ROMANIA AND SMART SPECIALISATION STRATEGY

BACKGROUND DOCUMENT

Economic context

The Romanian economy, ranked right in the middle of the latest Global Competitiveness Report, is efficiency-driven and displays low business sophistication. It specializes in medium- and low-innovation sectors and is separated from the average national economy in Europe by a considerable competitiveness gap. Most of its small- and medium-sized firms are not innovation-driven and have low added value. On the opposite end of the spectrum, the main purveyors of innovation are multinational corporations, which, alongside a few large state-owned companies, play a dominant role in the economy.

The structure of the labor force diverges substantially from the European trends. The largest share of the working population is employed in services, but at just under 40% it is far below the EU average. Agriculture still employs almost a third of the work force, a good section of it, however, in subsistence-level activities. Manufacturing accounts for 28% of the labor force.[1]

In the manufacturing sector, most companies are concentrated in food and beverages, metal products, furniture, wood, clothing, and machinery and equipment. All of these subsectors are situated in the low-to-intermediate part of the skills and the technology spectrum. The manufacturing subsectors with considerable future potential (i.e., with high added value and intermediate-to-high skills and technology) include motor vehicles and transportation equipment, chemicals and chemical products, and medical precision and optical instruments.[2]

Business expenditures in R&D remain very low (at 0.13% of GDP), partly because the large corporations are wary of migrating R&D activities to Romania, not least due to IP concerns. Since 2000, the average annual growth rate of business R&D intensity – and of other indicators on business innovation – has been negative.[3]

Research, development and innovation are a mostly sectoral affair, under the coordination of the Ministry of Education and Research. The agency charged with ensuring intra-governmental coordination on research, development and innovation (RDI) – the National Council for Science and Technology Policy – is still not operative, although a decade has passed since its formal establishment.

Regions and regionalization

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[1] ERAWATCH, Romania country fiche, http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/ro/.
[2] JASPERS/ARUP, *Analysis and Evidence Base of the R&D&I Market in Romania*, 2013, p. 23.
[3] European Commission, *Research and Innovation performance in Romania: Country profile*, 2013, p. 3.

There are no truly functional regions in Romania, although the country is divided into eight more or less formal 'development regions'. A process of regionalization has been announced and a regionalization strategy is currently undergoing public consultations, but both the public opinion and experts are divided about the best approach to the matter.

Economically, the eight 'development regions' are very unequal in strength, with Bucharest being clearly dominant and the West in better shape than the East. The southern regions are at the bottom of the European competitiveness scale.[4]

As far as regional RDI is concerned, each region has an Agency for Regional Development (ADR) in charge with elaborating development strategies and plans. However, these non-governmental, not-for-profit institutions have few means to follow through on their initiatives.

The RDI system

In terms of the number of researchers, the Romanian RDI system is undersized by European standards, with the number of FTE researchers at a quarter of the EU average. The private part of this system is, comparatively speaking, even more underdeveloped, employing just one fifth of the country's researchers.

After a consistent, threefold increase in public R&D financing in the years immediately preceding the economic crisis, the level of funding plummeted to around 0.3% of the GDP. Business expenditure has been decreasing as well, to less than half of its public counterpart.

The large multinationals have been reluctant to locate their R&D in Romania. Smaller companies invest little in research, and recent policies to move them to do so – such as substantial fiscal facilities – have not yet shown results. Public-private co-authorship of scientific publications remains at 11% of the European average.[5]

Under such conditions of under-financing, the public R&D system is nevertheless organizationally extensive, yet also fragmented. There are currently around 260 public R&D entities covering a very large range of fields. These organizations include:

- the 66 institutes of the Romanian Academy, an institution which until not long ago followed the Soviet-bloc 'Academy' model;

- the 46 National Institutes for Research and Development (INCD), formerly the institutes affiliated to the branch ministries (and recently brought under the formal coordination of the Ministry of Education and Research);

- around 90 Romanian universities, both public and private;

[4] World Economic Forum, *The Global Competitiveness Report 2013-2014*, 2013, p. 26.
[5] World Bank, *Functional Review of the Research, Development & Innovation Sector in Romania*, 2011, p. 18.

