RESEARCH AND INNOVATION IN ROMANIA: BETWEEN POVERTY, IMPOSTURE, AND A TWO-SPEED EUROPE

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Abstract. Rather surprisingly, the performance of Romania in what concerns research, development and innovation during the period of time elapsed since the accession to the European Union visibly dropped. The Innovation Union Scoreboard places Romania in the group of "modest innovators" with the lowest values of all indicators, and the Bloomberg innovation index ranks Romania the 46th of 50 countries, after Tunisia, Argentina, and Malta. This paper is an insider analysis of the Romanian RDI system aiming to identify the multiple causes of this situation, and to propose a possible solution based on the concept of "open innovation".
Keywords: Romanian research and innovation, pseudo-excellence, open innovation

I. INTRODUCTION. MOVING DOWNHILL IN A FLAT WORLD

During the past three decades, the paradigms of social evolution changed several times. "In the 1980s, there was much talk about the transition from the Industrial Society to the Information Society. Then in the 1990s people began to talk about the Knowledge Society, noting that information is useful only when it is transformed into knowledge. But as I see it, knowledge alone is not enough. In today's rapidly changing world, people must continually come up with creative solutions to unexpected problems. Success is based not only on what you know or how much you know, but on your ability to think and act creatively. In short, we are now living in the Creative Society" (Resnick, 2007).

Following these transformations, it became obvious that there is a new key resource needed for progress, besides capital and labor: the innovation (see Drucker, 1993).

While everybody seems to agree that "innovation is good", the task of defining innovation is clearly a difficult one. Baregheh et al. (2009) identified as many as 60 distinct definitions of innovation, and we are still counting. In this work, we will accept the definition proposed by Teresa Amabile (1996): "innovation is the successful implementation of creative ideas within an organization", and "creativity is the production of novel and useful ideas in any domain". Jan Fagerberg (2004) differentiates invention and innovation: "Invention is the first occurrence of an idea for a new product or process. Innovation is the first commercialization of the idea." The

systematic quest for new ideas is a process called “research”. A simplified diagram showing how these concepts are connected is presented in figure 1.

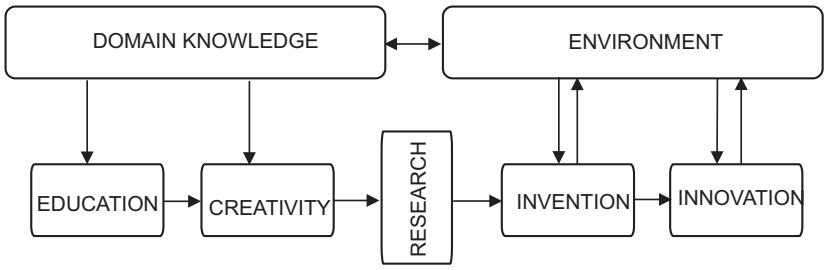

Fig. 1 The main processes related to innovation

It is worth to note that the magnitude of the expected results of innovation should also be considered. Following this criterion, the literature describes *incremental innovation* (“the small i”), and *radical innovation* (“the big I”) – see for example Norman and Verganti (2012), who argue that these types of innovation result from different processes.

The processes related to innovation are influenced by globalization in multiple and complex ways: international application of locally produced innovations, global exploitation of innovations through multi-national enterprises, generation of innovation through the activity of large multi-national consortia (see Archibugi & Iammarino, 2002).

Arguably, these global forces should act towards an increase in the dynamism and in the overall performance of the research and innovation of the affected countries, but – as far as Romania is concerned – the statistics show an opposite trend.

Despite the very optimistic strategy adopted in 2007, right after the accession to the EU (*www.research.edu.ro/uploads/legislatie/planul-national/hg-475.doc*), which formally stated the ambitious objective to “recover the delays relative to other European countries [in the field of Research and Innovation]”, the results recorded in 2013 were totally disappointing. . The Innovation Union Scoreboard 2014 report *(http://ec.europa.eu/enterprise/policies/innovation/files/ius/ius-2014_en.pdf)* places Romania in the group of “modest innovators” with the lowest values of all indicators, and the Bloomberg innovation index ranks Romania the 46th of 50 countries, after Tunisia, Argentina, and Malta *(http://www.bloomberg.com/slideshow/2013-02-01/50-most-innovative-countries.html).*

The present work is an attempt to understand this apparently paradoxical evolution and to outline a possible solution.

