focused on fisheries and related areas.

13.6 Appendix 5: Retained proposals in FP 7

		AT - Austria			Herzegovina			BG - Bulgaria			HR - Croatia			CZ - Czech Republic		
		and Requested Contribution by Priority Area and						(MEMBER-NEW)			(MEMBER-NEW)			Proposals and Applicants		
		All Funding Schemes						Proposals and			Proposals: Proposals			All Funding Schemes		
								All Funding Schemes								
Specific Programme	Priority Area	Eligible proposals with at least one applicant in the selection	Retained proposals with at least one applicant in the selection	Requested EU financial contribution to proposals	Eligible proposals with at least one applicant in the selection	Retained proposals with at least one applicant in the selection	Requested EU financial contribution to proposals	Eligible proposals with at least one applicant in the selection	Retained proposals with at least one applicant in the selection	Requested EU financial contribution to proposals	Eligible proposals with at least one applicant in the selection	Retained proposals with at least one applicant in the selection	Requested EU financial contribution to proposals	Eligible proposals with at least one applicant in the selection	Retained proposals with at least one applicant in the selection	Requested EU financial contribution to proposals
				(euro)			(euro)			(euro)			(euro)			(euro)
COOPERATION	Health	667	181	1,1E+09	12	2	1,2E+07	132	24	81190900	98	18	1,2E+08	306	67	3,58E+08
	Food, Agriculture and Fisheries, and Biotechnology	526	117	4,4E+08	22	2	3612337	220	43	1,32E+08	133	24	8,7E+07	337	80	3,27E+08
	Information and Communication Technologies	2909	495	2,2E+09	45	4	6672782	592	70	2,3E+08	268	38	1,1E+08	882	134	4,92E+08
	Nanosciences, Nanotechnologies, Materials and new Production	452	135	7E+08	5			81	17	70331523	49	9	4,2E+07	299	104	5,08E+08
	Energy	309	70	3,7E+08	17	2	1E+07	113	17	89733134	61	12	3,5E+07	116	24	1,59E+08
	Environment (including Climate Change)	577	142	5,4E+08	24	5	1E+07	233	46	2,14E+08	114	22	9,6E+07	304	61	2,51E+08
	Transport (including Aeronautics)	511	156	7E+08	6	1	599436	133	29	73998087	98	26	1,1E+08	407	97	5,69E+08
	Socio-economic sciences and Humanities	580	72	2E+08	49			358	27	71429827	165	13	5,8E+07	329	31	92066957
	Space	169	48	2E+08	2			41	12	1,46E+08	12	5	1,2E+07	88	23	1,19E+08
	Security	327	77	4E+08	6	1	3175396	136	21	1E+08	45	9	3,9E+07	191	30	1,23E+08
	General Activities	13	10	2,5E+07				1	1	3220985	1	1	6100578	3	1	2832504
Subtotal: COOPERATION excluding J		7040	1503	6,9E+09	188	17	4,6E+07	2040	307	1,21E+09	1044	177	7,1E+08	3262	652	3E+09

		DE - Germany			DE - Germany			DE - Germany			HU - Hungary			of)		
		WÜRTTEMBERG			DE2 - BAYERN			Proposals and Applicants			Proposals and Applicants			Proposals: Proposals		
		Proposals and Applicants			Proposals and			All Funding Schemes			All Funding Schemes			All Funding Schemes		
		All Funding Schemes			All Funding Schemes											
Specific Programme	Priority Area	Eligible proposals with at least one applicant in the selection	Retained proposals with at least one applicant in the selection	Requested EU financial contribution to proposals	Eligible proposals with at least one applicant in the selection	Retained proposals with at least one applicant in the selection	Requested EU financial contribution to proposals	Eligible proposals with at least one applicant in the selection	Retained proposals with at least one applicant in the selection	Requested EU financial contribution to proposals	Eligible proposals with at least one applicant in the selection	Retained proposals with at least one applicant in the selection	Requested EU financial contribution to proposals	Eligible proposals with at least one applicant in the selection	Retained proposals with at least one applicant in the selection	Requested EU financial contribution to proposals
				(euro)			(euro)			(euro)			(euro)			(euro)
COOPERATION	Health	844	287	1,72E+09	913	256	1,6E+09	2539	685	3,6E+09	401	87	4,3E+08	15	4	2E+07
	Food, Agriculture and Fisheries, and Biotechnology	386	72	3,13E+08	456	92	4,4E+08	1725	357	1,4E+09	423	85	3,1E+08	16	1	2E+06
	Information and Communication Technologies	2744	541	2,59E+09	4284	790	3,6E+09	9982	1684	6,6E+09	1081	158	7E+08	28	6	8E+06
	Nanosciences, Nanotechnologies, Materials and new Production	668	211	1,11E+09	1026	348	1,7E+09	2030	645	3E+09	182	67	3,1E+08	5		
	Energy	332	87	5,07E+08	412	107	6,1E+08	1064	273	1,5E+09	132	25	1,7E+08	2		
	Environment (including Climate Change)	380	91	3,9E+08	386	113	5E+08	1569	368	1,4E+09	310	52	1,7E+08	18	1	1E+06
	Transport (including Aeronautics)	427	137	8,39E+08	808	227	1,3E+09	1973	548	2,2E+09	259	68	2,4E+08	4	3	3E+06
	Socio-economic sciences and Humanities	206	33	95912492	223	27	7,1E+07	1388	164	4,2E+08	632	71	2,1E+08	31	1	2E+06
	Space	92	27	1,19E+08	191	55	1,7E+08	569	162	5,1E+08	61	16	5,7E+07			
	Security	182	30	1,79E+08	487	113	5,9E+08	1001	199	9,1E+08	155	28	1E+08	2		
	General Activities	2	1	95186	2	1	1774101	13	10	4,3E+07	2	2	5078212			
Subtotal: COOPERATION excluding J		6263	1517	7,87E+09	9188	2129	1,1E+10	23853	5095	2,2E+10	3638	659	2,7E+09	121	16	3E+07

