RIO Country Report 2016: Romania

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Foreword

This report offers an analysis of the R&I system in Romania for 2016, including relevant policies and funding, with a particular focus on topics of critical importance for EU policies. The report identifies the main challenges of the Romanian research and innovation system and assesses the policy responses implemented. It was prepared according to a set of guidelines for collecting and analysing a range of materials, including policy documents, statistics, evaluation reports and online publications. The quantitative data are, whenever possible, comparable across all the EU Member State reports. Unless specifically referenced, all data used in this report are based on Eurostat statistics available in January 2017. The report contents are partly based on the RIO Country Report 2015 for Romania (Andreeescu, Gheorghiu and Zifciakova, 2016).
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HIGHLIGHTS

- Romania’s macroeconomic situation has been relatively stable, with low inflation and low external deficits. According to the Eurostat, in 2015 Romania had one of the highest growth rates in the EU (3.9% of GDP). The International Monetary Fund has forecasted that Romania’s GDP will reach 4.2% by the end of 2016 (mainly due to the consumption stimulus) and decelerate to 3.6% in 2017.
- In November 2015, the coalition government led by Víctor Ponta from the Social Democratic Party (PSD) resigned. Subsequently, a technocratic government led by the former EU Commissioner Dacian Cioloș was appointed until the general election. By the end of August 2016, 8 ministers were replaced.
- The results of the general election from the 11th of December 2016 brought the resurgence of preferences for the Social Democratic Party, which got 45% of the votes. Together with the Alliance of Liberals and Democrats (ALDE), they hold the majority of seats in the Parliament.
- On the 4th of January 2017, the Romanian Parliament approved a new left-leaning coalition government which brought also some institutional changes for the R&I system. The former Ministry of National Education and Scientific Research was replaced by two ministries: the Ministry of Education and the Ministry of Research and Innovation.
- In January 2017, the new Government approved a series of fiscal-budgetary measures, which have raised concerns over the increase of the risk of budgetary deficit to over 3% of GDP.
- As of 22 January 2017, significant protests took place across the country. These protests were a reaction to government’s plans to change the amnesty and the pardon law within the penal code via emergency decree. This decree was adopted despite the massive street demonstrations on the 1st of February 2017.
- In 2015, the Romanian expenditure on R&I (GERD) increased to 0.49% of GDP from 0.38% of GDP in 2014 (however Romania has still the second lowest intensity in the EU). The public allocation for R&I also increased with 30% in 2016.
- The R&I investments in the business sector (BERD) showed an increase from 0.16% of GDP in 2014 to 0.21% of GDP in 2015 (compared to 1.30% of GDP EU28 average).
- The underfinancing of the R&I system has generated significant brain drain.
- The ex-ante conditionality for R&I was set to be finalised by the end of 2016.
- The European Commission approved the amendment and the financing of the second phase of the project Extreme Light Infrastructure – Nuclear Physics (ELI-NP), which is developed in Magurele.
- The priority investments in 2017 are foreseen for the generation IV nuclear reactor (Alfred), the ELI-NP and the ELI-NP Laser Valley.

MAIN R&I POLICY CHALLENGES

- **Increase public R&I expenditure and the absorption of Structural Funds.** Since 2008, the Romanian R&I system has been underfunded compared to the targets in strategic documents and underperforms in comparison to EU28. Under the new Cohesion Policy for 2014-2020, Romania was allocated €30.84 billion, the fourth largest ESIF budget, but the share allocated for R&I is only 3.43%.

1 Authors’ calculation based on DG REGIO data.

- **Enhance the efficiency of public expenditure for R&I and improve the mechanisms for evaluation and monitoring.** The limited funds for R&I are dissipated across a fragmented and large R&I system, which lacks funding schemes directly correlated with the results of institutional research performance evaluation.
- **Improve the R&I governance.** The R&I governance is often characterised by low administrative capacity, fragmentation, frequent legislative, staff and institutional changes, insufficient policy capacity, lack
of human resources with expertise or insufficient in number. A genuine regionalisation process still remains uncertain, while Regional Development Agencies have very limited competences in R&I.

- **Improve the framework for private investment in R&I.** Businesses have little motivation to invest in R&I, they prefer to import technology. While the private sector is in general reluctant in taking financial risks which arise from R&I, financial services and instruments to mitigate the risk have been hardly available.

- **Build synergies between science and industry.** In 2013, Romania received a Council country-specific recommendation to increase investment in R&I and ensure closer links between science and industry. The recommendation was not reiterated in the following years, although the situation did not register a significant improvement. The absence of an explicit recommendation on this might be explained by the need to prioritise other important structural problems on short term.

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**MAIN R&I POLICY DEVELOPMENTS IN 2016**

- The National Plan for RDI 2015-2020 (NP3)
- The Competitiveness Operational Program, Priority Axis 1, Research, development and innovation
- Approval of the financing of the second phase of ELI-NP (by the European Commission)
- New Tax Code and fiscal stimuli for R&I activities
- Regulatory framework and fiscal facilities for business incubators
- New Law on salaries in the public sector
- Law 233/2016 on public-private partnership
# 1. Main R&I policy developments in 2016

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
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<tbody>
<tr>
<td><strong>National Plan for RDI 2015-2020 (2016)</strong></td>
<td>The National Plan for RDI 2015-2020 (NP3) was approved in July 2015 with a budget of €3.300m. NP3 is structured around five programmes with distinct targets, financing instruments and coordinating institutions. These are: Development of the national R&amp;I system; Increase of economic competitiveness through R&amp;I; EU and international cooperation; Fundamental and frontier research; and Research in fields of strategic interest. Many of the NP3 programmes were launched in 2016, after being open for public consultation.</td>
</tr>
<tr>
<td><strong>The Competitiveness Operational Program, Priority Axis 1, Research, development and innovation (2016)</strong></td>
<td>Many of the calls under Priority Axis 1 (PA1) Research, development and innovation supporting economic competitiveness and the development of businesses (total budget €952.57m) of the Competitiveness Operational Program (COP) funded through European Regional Funds were opened.</td>
</tr>
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<td><strong>New Tax Code and fiscal stimuli for R&amp;I activities (01/2016)</strong></td>
<td>From January 2016, Romania introduced a new Tax Code, which aims to simplify the process of tax collection. Standard VAT was reduced to 20% and will be reduced further from January 2017 to 19%. The Government Ordinance OUG 32/2016 amends the article 60 of the Tax Code, introducing a fiscal stimulus for R&amp;I activities. This ordinance stipulates an exemption for personnel income resulting from R&amp;I activities.</td>
</tr>
<tr>
<td><strong>Regulatory framework and fiscal facilities for business incubators (05/2016)</strong></td>
<td>At the end of May 2016, the Law 102/2016 which provides the principles of setting up, functioning and several fiscal facilities for establishing business incubators was adopted.</td>
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<tr>
<td><strong>EC approves the second phase of ELI-NP (06/2016)</strong></td>
<td>In June 2016, the EC approved €140 million financing for the second phase of the &quot;Extreme Light Infrastructure – Nuclear Physics&quot; (ELI-NP) project developed in Magurele.</td>
</tr>
<tr>
<td><strong>Law on salaries in the public sector (early 2016)</strong></td>
<td>A new law on salaries in the public sector was adopted in the first half of 2016. However, the law did not provide any substantial stimulus, being rather aimed at minimising the discrepancies for the same level of experience in the system.</td>
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<tr>
<td><strong>Law 233/2016 on public-private partnership (11/2016)</strong></td>
<td>The law regulating the establishment and implementation of the public-private partnership was adopted on 24 November 2016.</td>
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## 1.1 Focus on National and Regional Smart Specialisation Strategies


The National Plan for RDI 2015-2020 (NP3), approved in July 2015, is the main implementation instrument of the strategy. The responsibility for its management and execution belongs to the National Authority for Scientific Research and Innovation (currently reorganised as the Ministry of Research and Innovation), which outsourced the management for most of the programmes. Other implementation instruments of the strategy are the OP-Competitiveness/ Priority Axis 1 – RDI for competitiveness, the sectorial RDI plans of various ministries, the scientific programmes of the Romanian
Academy, as well as the ROP-Regional Operational Programme/ Priority Axis 1 - ‘Technology transfer’, managed by the Ministry for Regional Development.

