Policy-makers all around the world are seeking fresh and innovative ways to boost economic growth, create new jobs and improve the competitiveness of their industries. However, due to complexity and the lack of immediate results, improvements to the level of research and innovation (R&I) remains a “high-hanging fruit” initiative. Nevertheless, with proper execution, it can have a significant impact on the well-being of citizens; furthermore, the results of R&I can be beyond imagination.
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Realizing the long-term importance of R&I and under the pressure of ever-increasing international competition, the European Union (EU) has conducted several initiatives and programs to strengthen its R&I position. Despite its best efforts and numerous R&I projects developed by institutions and individuals from Member States in recent years, the EU is still lagging behind global leaders, such as the United States, Japan and South Korea, in terms of business research and development (R&D) expenditure, patent applications and tertiary education.1

In order to close this gap, from 2014 to 2020, the EU plans to invest €78.6b in new R&I projects and initiatives under the Horizon 2020 program. However, it is facing a particular challenge of its own—the significant diversity of EU Member States, in terms of economic and R&I development. To improve cohesion and cooperation of its Member States, the EU has identified several macro-regions within European territory, based on certain common characteristics. So far, three macro-regional strategies have been introduced: for the Baltic Sea,2 the Danube3 and the Adriatic-Ionian4 regions, each divided into multiple priority areas, some of which focus specifically on R&I.

We helped to assess the feasibility and potential impact of a proposed fund supporting R&I projects in the Danube Region (DR). During our cooperation with DR representatives, which lasted approximately a year, we engaged in numerous dealings with stakeholders from public and private sectors across 14 DR countries in order to arrive at the results.

The aims of the project were to assess whether additional support to international R&I is required and to identify which scientific areas should be supported and by what means.

Diversity of the region—challenge or advantage?
The differences in the national levels of R&I are influenced by multiple factors, such as education systems, R&I infrastructure, business investment in R&I and government tools for the support of R&I. In order to comprehensively evaluate the levels of R&I and to identify the absorption capacity (i.e., room for improvement), we used quantitative and qualitative indicators that cover the factors impacting the levels of R&I in the public and private sectors. One aspect that must be taken into consideration in selecting appropriate indicators for R&I evaluation is the data availability and methodology used for their calculation, making it possible to compare countries against each other, as well as the global leaders’ benchmarks.

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2. Baltic Sea countries: Sweden, Denmark, Estonia, Finland, Germany, Latvia, Lithuania and Poland.
3. Danube countries: (EU Member States) Germany, Austria, Hungary, Czech Republic, Slovakia, Slovenia, Bulgaria, Romania and Croatia; (accession countries) Serbia, Bosnia and Herzegovina, and Montenegro; (neighboring countries) Moldova and Ukraine.
4. Adriatic-Ionian countries: (EU Member States) Croatia, Greece, Italy and Slovenia; (accession countries) Serbia, Bosnia and Herzegovina, and Montenegro; (neighboring countries) Albania.
We analyzed three main indicator groups (see Table 1):

1. **Prerequisites**: the main external factors critical for the level of R&I in the respective countries
2. **Activities of companies**: the innovative activity happening at company level
3. **Outcomes**: the results of companies’ innovative activities

Additional complementary qualitative analyses, such as SWOT, PESTEL and analysis of participation in existing R&I funding programs, were also performed.

As expected, the analysis proved that accounting for diversity will be one of the main challenges to boosting R&I in the DR. However, at the same time, it helped to identify other common challenges that can be addressed by all countries involved. Based on the analysis, the following areas for improvement were identified:

- **R&D expenditure**: the DR, as a whole, has half the R&D expenditure (both private and public) of the innovation leaders (e.g., USA).
- **Human capital utilization**: values in the private sector are relatively close to the EU average. However, when it comes to the public sector, significant improvements, such as human capital mobility, overall political support and investments, are necessary.

### Table 1. The three main indicator groups

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th>Activities of companies</th>
<th>Outcomes</th>
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<tbody>
<tr>
<td>The main external factors critical for the level of R&amp;I</td>
<td>Innovation activities happening at company level</td>
<td>Impact of companies’ innovative activities</td>
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<tr>
<td>► R&amp;D support in the respective countries</td>
<td>► Number of public-private co-publications</td>
<td>► Rate of employment in knowledge-intensive activities</td>
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<tr>
<td>► Human capital resource in R&amp;D</td>
<td>► Level of R&amp;D expenditure in the business sector</td>
<td>► Level of innovation in small and medium-sized enterprises</td>
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<tr>
<td>► Most-cited publications globally and level of cooperation in international co-publications</td>
<td>► Number of patents registered</td>
<td>► Proportion of license and patent revenues from abroad as a percentage of GDP</td>
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5. SWOT analysis explores strengths, weaknesses, opportunities and threats. PESTEL analysis explores the political, economic, social, technological, environmental and legal aspects.
Public-private cooperation: compared with the innovation leaders, the majority of the region is lagging behind in cooperation between the public and private sectors.

Cross-border cooperation and best practice sharing: cooperation between the majority of countries in the region is limited and there are very few joint programs at an international level.

Participation in R&I funding programs: less developed countries in the region have a low participation rate in applications for funding and even lower success rates.

Not only did the analyses provide EY and the DR representatives with a comprehensive overview of the current status but they also served as a basis for discussions and negotiations at the national, regional and European levels.