Beyond this introduction, the paper is structured as follows:

- Section II identifies the domestic causes of the obvious decrease in the performances of the R&I activity in Romania;
- Section III places the evolution of the Romanian R&I in an European context and looks for external causes of the poor performances of Romanian innovation;

- Section IV attempts to outline a possible solution to improve the situation, and finally, Section V is reserved for conclusions.

II. WHY IS ROMANIA DIFFERENT?

In this general formulation, this topic is so vast that it would take several volumes to discuss it (see also Boia, 2012). However, from a perspective strictly limited to the sector of Research, Development and Innovation, things appear to be much simpler. Some researchers (e.g. Ranga, 2012) blame the global economic crisis from 2008-2010, accompanied by totally improper anti-crisis measures, for the current status of the innovation in Romania. The crisis brought severe cuts in the GERD (Gross Expenditure for Research & Development), which – according to Ranga (2012) "annihilated the improvements of the few previous years that benefited of higher funding."

The level of public expenditure for research, development and innovation should have been 1% of the GDP in 2010, and expected to raise at 1.5% in 2013. In fact, by the end of 2013 the value of this indicator was only 0.49% of the GDP, a quarter of the EU average of 2% (see European Comission document EUR25650 EN, 2013).

However, insufficient funding is not the only cause of the issues. As a matter of fact, most research in Romania is not funded at all: the didactic personnel involved in higher education is required to constantly publish research reports, or else they will not be eligible for any professional promotions. This long term "publish or perish" policy obviously lead to a great number of worthless publications, and trained thousands of people to mimic research by producing compilations of the existing literature, or –even worse – by simply plagiarizing. An attempt of the former Minister of Education, Daniel Funeriu to correct this situation fell into the other extreme: he imposed severe criteria for professional promotion of the researchers, requiring publications in high impact factor journals, but he simply forgot that most of the people supposed to write for these journals were not even capable to read them in lack of an institutional subscription. Not to mention the research infrastructure required to produce results worth publishing in high end journals, and the ridiculous salaries of the entry level researchers. Therefore, I cannot believe in the sincerity of the intentions of Daniel Funeriu. He simply mimicked the reform, just like the others mimicked the research.

A World Bank report containing the functional review of the RD&I sector in Romania (World Bank, 2011) clearly states that: "Romania's government and private sector are investing too little in RD&I, and, perhaps as importantly, often investing it poorly." The consequences may be lasting and severe: *"Romania must decide if it will remain largely a provider of agriculture and raw materials for richer markets or recapture its scientific and technology ranking."*

The cited World Bank report identifies several other causes of the poor performance of the Romanian RD&I sector:

a. Deficient management of the funding of the RD&I sector, which is "split among various ministries and stakeholders who together have lacked a unified vision or even minimal coordination";
b. The financing focused on basic research, neglecting the applied research.
c. "The talents of Romanian entrepreneurs and researchers are not being properly mobilized, and too often are frittered away"

The findings of the World Banck report cited above are worth a closer look.

The poor management of the funding of RD&I does not seem to be an accident – it looks more like a strategy to ensure that the funding will reach the members of an "exclusive club" of beneficiaries. Occasionally, the mass-media publishes leaked information about the salaries of some members of this club (e.g. http://www.hotnews.ro/stiri-esential-12086782-cum-poti-castiga-6-000-euro-brut-lunar-din-invatamant-cercetare.htm), but a systematic investigation on this topic was never conducted.

The preference for basic research is justified by the fact that in this case the performance is only measurable by the number of publications. The applied research is almost entirely ignored, and the result is that – according to the European Patent Office (EPO) statistics – Romanian researchers filed in 2013 only 30 European patent applications. For comparison, Malta registered 88 filings, and Germany 32022 filings. Note that this magnificent result is recorded in 2013, the final year of the period covered by the already cited National Strategy for Research and Innovation for 2007-2013, which states the objective to multiply by 10 the number of EPO patents.

In what concerns the frittered away talents of the human resource involved in RD&I, it is worth to note that Romania was the only country in EU27 where the number of researchers actually dropped by more than 5% between 2005-2011 (see Innovation Union Competitiveness Report for 2013: http://ec.europa.eu/research/innovation-union/pdf/competitiveness_report_2013.pdf)

The main cause of the decrease of the number of researchers in Romania is the brain drain. We don't have official data regarding the migration of researchers, but considering the fact that over 22,000 physicians emigrated from Romania between 2007-2013, we can estimate that this phenomenon also affects other categories of skilled workers, including researchers. And there are no reports about any serious initiative of the Romanian authorities to stem this process.