Four smart specialisations defined at national level were aggregated through the foresight-based elaboration process in the NSRDI 2020; bioeconomy (based on the agricultural potential of the country), ICT (currently the most dynamic RDI sector in Romania), energy and environment (related to the challenges of energy efficiency, and to water resources), and eco-technologies (focused on new-generation vehicles and equipment, the generation of bio resources, depolluting and waste reuse). The set of specialisations was then expanded by political decision in the adopted form of the NS 2020 to include: space and security, energy production, climate change, and new materials (substitution of critical materials, new polymer materials, and nanomaterials).

All the regions have made progress in developing their own regional smart specialisation strategies (RIS3). However, while the already existing strategies select a number of priorities, these were typically formulated as broad goals and the contemplated measures were horizontal in nature. In the preparation of the calls under the Priority Axis 1, ‘Technology transfer’ of the Regional Operational Programmes, all seven regions eligible for cohesion funds have to develop by March 2017 a concept note based on a common methodology. For the regions which already have a RIS3, the note should provide a detailed explanation regarding the economic sectors and type of services for which the Technology Transfer Offices (TTO) could be funded and the SMEs which may implement results of the technology transfer. For the regions which do not have a RIS3 yet, the note will also identify smart specialisation priorities. By November 2016, all the seven ‘less developed’ regions in Romania advanced in drafting the concept note, the selection of the S2 niches being achieved via a more active entrepreneurial discovery process.

**New developments**: The Lagging Regions project funded by European Parliament and outsourced to the European Commission (DG REGIO and DG JRC) aims to develop and enhance the engagement of relevant stakeholders as well as create linkages between regional R&I smart specialisation strategies and existing national RIS3 in selected European lagging regions, including the North-East and North-West Romanian regions.

The project Enhancement of the Administrative Capacity of the NASRI for the implementation of the actions foreseen in the NSRDI 2014-2020; SIPOCA 27, funded through the Operational Programme Administrative Capacity, launched in August 2016 provides for the implementation of the entrepreneurial discovery process, the implementation of a strategic orientation mechanism as well as the development of a methodology for the evaluation of the four smart specialisation priorities and health.

**Outstanding issues**: A genuine regionalisation process still remains uncertain in Romania. The topic has been intermittently on the top of the public agenda, but controversies regarding the appropriate depth and breadth of regionalisation have determined the delay of any decision on this matter. The RDAs are very heterogeneous in terms of resources, with practically no RDI policy design capabilities and responsibilities. In these circumstances, the R&I instruments these strategies may use are limited to those provided at national level (the National RDI Plan, the OP-Competitiveness/Axis 1 RDI for competitiveness, the ROP/Axis 1 Technology Transfer).

### 2. Economic Context

Romania’s macroeconomic situation is relatively stable, with low inflation and external deficits. According to the Eurostat, in 2015, Romania had one of the highest growth rates in the EU (3.9% increase of GDP). This was driven mainly by domestic demand and exports. The International Monetary Fund (IMF) forecasts that Romania’s growth rate will reach 4.2% in 2016, mostly due to the stimulus to consumption from the recent fiscal expansion and will decelerate to 3.6% in 2017 (IMF, 2016). After one year of a technocratic government lead by the former EU Commissioner Dacian Ciolos, the new government formed by the winning PSD party took office on 4th January 2017.
The modifications brought to the Tax Code at the beginning of 2017, the Law repealing 102 non-fiscal rates and taxes and the elimination of the 088 form are among the most important measures with an economic impact to come into force on 1 February 2017. The 2017 state budget providing for fiscal relaxation and salary increase in the public sector relies on a 5% economic growth estimate and budget revenues which may be too ambitious. While Romania has made significant progress in adjusting macroeconomic imbalances and fiscal consolidation, the recent tax cuts could negatively affect the fiscal outlook and economic competitiveness.\(^2\) The tense political situation as a result of the Government’s decision to adopt the bill on the pardon of certain deeds and on amending the criminal code caused massive street protests during the winter, and affected the financial markets, triggering investors’ concern.

2.1 Structure of the economy

Services have the highest share in the Romanian economy (69% of GDP in 2015). Despite contracting, the agricultural sector still plays an important role (5% of GDP), while the industry contributes with 26% of GDP. Foreign Direct Investment (FDI) has a key contribution to the Romanian economy (World Bank 2016), which is currently largely dependent on the presence of multinationals subsidiaries, in terms of both assets and employment. Romania is one the most attractive countries for the development of the automotive manufacturing industry in the South Eastern Europe and a good location for near-shoring software development.

As noted by the European Commission in its 2015 Country Report, Romania has the second-lowest labour productivity in the EU. After undergoing a sharp decline during the crisis years and a moderate decline after, labour productivity started growing in 2013.

2.2 Business environment

Romania is a market with potential, a strategic location for exports to Turkey, the Middle East and the Balkans, as well as a business environment which offers opportunities, but also vulnerabilities. According to Doing Business 2016, Romania ranked 37 out of 189 countries in the ease of doing business, lower than Poland, Slovak Republic and Czech Republic, but higher than Bulgaria and Hungary. Romania ranks 45 on the ease of starting a business, while the lowest rankings are on the ease of getting electricity and construction permits, for which the procedures remain complex.

Romania welcomes foreign investments by providing special tax incentives and ensuring an investment-friendly business climate. The standard corporate tax is 16%, applicable to both Romanian and foreign businesses established permanently in the country. Reduction of the standard 16% tax is granted for profits reinvested in new technological equipment used for business purposes, and income tax exemption applies for IT&C employees. The August 2016 Fiscal code amendment also introduced a supplementary 50% tax reduction for research activities (150% reduction in total). The micro-enterprises benefit of reduced tax (1% to 3% depending on the number of employees).

Most of the reforms related to doing business target the tax regulation and only a few the labour regulation and insolvency. The number of payments per year required to fulfil fiscal obligations has dropped from 113 in 2012 to only 14 in 2016. This, coupled with one of the friendliest tax systems in the EU, provide potential for growth. The venture capital market is underdeveloped. According to the European Commission Country Report 2015, there is no appropriate regulatory framework, including investor and entrepreneur protection, for venture capital and other alternative sources of financing.

2.3 Supply of human resources

\(^2\) [http://www.romania-insider.com/moodys-fiscal-relaxation-romania-generates-risks/]
In 2015, Romania had the second-lowest share in the EU of Human Resources in Science and Technology (HRST) of the total active population (27%). The distribution of total HRST full time employed by sector of performance was 29% in business, 35% in government and 36% in HEIs in 2014. The share of female researchers is above the EU average (45.7 vs. 41% in 2014).