		ME - Montenegro			RO - Romania			RS - Serbia			SK - Slovakia			SI - Slovenia			UA - Ukraine		
		Proposals: Proposals			(MEMBER-NEW)			Proposals and Applicants			Proposals and Applicants			Proposals and Applicants			Proposals: Proposals		
		All Funding Schemes			Proposals and Applicants			All Funding Schemes			All Funding Schemes			All Funding Schemes			All Funding Schemes		
					All Funding Schemes														
Specific Programme	Priority Area	Eligible proposals with at least one applicant in the selection	Retained proposals with at least one applicant in the selection	Requested EU financial contribution to proposals	Eligible proposals with at least one applicant in the selection	Retained proposals with at least one applicant in the selection	Requested EU financial contribution to proposals	Eligible proposals with at least one applicant in the selection	Retained proposals with at least one applicant in the selection	Requested EU financial contribution to proposals	Eligible proposals with at least one applicant in the selection	Retained proposals with at least one applicant in the selection	Requested EU financial contribution to proposals	Eligible proposals with at least one applicant in the selection	Retained proposals with at least one applicant in the selection	Requested EU financial contribution to proposals	Eligible proposals with at least one applicant in the selection	Retained proposals with at least one applicant in the selection	Requested EU financial contribution to proposals
				(euro)			(euro)			(euro)			(euro)			(euro)			(euro)
COOPERATION	Health	6			243	44	1,85E+08	83	7	4E+07	105	18	1,2E+08	208	46	2E+08	39	8	5E+07
	Food, Agriculture and Fisheries, and Biotechnology	14	2	1E+07	335	45	1,5E+08	111	24	1E+08	141	21	8,3E+07	269	55	2E+08	81	11	3E+07
	Information and Communication Technologies	30	8	3E+07	1081	104	4,18E+08	332	44	1E+08	342	52	1,7E+08	948	118	4E+08	67	8	7E+06
	Nanosciences, Nanotechnologies, Materials and new Production	4			227	80	3,74E+08	29	4	2E+07	94	30	1,8E+08	232	68	3E+08	38	11	4E+07
	Energy	3			155	17	66043194	42	10	3E+07	78	14	6,6E+07	103	22	9E+07	49	7	2E+07
	Environment (including Climate Change)	13	2	4E+06	333	68	2,87E+08	93	20	7E+07	123	17	8,7E+07	244	53	2E+08	76	15	9E+07
	Transport (including Aeronautics)	7			322	76	2,77E+08	72	15	4E+07	101	24	5E+07	155	26	8E+07	64	13	3E+07
	Socio-economic sciences and Humanities	14	1	3E+06	419	28	84727507	126	4	1E+07	201	18	6,7E+07	376	25	7E+07	92	8	2E+07
	Space	2			75	18	1,72E+08	6	1	999987	32	2	3,1E+07	42	7	9E+07	74	10	9E+07
	Security	3	1	3E+06	238	31	1,44E+08	34	6	2E+07	95	19	9,4E+07	130	20	7E+07	15	2	4E+06
	General Activities				3	3	7965167				1	1	2832504	3	2	2E+07			
Subtotal: COOPERATION excluding J		96	14	5E+07	3431	514	2,17E+09	928	135	4E+08	1313	216	9,5E+08	2710	442	2E+09	595	93	4E+08

* Proposals and requested financial contribution according to priority areas, grant schemes and country of applicant.

13.7 Appendix 6: Questionnaire – Conclusions verification

Please score the statements below according to the scales provided. Should you have any comments, please include them in the last column.