- other institutes and research stations, affiliated with the so-called 'branch academies'.

Given the large number of individual actors, there is a considerable degree of duplication in the RDI system. As a result, the efficiency of the allocation of public resources has been among the main policy concerns of recent governments. Around two thirds to three quarters of the public funding for R&D have been allocated competitively over the past years.

The national Academy has its separate line in the national budget and its own rules for apportioning the money. The financing of the INCDs has been recently refashioned as a performance-based system. However, in practice the first rounds of evaluations have not had a palpable effect on the funding of these institutions. Indeed, many of the public research organizations have pro forma evaluation regimes.

The outgoing national strategy for RDI (2007-2013) represented one the first major efforts to introduce genuinely competitive financing for R&D, to target innovation specifically, to increase the scientific output in terms of publications in the main scientific flows and patents, and to raise the number of researchers on a path convergent with the EU average. The strategy was premised on public allocations of 1% of GDP (and targeted a similar figure from business investment).

As a result of the strategy, public funding for R&D grew substantially and consistently for several years. However, funds were slashed soon after the onset of the economic crisis. Around a third of the projected RDI budget was actually disbursed. Some of the programs under the National Plan for RDI 2007-2012 (PN2), the chief instrument for the implementation of the outgoing strategy, never took off. As of 2013-2014, the public allocation for RDI is back at pre-2007 levels.

For the next strategic period (2014-2020), the plan is again to reach 1% GDP in public allocations. It should be noted, however, that the structural funds for research and innovation can only cover 15% of that amount.

Nonetheless, the strategy has achieved some notable successes, mainly on the strength of the funding of competitive R&D programs. The scientific productivity measured in terms of publications per researcher is now well above (around 2x) the EU average, with universities leading the way, followed at a considerable distance by the Academy institutes and the INCDs.[6] This upsurge in publications has ensured or solidified a revealed scientific advantage in chemistry and chemical engineering, mathematics, physics and astronomy, and material science.

On the other hand, Romanian researchers continue to be cited less than the average European researcher. The ratio of scientific publications in top science journals is also below the EU average. Romanian RDI fares much worse in terms of IP indicators – the number of EPO patents

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[6] Ad-Astra, *White Book of Romanian Research*, 2011.

is at a mere 1.5% of the average figure for the EU. The number of researchers has decreased over the recent years.

The National Strategy for RDI, 2014-2020

The elaboration of the national strategy for 2014-2020 was outsourced by the Ministry of Education and Research to a consortium headed by 11 main partners supported by an additional 141 associated partners. It was designed as a full-fledged, evidence-based, smart specialization-aware foresight exercise, one of the main goals of which was to identify a set of RDI priority fields.

The project was grounded in a broad participatory exercise, ensuring the involvement of a large number of experts and stakeholders, including representatives of the business community. A commitment to the project was secured from a broad group of key actors – decision-makers in relevant ministries and other public bodies, leaders of the important businessperson associations, members of the civil society, heads of the Regional Development Agencies, and so on.

The strategic package consists of the following key components:

- the Vision on Romanian research, development and innovation in 2020;
- the National Strategy, of which two primary components are the selection of a limited number of strategic domains (smart specialization and public interest fields) and of the strategic objectives for 2014-2020;
- an investment model for the RDI ecosystem (including a Plan for the implementation of the Strategy and an Operational program for RDI);
- a governance model for the RDI ecosystem.

The Vision for 2020 envisages an innovation ecosystem where research and development support the advancement in the global value-added chains. In this environment, excellence and an entrepreneurial spirit mobilize a critical mass of actors; companies become key actors of innovation; the R&D sector is developed around strategic fields and is internationally integrated; and Romania is placed next to major European or global initiatives, either through co-participation or by assuming a leading role (in cases such as ELI-NP or the Danube Institute).