In 2016, Romania invested only 3.75% of GDP in education and training. The latest available EUROSTAT data (2013) indicate that Romania had the lowest investment in education in EU. It ranks rather low relative to EU15 in terms of graduates in tertiary education, but fairly well, regarding the number of graduates in science, mathematics and computing, engineering, manufacturing, construction. ‘In 2008, 72% of students graduated with degrees in soft disciplines, the highest proportion of graduates in the social sciences in the EU’ (World Bank, 2014), while more recent data indicates that between two thirds and three quarters of the students studied law or economics in the period 1997-2013 (INSSE 2015).

The number of new doctorate graduates is relatively high (1.14 new doctorate graduates per 1000 population aged 25-34 compared to 1.07 (EU28 average), while the number of researchers per thousand of population is only 1.38 compared to 5.36 (EU28 average), Romania having the lowest share of researchers per total population. (EUROSTAT, 2013)

The new doctoral schools – initially funded through Structural Funds – provided financial support to about 7 800 PhD students in 2015. Nevertheless, the figure is not reflected in the increase of the number of researchers, which tends to remain constant, with small fluctuations around 27 000 (and, respectively, a total R&D personnel of around 43 000). For the period 2014-2020, the new objective in terms of researchers is to double their number and simultaneously reach a share of 45% in the business sector.

This objective seems rather difficult to attain, due to two key hindering factors:
- the attractiveness of a scientific career remains low in the context of the underfunded research and education systems and low salaries;
- the enterprises remain reluctant in developing their own R&D personnel and activities, in spite of the recent fiscal incentives and the improvements in the IPR legislation. This fact is reflected by the stagnating low level of private R&D investments during the post-recession years (around 0.2% of GDP).

There is mismatch between supply and demand, reflected in the relative disconnection between the higher education system and the labour market, the former responding to the short term student population demands, while the PhD holders supply exceeds the capacity of absorption by the chronically underfunded R&I system.

Thus, Romania with its free education system, coupled with a rewarding system for students, but underpaid and unsatisfied staff, and with a relatively high supply of PhD holders, continues to face substantial challenges, both for increasing the number of researchers and for reducing the serious brain-drain phenomenon. The country has a significant number of researchers (World Bank, 2014) and more than 20.000 doctors working abroad, its best graduates are recruited by top world universities and do not return, while many good graduates from soft fields work in sectors which do not correspond to their level of expertise and specialisation. In the absence of relevant data and studies, it is difficult to quantify the long term impact of the loss of qualified human resources and the efficiency of the investment in education, however poor, against this particular context.

3. Main R&I actors

In the last years, the Ministry of National Education and Scientific Research (MNESR), through the National Authority for Scientific Research and Innovation (NASRI), has been responsible for drafting research and innovation policies and for the coordination of the national R&I system. Starting January 2017, NASRI was restructured as the Ministry of Research and Innovation (MRI). NASRI (currently MRI) is also responsible for the overall implementation of the two main funding instruments of the
National R&I Strategy: the NP3 and the Competitiveness Operational Programme (COP)/Axis 1, where it acts as intermediary body. The NP3’s execution was outsourced to a large extent to the **Executive Agency for Higher Education, Research, Development and Innovation Funding (UEFISCDI)**, but also to the Romanian Space Agency (ROSA) and to the **Institute for Atomic Physics (IFA)**.

The management of the other R&I relevant programmes funded through ESIF belongs to the **management authority (MA)** and the intermediary body of the responsible ministries. Various Councils and Consultative Bodies with different roles support NASRI (currently MRI) in its activity.

The country is formally divided into 8 development regions, however with limited administrative powers. Each region has a **Regional Development Agency (RDA)** which elaborates a Regional Development Plan (RDP) and ensures the technical management of funding, but has limited competences and responsibilities in R&I in the current framework.

In 2015, there were 101 accredited Higher Education Institutions (HEIs) in Romania (56 public universities and 46 private universities). The number of academic staff decreased with 11% from 2009-2010 to 2014-2015. In 2014-2015, the indicator students per academic staff reached 14.8, the lowest value in the last decade (MNER, 2016). No Romanian university has been included in the Shanghai top 500. Universities receive public institutional funding for teaching activities, but not for R&I. They obtain their research funding via projects based on competitive funding, which is open to all R&I actors. Nevertheless, the research performance is a key factor in evaluating the universities and to some extent in quantifying their institutional funding.

The public R&I performers system consists primarily of 47 national R&D institutes specialized in technological research, the majority of them being coordinated by MRI, the 65 research institutes and centres of the Romanian Academy, most of them oriented towards socio-economic and humanistic domains, and the 56 public universities. The public R&I system is divided between a roughly equal number of applied research and fundamental research organisations. The private research organisations represent a small minority. The SME sector consists, to a large extent, of ‘subsistence organisations’, the R&I activities being too risky for them, while several large multinational corporations have limited R&I activities in the country. Few sectors emerged recently, such as the ICT sector. The very low BERD intensity in Romania had shown a decreasing trend in the last decade, with a light revitalisation in 2015 (increasing from 0.16% of GDP in 2014 to 0.21% in 2015).

The number of newly registered foundations has been declining steadily over the past few years in Romania. The reasons are high set-up costs and insufficient funding opportunities. Only a few of them are active in research and/or innovation. Their role is however marginal and their investments scarce. Foundations are often not even mentioned in national reports which discuss research funding opportunities. An exception is the **Romanian-American Foundation**, which has launched the ARTIE grant program. This program is unique in Romania and may represent a source of inspiration for other grant providers (Romania – EUFORI Study Country Report, 2015).

Currently there are 45 clusters registered in the **Romanian Cluster Association – CLUSTERO**. Among the most important clusters and cluster agglomeration could be mentioned Auto Muntenia Competitiveness Pole and "Cluj IT Cluster".

In recent years, the technology start-up movement has gained momentum. The 'hubisation' trend has led to pre-acceleration and acceleration programmes and pitching sessions, mostly in the field of ICT. So far, these innovative technology companies have...
emerged primarily in major urban agglomerations, such as Bucharest, Cluj, Timisoara, Iași or Brașov.

The poor prospects of a career in research or in higher education have generated a massive brain drain from Romania over the past twenty years. Romania is among the top European countries in terms of brain drain (World Bank, 2011).

4. R&I trends

In 2015, the Romanian expenditure on R&D (GERD) increased to 0.49% of GDP from 0.38% of GDP in the previous year, but it still accounts for the second lowest intensity in the EU.

![Figure 1](image)

**Figure 1** Breakdown of sectorial contributions to total GERD funding.
Data source: Eurostat, November 2016.

4.1 Public allocation of R&D and R&D expenditure

The government support for R&D (measured via government budget appropriations or outlays for research and development, GBAORD) was well below the European average, yet showed a slight increase to 0.26% in 2015 (compared to 0.21% GDP in 2014). In 2016, the budget allocation for R&D increased with 30% compared to 2015. Romania was severely hit by the financial crisis in 2009, which had large repercussions on GERD. Government funding did not recover after the crisis and in 2014 it was still at its 2009 level.

Currently, there are just a few R&D fiscal incentive programmes in Romania: the 150% deduction on qualifying R&D expenses, the accelerated depreciation on qualifying R&D assets, and, since August 2016, a tax amendment providing tax exemption for personnel income resulting from research projects. However, given the complex methodology associated to the latest, there is concern than its usage and its impact will be limited.