Please fill in the grey fields

Country name:				
Surname Name, Institution:				
	Opinion *I do ……. with this statement:* *1 - Strongly Agree* *2 - Agree* *3 - Neutral* *4 - Disagree* *5 - Strongly Disagree*	**Priority** *Solving this issue should have:* *1 - Extreme Priority* *2 - High Priority* *3 - Medium Priority* *4 - Low Priority* *5 - No Priority*	**Complexity** *The complexity of solving this issue is:* *1 - Very Complex* *2 - Complex* *3 - Manageable* *4 - Less Complex* *5 - Not Complex*	**Additional Comments** *Feel free to comment or specify your answer.*
DRRIF should focus on:				
Improving development and exploitation of human capital.				
Mentoring R&D institution and facilitate submission of proposals for grants by countries with low success rate.				
Promoting and spreading awareness about EU programs in countries with low success rate.				
Increasing the participation rate of students and young scientists in R&D projects (e.g. each project should have a part devoted to education of students in the scientific area of the project).				
Connecting scientists and public institutions with the private sector via joint projects, events or even in its administrative bodies.				
Increasing the total number of patents and co-applicants from other countries.				
Supporting the innovative activities of SMEs in the Danube Region and increasing the total number of SMEs in the region.				
Collecting missing data in non-EU states and gather new data in EU and non-EU states (e.g. share of international projects).				
Increase the share of international scientific publications of German scientists with scientists from other countries.				
I do believe that despite differences between DR countries, the compromise about DRRIF focus will be reached.				

13.8 Appendix 7: Questionnaire – Mapping of cooperation

Mapping of cooperation, selected funding possibilities and EUSDR support in the strategic documents

Please fill in the white fields

Country name:	
Surname Name, Institution:	

	Yes / No	Name the document/s if applicable	Period to which the document relates	Budget allocated to this support (please state if information is available)	If applicable please copy the paragraph in document where the support for Macroregional strategies is mentioned
Is the (financial) support of Macroregional strategies already foreseen in your national documents? (*e.g. national strategic documents, national budget plan, Operational Programmes under ESIF*) If yes, please provide detailed information.					
Is the (financial) support of EUSDR specifically mentioned in your national documents? (*e.g. national strategic documents, national budget plan, Operational Programmes under ESIF*) If yes, please provide detailed information.					

Please fill in the white fields

*Please fill in the information about **R&D** and/or **innovation oriented existing** and/or **upcoming bilateral** and **multilateral agreements** between your country and other **DR country/countries**.*

#	Name of the agreement	Partner countries *(please list all of them)*	Period *(start - end)*	Allocated budget	Type of agreement *(bilateral or multilateral; EU supported or non-EU supported; etc.)*	Thematic focus	Description of an agreement, planned activities, areas of support, etc.
1							
2							
3							
4							
5							
6							
add lines if needed							

Please fill in the white fields

	Yes / No	Name of Operational Programme supporting research, development and/or innovation	Budget allocated to this Operational Programme	Name of document/s if applicable	Period to which the document relates	If applicable please copy the paragraph in the document where the support for international cooperation / EUSDR / DRRIF is mentioned
Question to be answered only by countries benefiting from ESIF in 2014-2020 programming period! Article 70 of the Regulation No. 1303/2013 of the European Parliament and of the Council of 17 December 2013 states (among other) that *"The managing authority may accept that an operation is implemented outside the programme area but within the Union, provided that all the following conditions are satisfied: (a) the operation is for the benefit of the programme area; (b) the total amount allocated under the programme to operations located outside the programme area does not exceed 15% of the support from the ERDF, Cohesion Fund and EMFF at the level of the priority, or 5 % of the support from the EAFRD at the level of the programme; (...)"* **Does in your country exist a possibility (legal conditions) to implement up to 15% of respective ESIF allocation outside the programme area (in order to support international R&D and/or R&I cooperation)?** **If yes please provide detailed information.**						

This is a section for non-EU members. Please fill in the white fields

	Yes / No	Description
Do the schemes ENI, IPA II, WISE (RCC) and / or WBIF support research, development and innovations in your country? Please describe how. (*in addition to the above mentioned schemes, feel free to add any other schemes of international cooperation that serve non-EU countries and are from your point of view relevant*)		
Do you foresee any potential synergies between any of the schemes mentioned above and EUSDR (in the field of research, development and/or innovation)?		
Do you foresee any potential threats between any of the schemes mentioned above and EUSDR (in the field of research, development and/or innovation)? (*e.g. competing for the same state grants*)		
Is there a possibility that any of the above mentioned scheme would (financially) support EUSDR and DRRIF in particular?		
If yes, what are the procedural assumptions and the potential barriers to it?	*x*	