Support – but what?
Our conclusion from the analyses performed was that there is room for improvement and capacity to absorb additional R&I support in the DR.

In R&I, specialization is important in order to gain a competitive advantage. As it is not possible to support all types of research in a country or within the region, the question of which areas and goals should be supported is a contentious one.

We recommend firstly analyzing the data available and creating a list of thematic areas. This list should serve as a basis for discussion and, after voting, a short list of thematic areas should be created. It should be kept in mind that, in policy-making, results of data analysis are usually only a basis for discussion and not a straightforward solution that all stakeholders will be willing to implement. When selecting thematic areas, significant value can be added by inviting R&I experts – scientists, not bureaucrats – to the table. It is often the case that people vote for the scientific field that they understand, not the one with the most promising results.

Policy-makers deal with whether to support an area in which the country or region already has developed skills and expertise or to start building an area they envisage as important for the future. There is no clear and definitive answer to this question and usually both approaches are balanced.

For the DR, we identified both vertical and horizontal examples of priorities that should be followed. Vertical priorities such as automotive industry, IT, new materials or environment are specific to the region; on the other side, horizontal priorities (see separate box for examples) are more universal and might also serve as a good example outside the DR.

From 2014 to 2020, the EU plans to invest €78.6b in new R&I projects and initiatives under the Horizon 2020 program.

Examples of horizontal priorities for an initiative supporting international R&I

- Supporting the innovative activities of small and medium-sized enterprises
- Connecting scientists and public institutions with the private sector
- Mentoring R&D institutions and facilitating submission of proposals for grants
- Improving development and exploitation of human capital
- Increasing the participation rate of students and young scientists in R&D projects
- Increasing the total number of patents and co-applicants
- Promoting and spreading awareness about EU programs in countries with low success rates
- Collecting missing data in non-EU states and gathering new data in EU and non-EU states
Priorities and thematic areas should accord with strategies already in place. However, there are often too many different strategies and strategic documents developed at national, regional or European level, and agreeing with all of them can lead to very generic goals. This should be avoided, as a generic strategy is not executable.

How to support and how to get political support
Other problems that institutions and individuals from DR countries face are connected to obtaining funding from available public or private sources. The reasons behind the inability to receive competitive funding are mainly insufficient experience in submitting excellent R&I proposals and in building or joining scientific networks to create international project teams. It is international cooperation that enables effective scientific knowledge sharing and accelerates new discoveries.

Our conclusion from the analyses performed was that there is room for improvement and capacity to absorb additional R&I support in the Danube Region.
Removing the barriers, which are common for many countries in the region, can boost R&I activity in the DR. In cooperation with the DR Working Group, we proposed three forms of institution that might help to solve these issues.

The first proposed alternative was a virtual fund; pooling financial contributions from national and EU sources into one common pot in order to finance international R&I projects in the region. Such a fund would be used for direct funding of projects. However, countries with underfinanced R&I would not have sufficient resources to contribute.

The second alternative was a funding network that would be built on the already established networks between DR representatives and R&I supporting initiatives in the region. This low-cost network would monitor and identify potential areas of cooperation and also find existing funding opportunities for common R&I projects. Such a network, without legal or institutional form, is very dependent on the active participation of its members. One of the key goals of a funding network would be supporting the transformation of bilateral agreements between countries into multilateral ones. This would have the effect of involving more countries from the region in international scientific cooperation and thus increase the number of international projects.

The third short-listed alternative was a support center that would enable the establishment of new successful international partnerships, and provide guidance for project applicants in scientific writing and scientific review of project proposals, in order to prepare them for submission of proposals into competitive funding calls. The support center would also organize networking workshops and connect the right people.

When proposing a new initiative or form of support, it is crucial to map all existing initiatives and programs in order to avoid overlap with their activities. A new form or initiative has to be designed so that it is flexible enough to be able to adapt to continuous changes in the R&I environment and the changing needs of stakeholders. Sustainability is a key prerequisite for successful implementation of any new initiative.

**Key takeaways**

► In evaluating absorption capacity, it is beneficial to focus on a particular R&I field or thematic area in order to analyze aspects in more detail.

► When considering the development of a new initiative, ensure that appropriate infrastructure is in place in order to create conditions for successful and sustainable implementation in the long term.

► Supporting science and engaging in science are two different worlds. To be
Supporting science and engaging in science are two different worlds. To be successful, the country or the region has to master both.

- In long-term projects with numerous stakeholders, be ready for potential changes in the project’s scope so that the ultimate outputs deliver added value to the client.
- Since quality of data and information may vary from source to source, it is beneficial to verify key conclusions with relevant stakeholders so that there is certainty that the conclusions made are correct.
- Decision-making in the public sector is a lengthier process than in the private sector. Each decision has firstly to be discussed internally within the national ministry or institution and then presented. Opinions or decisions of public representatives are often not binding, which complicates planning or development of new initiatives. Often, approved strategic documents, at the national level, have the advantage of serving as a guideline for consistent decision-making and voting.
- When developing new international initiatives, there is a need for support from the leading country (or countries) and, ultimately, “it’s all about money,” both in volume and availability. Financial aspects should, therefore, be among the first topics for discussion and conclusion when considering any new initiative design. However, the best solutions are not necessarily the most expensive.