The main obstacle appears to be the very low interest of enterprises in developing R&D activities, considered too costly and risky, but also the uncertainty about the tax authority’s approach to the treatment of R&D costs. Furthermore, according to the Deloitte Romania Corporate R&D Report 2014, 46% of Romanian companies are not familiar with R&D tax incentives. In addition, almost half of respondents (46%) consider that R&D tax regulations may entangle serious financial risks for the company because of the relative difficulty in identifying and classifying R&D activities properly.
4.2 Private R&D expenditure

The R&D investments in the business sector (BERD) showed an increase from 0.16 in 2014 to 0.21% of GDP in 2015, but they are still significantly lower than the EU28 average (1.30% of GDP). The level of funding provided by business has practically stagnated in terms of GDP (fluctuation of +/- 0.02% of GDP) in the last decade, which shows that companies did not engage in or did not expand their research activities. In the period 2012-2013, total R&D intensity decreased due to the simultaneous decrease of both public and private support. This was followed by a subsequent increase over the period 2013-2014. Since 2012 the importance of external funding seems to be growing. External funding has grown with an average of 20% of total GERD during 2012-2014, although in itself it is still a minor resource, representing only about 0.03% of GDP.

![Figure 2 Breakdown of sectorial contributions to total BERD funding. Data source: Eurostat, November 2016.](image)

The limited innovation performance is, to some extent, explained by the structure of the Romanian economy, which has a prevalence of low- and medium-technology sectors (wearing apparel, leather, textiles and basic metals). When looking at the contribution of the various sectors to the total gross value added (GVA), manufacturing was by far the most important sector, with automotive industry in the first place, followed by the services associated sector (wholesale and retail trade repair) and industry. Construction, real estate activities and transportation occupy also an important place. The shares of other sectors in GVA are close to or below 5% and the leading services sectors in terms of BERD are contributing to a lesser extent to the GVA. One explanation could be that these are smaller sectors within the country's economy or that they operate with a low margin due to the strong sectorial competition.

When classifying business funds for R&D by sectors of performance, 17% of funds were directed to activities carried out in the government and higher education sectors (2014 data, EUROSTAT). According to the EU Industrial R&D Investment Scoreboard 2016, Romania has no company in the top 1000 EU R&D performers. Several multinationals run R&D centres in Romania, including Renault Technology Romania (with 3200 engineers), Honeywell Romania (2500 employees) Infineon Technologies (300 employees) and Continental Automotive (3 R&D centres). Other multinational companies with R&D centres in the country include IBM, Adobe Systems, Freescale Inc., Alcatel-Lucent, Ubisoft and Microchip Technology. Since 2011, the Continental Teves ranks with 110 inventions on the 4th position in Romanian patent activity, while the top high scoring
inventions according to Thomson Reuters Patent Strength Index™ scoring system belongs to BITDEFENDER IPR, followed by Digitaloptics Corp Euro Ltd (Thomson, 2015).

4.3 Public sector innovation and civil society engagement

The Central Unit for Public Administration Reform (CUPAR) has been the main promoter of public innovation in Romania since 2002, with the aim of transforming central and local public administration into a more efficient one. However, the activity of CUPAR is not easy to track and assess from sources available to the public. The National Electronic System for Online Payments is a platform for online payments launched in 2011. All Romanian central and local public institutions that levy taxes are required to enrol in the national online payment platform, according to an agreed calendar. The implementation of this platform has brought with it several innovations in the Romanian administration⁴.

According to the European Public Sector Innovation Scoreboard 2013, Romania has the lowest government effectiveness value in the EU27: -0.51 in 2000, showing an improvement of the performance to -0.14 in 2010. The Ciolos government has been active in implementing innovative actions in the public sector, aiming to reduce bureaucracy, ensure transparency and online access to information.

In February 2016, the Romanian Government launched the online platform www.maisimplu.gov.ro, with the aim to open public consultation regarding the complex bureaucratic procedures and ways to simplify them, ensuring transparency and online access. Several actions, which are mentioned below, have been already implemented.

The GovITHub program brings together the entrepreneurs who want to contribute to the digitalisation of the public services, aimed to facilitate the relationship of citizens with the state institutions. The platform was launched in August 2016 and by November 2016 included 20 projects, over 300 volunteers and more than 1,000 sponsors. Among the GovITHub projects are the Single Electronic Register, allowing the record, integration and analysis of all data on social enterprises; the digital platform for petitions tracking the status of the petition addressed to a state institution; the development of new modules for MySMIS, the national platform managing the ESIF; RADAR, a platform that allows citizens to visualize data held by public administrative-territorial units; consultare.gov.ro, a platform that aggregates all legislation under public consultation and enable the submission of proposals in electronic format.

The Foreign Investor's Guide provides the information needed by new foreign investors coming to Romania (www.investromania.gov.ro). The online platform Set up your company in 5 minutes! (www.approd.ro) created by IT specialists, generates the documents needed for setting up a company.

Given the delays of reform, public innovation can arise in any segment of the public system. The ERRIS (www.erris.gov.ro) platform is an innovative online repository of all national RIs, while the Brainmap pPatform (https://www.brainmap.ro) aims to store information about national and international researchers.

The health system is a good example of top-down and bottom-up implemented innovation. The health information system was designed to function in silos, with their own rules and formats limiting the opportunity for information to be globally integrated and readily available. The top-down measure of the National Health Card and its supporting system provides the opportunity to identify in the system, to have records of medical services and allows for more transparency. A good example of bottom-up process/organisational innovation in the health system is the ST-Elevation Myocardial Infarction (STEMI) register which started as an initiative from cardiologists. Its major progress was the significant reduction of STEMI-related mortality in the regions.

⁴ The tax payer can visualise all the payments due to public institutions which are registered in the online platform. The tax and levies register used in the online systems of local and central public administration is standardised, as well as payments processing and reimbursements.
5. Innovation challenges

5.1 Challenge 1: Increase public R&I expenditure and the absorption of Structural Funds

Description

The R&I system is underfunded. After a relative pre-recession increase, reaching 0.39% in 2008, public allocations for R&D entered a downward spiral, reaching a flat valley: 0.20% (2013), 0.19% (2014) and 0.20% (2015). In the period 2007-2013, Structural Funds for R&I contributed to around 20% of public R&I expenditure. A similar percentage is foreseen for the period 2014-2020. Romania had also a low participation in FP7, with a contribution of only around €6.4/capita compared to €17.8 in EU13 and €95.2 in EU15 (Stairway to Excellence Facts & Figures, 2015).

According to Directorate-General for Regional and Urban Policy of the European Commission, Romania had one of the lowest overall absorption rates in the EU by August 2016. Yet, the absorption rate for the R&I sector is rather high (117% during the 2007-2013 financial exercise), unlike the very low overall absorption rate. This was acknowledged through the decision of the European Commission to reallocate €110m from the 2014-2020 Structural Funds programming to supplement the €800m initially allocated to the Axis AP1 of the COP – “R&I in support of competitiveness and business development”.

Policy response

The National Strategy for RDI 2014-2020 (NSRDI 2020), adopted on 21 October 2014, reaffirmed a 2% GERD target (1% public and 1% private) by 2020. Its main financing instrument, the National Plan for RDI 2015-2020 (NPRDI 2015-2020), which is financed from the national funds, was approved in July 2015 with a total budget of ca. €3,300m and it is designed on the basis of this target and multiannual planning.

According to the Annual Budget for 2016, approved by the State Budget Law 2016, the investment in research increased by approximately 30% compared to the estimated final budget implementation in 2015.