The strategy covers the entire spectrum of RDI issues – from the structure of the research & innovation ecosystem as a whole to smart specialization priorities, to 'public interest priorities', to fundamental research.

As far as smart specialization priorities are concerned, they were selected not as ready-made fields and subfields, but as processes: as detailed below, they were nominated and defined gradually by groups of experts and stakeholders, on the basis of available evidence, with input from the wider RDI community at critical junctures throughout the procedures.

Selecting smart specialization fields for the new strategy

As noted previously, one of the key tasks in the elaboration of the strategic package was to select the set of smart specialization priorities at the center of the strategy. The initial step consisted in defining a larger set of potential (or 'candidate') smart specialization fields. To this end, a broad range of data was put together and analyzed with an eye to determining fields already showing promising scientific results, as well as enjoying a critical mass of researchers and the premises for economic relevance. Once these candidate fields were selected and defined, they became the subject of a three-stage consultation/elaboration process aimed at reducing the list to a smaller set of strategic priorities.

The first stage was based on an online consultation and requested input from the wide RDI community on a list of candidate fields. The input consisted primarily of proposals for important R&I programs at the horizon 2020 in each of the candidate fields. The proposals were backed by arguments.

In the second stage, 13 panels of 15-25 experts and stakeholders worked from this input as well as a large selection of data on the economic value added, on scientific collaborations and results, on societal needs, global trends etc. in the shortlisted smart specialization fields. The chief goal of the panels was to explore the most promising R&I programs in their field and to elaborate some 6-8 program fiches per field.

In the third stage, the fiches (90 in total) were the subject of another round of online consultations, this time even more extensive, assessing the panel proposals quantitatively and adducing arguments for and against. The real-time online Delphi exercise[7] was designed to deliver, among others, a hierarchy of the research and innovation programs in question, including an estimate of their cost at the horizon 2020. The weightiest criterion (representing 50% of all criteria) in the selection among the 90 programs was the anticipated economic impact. The highest ranking programs which, together, reached a cost threshold of 5 billion lei (an optimistic estimate of the RDI budget over the programming period) were selected – with some minor clustering – as the smart specialization priorities of the strategy.

As a whole, the selection process briefly described above:

- pursued an evidence-based approach, making use of:

  • existing or specially commissioned social and economic analyses of the Romanian RDI system, of its actual or prospective economic relevance (including a study by ARUP/JASPERS);

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[7] A complex questionnaire was dispatched to around 44,000 potential respondents – researchers and academics, doctoral students and recent PhDs, members of the scientific diaspora etc. The online consultation lasted a month.

- analyses of domestic and international policy and strategic documents (from the Romanian government, other countries' RDI strategies, Horizon 2020 etc.);
- semantic analyses of around 800 RDI projects to explore the concentration of competitively funded research and innovation in RDI fields;
- extensive data[8] on scientific productivity and on the concentration of scientific competences assembled in a format styled 'knowledge maps' (social network analyses with a visual and geographical (GIS) component).

- responded to a broad range of relevant criteria, among which:

  - proven scientific performance,
  - the potential for adding value (in the economy, public services, public decision-making etc.) to the results of research,
  - Romania's broader strategic interests, including its development strategies.

- used a flexible understanding of a 'priority (or strategic) field' – not simply a scientific domain, but one at the intersection of science, technology, and societal needs and problems;

- was future-oriented, as proposals were backed with arguments in large consultations (taking into account major and emerging trends; emergent technologies; pressing as well as incipient social needs; the behavior of global actors; national and regional strategic commitments; the sustainability of investments in RDI).

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[8] Data on all publicly-funded competitive Romanian RDI projects over the last 7-8 years (over 6,000); all publications in the main scientific flows (over 100,000); all patents awarded over the past several years (7,000+); and data on more than half a million business firms.