In 2016, the government has identified the main causes for the low absorption of Structural Funds in the previous cycle and designed actions to address them: reorganise the institutional system to eliminate redundancy and fragmentation, ensure transparency and avoid corruption, simplify guides and procedures and design a new financial circuit and ensure that the budget for all the OPs will be managed from one single budget, annually dimensioned on estimations. The actual absorption of EU funds for the 2014-2020 programme began only in May 2016, 2.5 years after the start of the programming period. By the end of November 2016, only 0.98% of ESIF funds were absorbed compared to the 2.6% EU average. According to the Minister of European Funds, in 2016 the institutional efforts were focused on increasing the absorption of funds from the previous cycle 2007-2013 and dealing with system blockages inherited from the previous governance. These have delayed the absorption of funds for the period 2014-2020 (Ministry of European Funds, 2016).

Policy Assessment

Since 2008, the R&I system has shown a trend of underfunding relative to the targets assumed by national and EU strategic documents and underperforms in comparison to EU28. The National Plan for RDI 2015-2020 was approved with a significant delay (July 2015) and the first calls were opened later than envisaged.

During the Ciolos government, the absorption rate has increased from 58.67% at the end of 2015 to 77% by August 2016.
The budget allocated for R&I in 2016 was increased in the State Budget Law 2016 and the August 2016 first annual budget rectification did not revise it downwards.

Under the new cycle of Cohesion Policy for 2014-2020, Romania was allocated €30.84 billion, the fourth largest ESIF budget, but the share allocated for R&I represents only 3.43%. This signals the relative low importance of the R&I on the political agenda.

5.2 Challenge 2: Enhance the efficiency of public expenditure for R&I and improve the mechanisms for evaluation and monitoring

Description

The limited funds for R&I are dissipated across a fragmented and large R&I system which lacks of funding schemes rigorously based on the results of the regular evaluation of the institutional research performance. Although the share of competitive allocations in the total public funding increased significantly, some institutional funding formally labelled as competitive is often awarded on a non-competitive basis to PROs. The institutional funding for public universities does not include a share for R&I expenses. The block funds are correlated with the number of students, while the funds for research activities are accessed only through competitions. The analysis of the scientific performance indicates that the HEIs are the best performers in terms of ISI scientific publications, although the HEIs do not receive block funding for R&I (Chioncel 2009, Zulean 2015).

In 2014 the R&I performed by HEIS was only 0.09% of GDP compared to 0.19% of GDP performed by PROs.

The budget cuts affected unevenly the funding instruments. While the funds for the National RDI Plan 2007-2013 were reduced greatly, the funds dedicated for the Programmes “Nucleu” (core) and those of the Romanian Academy were kept. This shows a preferential reduction of the competitive funding in favour of less transparent non-competitive institutional funding (Zulean, 2015). While the political choice of ensuring salaries for researchers in PROs may be well grounded, in the long-term this may further deteriorate the performance of the R&I system.

Several deficiencies arise as a longer term impact of budgetary constraints. While recent investments in research infrastructure increased its quality, they often lacked a long-term strategic approach. The investments were also often underused due to the lack of adequate skilled human resources and finances for maintenance and research activities, while the training of human resources may not have responded to the market demand.

Romania invests a low share of GDP in education (3.07% in 2015, EUROSTAT data), the lowest share in EU and significantly low compared to that mandated by the Law of Education (6%). Romania offers free education at all levels, complemented by a rewarding system for pupils and students. The system is characterised by heavy curriculum and high competition, limited infrastructures, limited offer for tailored education and vocational training, the staff underpayment generating frustration fluctuation and often underperformance. In this specific context the system has become in some way elitist: high rates of early school attrition, low results in national and international system evaluations, low staff salaries but top results in international competitions. The allocation of the number of undergraduate and PhD students in public universities (free of charge) is not based on foresight and labour market supply-demand studies.

The analysis of the evaluation and monitoring implemented during 2007-2013 shows that while there was a high degree of transparency regarding evaluation criteria and results, the monitoring component was not fully developed, the results being presented in an aggregated form in annual reports. The competitive based financing instruments PNII, POSDRU, POSCCE had a higher degree of transparency in comparison with the block funding (Zulean, 2015). While the feasibility and economic impact were considered in the project evaluation, the lack of standardised framework and the low systemic
capacity for evaluating financial feasibility and cost-benefit analysis caused subjective assessments (Curaj, 2015).

The monitoring implemented under POSDRU, POSCCE (2007-2013) has focused on meeting administrative goals rather than scientific output and encouraged project-based short-term thinking which in many cases did not lead to sustainability after the projects have ended. The monitoring mechanisms for POC 2014-2020, as described in the ‘Monitoring Procedures’ document, enable a good monitoring of the project progress. However, the subsequent implementation of mechanisms remains open for assessment.

Policy response

Institutional evaluation has been discussed extensively over the past few years in Romania. An institutional evaluation procedure for entities which are part of the national R&I system was adopted under the Government Decision 1062/2011. According to this regulation, evaluation panels include prestigious national and international scientists. The procedure was applied by NASRI, in cooperation with the National Advisory Board for R&I, to all the national R&I institutes. The evaluation process was finalised in 2015. All the institutes were ranked in the A category (further subdivided in A+, A, A-) and no institute is currently classified in the B, C, or D categories.

HEIs are evaluated according to specific methodologies approved by Government Emergency Ordinance 75/2005 (last updated in 2014) and applied by the Romanian Agency for Quality Assurance in Higher Education (ARACIS). The National Council for Funding Higher Education has been proposing for the past three years (2013-2015) several methodologies for an ‘Institutional Development Fund’ for universities to be granted to the highest-scoring higher education institutions.

Improved mechanisms are envisaged to be implemented under the 2014-2020 Strategy. The regulatory frameworks of NP3 and of OP Competitiveness (POC) aim to ensure mechanisms for transparent monitoring and evaluation. The institutional funding principles expressed in the NS 2020 aim to correlate the funding going to national R&I institutes, Romanian Academy institutes and public universities with the performance. Nevertheless, no further information about their implementation is available.

The project Enhancement of the Administrative Capacity of the NASRI (currently MRI) for the implementation of the actions foreseen in the NSRDI 2014-2020 (SIPOCA), funded through the Operational Programme Administrative Capacity has to deliver a methodology for the evaluation of the NSRDI 2014-2020, to be applied for the mid-term evaluation of the Strategy. It includes also the impact evaluation on the national smart specialisation domains. The evaluation should be based on a monitoring mechanism, collecting input and output (result and impact) indicators. The SIPOCA project aims to make operational a platform integrating the Registry of Researchers in Romania, the National Registry of Research Infrastructures (www.erris.gov.ro), and the Registry of Research Results. The National Roadmap for large research infrastructures is under elaboration and is one the requirements for closing the ex-ante conditionality for R&I.

The National Agency for Public Procurement (ANAP) has become operational. The 2014-2020 Public Procurement Strategy mandates for an Electronic System for Public Procurement within the ANAP aiming to ensure adequate monitoring and supervision of relevant actions.

Policy Assessment

The R&I system remains fragmented and highly polarised, with a limited number of actors achieving visible outputs. The attempts of implementing various mechanisms for institutional evaluations were under debate, yet implications of the classification for the funding remain unclear. The high degree of fragmentation and polarisation of the public research system hampers its efficiency and further amplifies the consequences of the low funding.

The transparency of the individual research organisations is heterogeneous. However, there is an overall low degree of transparency and this is influenced by some of the
existing regulatory frameworks. The HEIs are more transparent than the PROs and the Romanian Academy. (Zulean, 2015)

While improved mechanisms are envisaged to be implemented under the 2014-2020 Strategy, their implementation remains open for assessment. The SIPOCA project should provide a coherent monitoring mechanism, the methodology for evaluation and the mid-term evaluation results, foreseen for 2018.

Romania has one of the highest share of researchers and medical professionals working abroad, while the best of the graduates for whom the system takes pride are recruited by top world universities and do not return. The system lacks efficiency and long term perspective, ability to match supply and demand, interest to retain and use efficiently the skilled professionals formed in the country. The education policy may be in the long term one of the most important structural challenges of the Romanian society itself.

The main aim of the National Strategy for Public Procurement is to ensure efficiency and value-for-money, as well as transparency and responsible allocations, among others by reducing legislative clutter in the field.

5.3 Challenge 3: Improve the R&I governance

Description

The R&I governance is characterised by low administrative capacity, fragmentation, frequent legislative, staff and institutional changes, lack of human resources with adequate expertise or in sufficient number, all of which lead to insufficient policy capacity. A genuine regionalisation process still remains uncertain, while Regional Development Agencies have very limited competences in R&I. Under these circumstances, the spectrum of instruments that the Regional Smart Specialisation Strategies may deploy remains limited. The Council Recommendations since 2013 (including in 2016) reinforces that: “The weak capacity of the public administration to develop and implement policies remains a core challenge for Romania, hampering overall development of the country.”

Policy response

A coordination mechanism and an institutional framework with structures on three levels (strategic committee, thematic inter-institutional, operational) has been set up in 2015 to ensure the coherence of R&I interventions, complementarities and synergies in the programming and implementation of Structural Funds. The Committee of Coordination for the Management AP (CCMAP) with a representation of 54% from public authorities and 46% from members of civil society is set to have annual meetings and to collaborate with the Management Committee for the coordination of ESIF.

The Government Decision 236 of 19 October 2015 stipulates the establishment of the Inter-ministerial Committee for Public Procurement.

To ensure a better prioritisation and a higher effectiveness in the allocation and use of public funds for R&I, the National RDI Strategy 2014-2020 provides for the creation of The National Council for Science, Technology and Innovation Policy (NCSTIP), under the direct coordination of the Prime Minister.

Policy Assessment

The government has made progress in identifying the root causes of the structural weaknesses, but the implementation of the solutions is still delayed. While coordinating mechanisms and organisms are set-up, they may be deemed as insufficient in the absence of human resources and of a culture willing to make them functional.

There is room for better coordination between the national and regional levels to build upon the strengths of localised concentrations of entrepreneurial knowledge, as well as between all ministries and actors concerned at national level. The prospects for having a
genuine regionalisation process which would allow for more regional R&I competences at the regional administration level remains unclear.

5.4 Challenge 4: Improve the framework for private investment in R&I

Description

Businesses have little motivation to invest in R&I, they prefer rather to import technology. While the private sector is in general reluctant to bear the risks arising from R&I, financial services and instruments to mitigate the risk have been hardly available, the venture capital market is underdeveloped. The total value of venture capital investments as % of GDP is the lowest in the EU28 (Eurostat, 2015).

Romanian businesses take limited advantage of digital infrastructures and services in enhancing efficiency and productivity, but also in reaching customers and online sales. Only 7.4% of businesses sell online and a small share of their turnover is coming from these sales (4.9%). The processes for business creation and business activity have been streamlined, but efficient bankruptcy procedures have not been fully implemented, while labour regulations remain rigid, in spite of the recent amendments aimed at improving the flexibility of the labour code.

The venture capital market remains at an early stage, but some progress has been made particularly through various programs developed with several European and international institutions. Catalyst Romania, funded by the European Investment Fund (EIF), through the JEREMIE initiative, signed in March 2016 an investment of over €1 million in Smart Bill, the leading cloud invoicing company in Romania.

Policy response

The National Strategy for Competitiveness 2015-2020 identifies several significant economic sectors with competitive potential, while the National RDI Strategy 2014-2020 sets targets in terms of activating the business sector and increasing the economic impact, with a focus on the smart specialisation domains. Measures implemented under NP3 (innovation vouchers, experimental projects – demonstration/proof of concept, technology validation and transfer to industry) and OP Competitiveness/API (innovative technological projects, innovative spin-offs and start-ups, innovative newly created enterprises, investment for RD departments in enterprises) provide direct support for R&I activities performed by innovative companies. OP Competitiveness 2014-2020 also provides specific financial instruments, e.g., credits, guarantees and risk capital measures. The SME initiative programme with an allocation of €100m from the European Regional Development Fund (ERDF) facilitates the access to finance for Romanian SMEs. It is expected that 2500 SMEs will benefit from it. The financial aid scheme was launched in August 2016 and gives SMEs access to funds from €200,000 to €1m, provided that these companies carry out non-agricultural activities.

The National R&I Strategy 2014-2020 integrates smart specialisation priorities. The strategic orientation mechanism required by the ex-ante conditionality, linked with the smart specialisation, aims at supporting the entrepreneurial discovery process. The regulatory framework for the supplementary 50% (deduction 150% in total) tax deduction for R&I expenditures was finally adopted in 2015. The Government Ordinance OUG 32/2016 amends the article 60 of the Tax Code introduced as of the 1st of January 2016 by expanding the fiscal incentives for R&I activities. The ordinance stipulates the exemption of tax for personnel income resulted from R&I activities and defines the conditions under which the exemption is applied.

At the end of May 2016, a new law which provides for several fiscal facilities for companies setting up business incubators was approved. The insolvency system was improved by introducing time limits for the observation period and for the
implementation of the reorganisation plan and by clarifying rules on voidable transactions and on payment priority for claims of post-commencement creditors.

Policy Assessment
The government has made progress in identifying the causes of the low investment of businesses in R&I and they are addressed by the 2014-2020 R&I policy. The impact cannot be assessed yet since the mechanisms deploying the policy are at an early stage of implementation. The business sector shows signs of an increasing interest in innovation, as revealed by the emergence of hubs, especially in ICT. The recently implemented fiscal stimulus for R&I activities (August 2016) and the supplementary 50% tax deduction for R&I expenditure have the potential to trigger higher investments in R&I from the private sector.

Most of the reforms related to doing business target the tax regulation and only a few target labour regulation and insolvency. Entrepreneurs complain that business needs long term stability rather than frequent changes in regulation. The processes for business formation and operation have been streamlined, but efficient bankruptcy procedures have not been fully implemented, while labour regulations remain rigid.

Various interlinked factors limit the exploitation of online commerce, without which the country will have difficulties in competing in the global digital economy. The NS R&I 2014-2020 aims to provide support for all stages of innovation. Nevertheless, given that most of the actions have just been launched or still have to be opened, its efficiency and impact cannot be assessed.

5.5 Challenge 5: Build synergies between science and industry
Description
The level of R&I funds invested by businesses is very low: 0.18% of GDP in 2015 (EU28 average in 2013: 1.12%). The highest proportion of these funds is spent in R&I performed by business and a very small share 0.03% by public sector, which indicates a low level of science-business collaboration and a weak commercialisation of public research results. In 2013, Romania received a Council country-specific recommendation (CSR) to increase the investment in R&I and ensure closer links between research, innovation and industry by prioritising R&I activities that have the potential to attract private investment. Yet, the situation has not improved, likely because other critical issues were prioritised by the Romanian government, such as education, public administration, poverty and health.

Policy response
Several measures implemented through NP3, OPC, ROP are aimed to support the performance and competitiveness of economic agents by using the expertise in universities and R&I institutes, to provide support for the creation and development of knowledge and technology transfer broker offices and of Knowledge Transfer Partnerships.

In the period 2014-2020, the Regional Operational Programme (ROP) and the Priority Axis 4 Strengthening regional and local business environment provide the funding for regional and local business support structures.

The ERDF component for R&I, with €173,53 million supports the creation of knowledge and innovation transfer (KIT) centres, development of platforms for demand/supply of the intellectual properties and exploitation of the research results in new products and processes, which can be deployed to the market, support for KIT specific business consultancy. The eligible amounts for individual projects range from €100.000 to €3m. Entities for KITs covered range from KTOs, business and technological incubators, scientific and technological parks and the target is the creation of 60 new KITs.
**Policy Assessment**

The efforts made since 2007 to promote the collaboration between the public and private sectors, patenting and licensing or emergence of spin-off companies have limited impact and the results achieved are below the targets. The number of companies participating in national R&D programmes, in several hundreds of R&D projects achieved in partnership with PROs and universities, is around 1000 (approx. 2% of the total number of enterprises).

The results of public research remain essentially in academic domains with little impact on economic development (The World Bank, 2011), in essence because of the still low interest of companies in developing RDI activities. Moreover, the innovation and technology transfer infrastructure has been developed to a limited extent only and the capacity to deliver these services is rather low.

Given the lack of compliance with the initially planned budget it is difficult to assess the efficiency of the policy actions in the 2007-2013 period. In spite of the fact that, on one side, the main national RDI programmes (National RDI Plan, OP Competitiveness/ Axis 1) promote a wide variety of projects supporting industrial research done in partnership with PROs, and, on the other side, ROP 2014-2020 has specific actions aimed at facilitating knowledge transfer, the main problems persist: low interest and involvement of companies in R&I activities, traditional low level of industry-academia relations, lack of entrepreneurial culture and skills among researchers.

6. **Focus on creating and stimulating markets**

*This section aims at describing and assessing national level efforts to introduce demand-side innovation policies to stimulate the uptake of innovation or act on their diffusion, including public procurement and regulations supporting innovation. It also analyses policy measures aimed at internationalisation of companies with the aim of increasing the innovativeness of the economy.*

The participation of businesses in public tenders decreased from 30% in 2013 to 25% in 2015 (EC, SBA Factsheet RO). In 2015-2016, Romania started the reform of the public procurement system to address systemic deficiencies through full implementation of the national public procurement strategy. A new institution, the National Authority for Public Procurement ANAP ([http://anap.gov.ro/web/](http://anap.gov.ro/web/)), under the authority of the Ministry of Public Finance, has become operational. The ‘National Strategy for Public Procurement 2015–2020’ (approved on 25 October 2015) brings a new approach to public procurement and tries to ensure efficiency and value-for-money, transparency and responsible allocations.

Romania has an uptake level of EU Green Public Procurement (GGP) below 20 % ([Renda A et al, 2012](#)). Green criteria are usually not part of public bidding documents. The public-private partnerships (PPP) are rather at an incipient stage, yet actions were taken in the right direction.

A new law on PPP was approved on 25 November 2016. The law provides a more attractive framework for the private investor, ensures transparent and competitive auction, regardless the value of the contracts and introduces the concept of an innovation partnership for public institutions seeking innovative solutions which are not available on the market.

Various instruments under OPC (2014-2020) aim at stimulating the enterprises’ demand for innovation through R&I projects. The Programme ‘Develop marketing activities for market products and services’ opened in 2015 is a minims support scheme, offered within a multiannual frame programme, which aims at supporting the development and modernisation of economic agents and enhance their capacity to promote products and services on the market.
The National RDI Strategy 2020 (NS2020) defines activating public sector demand for innovation as a key objective. It envisages the following action lines: support for improving the capacity of the public sector to formulate demand for innovation, a programme of thematic research supported by public institutions directly interested in the results, support for the public procurement of innovative products and services, a programme for pre-commercial public procurement and monitoring of new and emerging technologies, establishment of a national target concerning the weight of public procurement of innovative products and services within the aggregate public procurement and of a pilot programme to support social innovation.

This investment-friendly environment combined with available EU funds and instruments is starting to open the doors for entrepreneurs seeking to do business in Romania. Foreign investors do not have to pay corporate income tax for a period of five years if the investment is made in industries such as agriculture or construction, for three years if the investment is made in natural resources sector, and two years if the investment is made in commerce, tourism, banking or insurance sectors.6

The National Strategy for Export 2014-2020 (NES)7 is the national strategic document providing the framework for the strategic actions for 2014-2020. The strategy envisages the creation of the support network of the strategy, network of service providers, regional export councils, an institute of export to providing training, think tanks accredited to manage jointly the implementation, monitoring and evaluation of the sectorial strategies. In 2014, the Office for attracting investments in SMEs and Internationalisation was established within the Ministry of Economy’s new Directorate-General for Entrepreneurial Policies. In 2015, the Romanian Institute for Foreign Trade was created with the aim to promote and support exports, organise fairs and exhibitions for economic players in the country and abroad and promote tourism at national and international level. (Ministry of Industry and Resources, 2016)

The National Strategy for Export 2014-2020 (NES) envisages various financing instruments. Currently EximBank offers financial instruments, such as: investments credit for SMEs, credit facility for current activity, export credits, letters of guarantee. EximBank as member of Factors Chain International may finance partially/totally, the commercial invoices related to export activity. Within the Programme multiannual ‘Export Promotion (already enacted in 2014), the initiative ‘Participation by economic operators, under the national flag, at international fairs and exhibitions abroad’, offers financial support to SMEs, aiming to promote export activities, improve company export structure and boost the access of domestic products and services to international market. The initiative ‘Organisation of economic missions and promotional events abroad’, which is also part of the ‘Export Promotion Programme’, was implemented in 2015, offering financial support to SMEs to help them participate in economic missions and promotional events abroad. (EximBank, 2015)

7 http://www.minind.ro/strategie_competitivitate
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## List of abbreviations and definitions

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<tr>
<td>COP</td>
<td>Competitiveness Operational Programme</td>
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<td>EDP</td>
<td>Entrepreneurial Discovery Process</td>
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<td>EIF</td>
<td>European Investment Fund</td>
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<td>ELI-NP</td>
<td>Extreme Light Infrastructure</td>
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<td>ERRIS</td>
<td>Engage in the Romanian Research Infrastructure System (platform)</td>
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<td>ESIF</td>
<td>European Structural and Investment funds</td>
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<td>EU15</td>
<td>The 15 Member States of the European Union as of December 31, 2003</td>
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<td>EU28</td>
<td>The 28 Member States of the EU</td>
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<td>FDI</td>
<td>Foreign Direct Investment</td>
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<td>FTE</td>
<td>Full-time equivalent (researchers)</td>
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<td>GBAORD</td>
<td>Government budget appropriations or outlays for research and development</td>
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<td>GD</td>
<td>Governmental Decision</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GERD</td>
<td>Gross domestic expenditure on R&amp;D</td>
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<td>GVA</td>
<td>Gross Value Added</td>
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<td>HEIs</td>
<td>Higher Education Institutions</td>
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<td>HRS</td>
<td>Human Resources in Science and Technology</td>
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<td>ICT</td>
<td>Information Communication Technology</td>
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<td>KIT</td>
<td>Knowledge and Innovation transfer</td>
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<td>KTO</td>
<td>Knowledge Transfer Offices</td>
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<td>MNC</td>
<td>Multinational company</td>
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<tr>
<td>MNER</td>
<td>Ministry of National Education and Research (Ministerul Educatiei Nationale si Cercetarii)</td>
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<td>MRI</td>
<td>Ministry of Research and Innovation</td>
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<td>NAPP</td>
<td>National Agency for Public Procurement (Agentia Nationala pentru Achizii Publice)</td>
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<td>NASRI</td>
<td>National Authority for Scientific Research and Innovation (Autoritatea Nationala pentru Cercetare Stiintifica si Inovare)</td>
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<td>NCSTIP</td>
<td>National Council for Science, Technology and Innovation Policy</td>
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<td>NCSTP</td>
<td>National Council for Science and Technology Policy</td>
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<td>NES</td>
<td>National Strategy for Export</td>
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<td>NP2</td>
<td>National Plan for Research, Development, and Innovation, 2007-2013</td>
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<td>NP3</td>
<td>National Plan for Research, Development, and Innovation, 2015-2020</td>
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<td>Acronym</td>
<td>Description</td>
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<td>NRP</td>
<td>National Reform Programme (Programul National de Reforma)</td>
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<td>NSPP</td>
<td>National Strategy on Public Procurement (Strategia Nationala de Achizitii Publice)</td>
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<td>OP</td>
<td>Operational programme</td>
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<td>OPC/COP/P</td>
<td>Operational Programme Competitiveness/ Competitiveness Operational Programme/ Programul Operational Competitivitate</td>
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<td>POSCCE</td>
<td>Sectorial Operational Programme on Increasing Economic Competitiveness (Programul Operational Sectorial Cresterea Competitivitatii Economice)</td>
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<td>POSDRU</td>
<td>Sectorial Operational Programme Development of Human Resources</td>
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<tr>
<td>R&amp;D, R&amp;I</td>
<td>Research and development, Research and innovation</td>
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<td>RA</td>
<td>Romanian Academy (Academia Romana)</td>
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<td>ReNITT</td>
<td>(Romanian) network for innovation and technological transfer (Reteaua Nationala pentru Inovare si Transfer Tehnologic)</td>
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<td>RI</td>
<td>Research infrastructure</td>
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<td>ROP</td>
<td>Regional Operational Programme</td>
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<td>S2E</td>
<td>Stairway to Excellence</td>
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<td>SF</td>
<td>Structural Funds</td>
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<td>SOP-IEC</td>
<td>Sectorial Operational Programme on Increasing Economic Competitiveness (Programul Operational Sectorial Cresterea Competitivitatii Economice)</td>
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<tr>
<td>UEFISCDI</td>
<td>Executive Agency for Higher Education, Research, Development and Innovation Funding (Unitatea Executiva pentru Finantarea Invatamantului Superior, a Cercetarii, Dezvoltarii si Inovarii)</td>
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<tr>
<td>VAT</td>
<td>Value Added Tax</td>
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<tr>
<td>VC</td>
<td>Venture capital</td>
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## Factsheet

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<tbody>
<tr>
<td>GDP per capita (euro per capita)</td>
<td>5900</td>
<td>6300</td>
<td>6600</td>
<td>6700</td>
<td>7200</td>
<td>7500</td>
<td>8100</td>
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<tr>
<td>Value added of services as share of the total value added (% of total)</td>
<td>56.32</td>
<td>52.39</td>
<td>51.15</td>
<td>57.58</td>
<td>57.27</td>
<td>59.04</td>
<td>61.59</td>
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<tr>
<td>Value added of manufacturing as share of the total value added (%)</td>
<td>21.56</td>
<td>23.86</td>
<td>24.47</td>
<td>22.61</td>
<td>23.04</td>
<td>23.65</td>
<td>22.02</td>
<td></td>
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<tr>
<td>Employment in manufacturing as share of total employment (%)</td>
<td>18.68</td>
<td>17.5</td>
<td>17.98</td>
<td>17.42</td>
<td>17.6</td>
<td>18.18</td>
<td>17.95</td>
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<tr>
<td>Employment in services as share of total employment (%)</td>
<td>40.13</td>
<td>39.61</td>
<td>40.96</td>
<td>41.55</td>
<td>41.8</td>
<td>42.1</td>
<td>45.74</td>
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<tr>
<td>Share of Foreign controlled enterprises in the total number of enterprises (%)</td>
<td>5.22</td>
<td>6.43</td>
<td>2.82</td>
<td>6.14</td>
<td>5.79</td>
<td></td>
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<tr>
<td>Labour productivity (Index, 2010=100)</td>
<td>100.1</td>
<td>100</td>
<td>100.1</td>
<td>110.6</td>
<td>115.9</td>
<td>119.5</td>
<td>124.7</td>
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<tr>
<td>New doctorate graduates (ISCED 6) per 1000 population aged 25-34</td>
<td>1.05</td>
<td>0.94</td>
<td>1.23</td>
<td>1.09</td>
<td>1.14</td>
<td>0.3</td>
<td>0.35</td>
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<tr>
<td>Summary Innovation Index (rank)</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>34</td>
<td>36</td>
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<tr>
<td>Innovative enterprises as a share of total number of enterprises (CIS data) (%)</td>
<td>20.7</td>
<td></td>
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<tr>
<td>Innovation output indicator (Rank, Intra-EU Comparison)</td>
<td>24</td>
<td>23</td>
<td>23</td>
<td>22</td>
<td></td>
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<tr>
<td>Turnover from innovation as % of total turnover (Eurostat)</td>
<td>14.3</td>
<td></td>
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<td>Country position in Doing Business (Ease of doing business index WB)(1=most business-friendly regulations)</td>
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<td>37</td>
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<td>Ease of getting credit (WB GII) (Rank)</td>
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<td>7</td>
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<tr>
<td>Venture capital investment as % of GDP (seed, start-up and later stage)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.002</td>
<td>0.002</td>
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<td>EC Digital Economy &amp; Society Index (DESI) (Rank)</td>
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<td>E-Government Development Index Rank</td>
<td>47</td>
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<td>64</td>
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<td>Online availability of public services – Percentage of individuals having interactions with public authorities via Internet (last 12 months)</td>
<td>7</td>
<td>8</td>
<td>7</td>
<td>31</td>
<td>5</td>
<td>10</td>
<td>11</td>
<td>9</td>
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<tr>
<td>GERD (as % of GDP)</td>
<td>0.46</td>
<td>0.45</td>
<td>0.49</td>
<td>0.48</td>
<td>0.39</td>
<td>0.38</td>
<td>0.49</td>
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<tr>
<td>GBAORD (as % of GDP)</td>
<td>0.3</td>
<td>0.28</td>
<td>0.26</td>
<td>0.22</td>
<td>0.21</td>
<td>0.21</td>
<td>0.26</td>
<td></td>
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<tr>
<td>R&amp;D funded by GOV (% of GDP)</td>
<td>0.25</td>
<td>0.25</td>
<td>0.24</td>
<td>0.24</td>
<td>0.2</td>
<td>0.19</td>
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<tr>
<td>BERD (% of GDP)</td>
<td>0.19</td>
<td>0.17</td>
<td>0.18</td>
<td>0.19</td>
<td>0.12</td>
<td>0.16</td>
<td>0.21</td>
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<td>Research excellence composite indicator (Rank)</td>
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<td>Percentage of scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country</td>
<td>4.37</td>
<td>5.16</td>
<td>5.55</td>
<td>4.73</td>
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<td>Public-private co-publications per million population</td>
<td>7.04</td>
<td>8.38</td>
<td>8.27</td>
<td>4.78</td>
<td>4.2</td>
<td>2.61</td>
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<td>World Share of PCT applications</td>
<td>0.03</td>
<td>0.02</td>
<td>0.03</td>
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<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
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