Perhaps even more serious than the underfunding of the research is the chronic underfunding of education. Though the Law of the National Education nr. 1/2011 stipulates the allocation of 6% of the GDP for funding the education, between 2009-2013, the amount of funding dropped from 4.24% to 3.6% of the GDP.

The result is that Romania has the one of the lowest percentage of university graduates from the total population (21.8% see http://www.6pentrueducatie.ro) and there are no Romanian universities

ranked in the top 500 world's best universities (Shanghai ranking) (http://www.shanghairanking.com/ARWU2012.html).

Even more harmful than the underfunding is the lack of consistency of the laws related to education. The Law of the National Education was often amended between 1995-2013, sometimes 2-3 times a year. This creates the persistent impression of confusion and lack of perspective resulting from the activity of the policy makers in Romanian education.

III. THE GREAT EXPECTATIONS

Considering the rather daunting landscape of the research and innovation in Romania, outlined in the previous section, many Romanian researchers linked their hopes for a solution to the apparently generous EU programmes for funding research.

Indeed, the European Union has spent 50 billions Euros in FP7 (that's about 12 times the cost of the LHC accelerator from CERN, and 20 times the cost of the Hubble telescope), and plans to spend 80 billions more in Horizon 2020 to fund usually large trans-national consortia to perform research in some pre-defined directions. These amounts probably exceed all the funding received by all the Nobel prize winning teams in the same period of time. Considering the lack of comparable results, and the attached bureaucracy, the EU research programmes look more like subsidizing an illusory transnational cohesion of the researchers, than actual research.

Obviously, the competition for these funds is fierce, and Romanian researchers are ill prepared for it. Between 2007 and 2013, Romanian researchers did not win not even one grant funded by the European Research Council, ERC – (see the synthetic report about ERC at this link: http://erc.europa.eu/sites/default/files/content/ERC_in_a_nutshell_oct_2013.pdf) and their performance in other funding channels is not much better.

At a closer look, the distribution of the ERC grants seems to support the idea of a two-speed Europe: the top 5 countries (UK, Germany, France, Netherlands, Italy) received more ERC grants than all the remaining EU and associated countries. This statistic only reflects the objective disparities between EU countries in what concerns cutting edge research.

There are however other elements, without any objective foundation, that also suggest the existence of a two-speed Europe. For example, by taking a look at this document (Table 5a): http://eacea.ec.europa.eu/llp/funding/2013/documents/jean_monnet_ka1/jm_financial_guidelines_llp_guide_part1_2013_en.pdf one could easily notice that a Romanian researcher is paid (for the same work, in the same project) just about a quarter of what is paid a Belgian or German colleague. Initially, I thought that this regulation is based on some considerations about the cost of life in various EU countries, but no - there is a clear statement there that: "The rate of the country in which the partner organization is registered will be applied, independent

of where the tasks will be executed (i.e. a staff member of an organization of Country A working fully or partly in Country B will be budgeted on the basis of the rates of Country A)". In other words, if you are Romanian, working in Belgium on a project with Belgian partners, your salary will be only a quarter of that of your Belgian colleagues. It's hard to believe, but it's exactly like this! Similar discriminatory provisions regarding the payment of researchers from various countries can be found in other EU documents (see for example the Country Correction Coefficients in Marie Curie Actions Programme, within Horizon 2020. Romania has, again, the lowest correction coefficient.)

So, it's almost official: we have a two-speed Europe, and it seems that the EU policy makers are not as concerned with the political correctness as their US counterparts.

Romania entered the race for EU funding with a severe handicap, and there are no signs of recovery it in the near future. The high-speed Europe will not wait for us, and most likely will not help us to accelerate.

IV. A POSSIBLE SOLUTION: OPEN INNOVATION

The concept of "open innovation" (OI) is defined as the process of creating "inflows and outflows of knowledge" that connect the organization with the outside world in order to minimize the cost of the research while keeping a high innovation level (Chesbrough, 2003). A typical example of open innovation is the organization of idea contests on topics selected by the organizers. These contests offer (usually modest) financial incentives for the participants who propose the best solutions. This way, the organizers can benefit of a multitude of innovative ideas at the lowest possible cost. In the famous "grand challenges" organized by Bill and Melinda Gates Foundation, or in the competitions organized online by Innocentive Inc. *(www.innocentive.com)* there is a striking discrepancy between the importance and the difficulty of the proposed problems, and the amount of the rewards offered for solvers.

Despite its obvious advantages for the organizers, the concept of open innovation is largely ignored in Europe by the decision makers and by business. One reason for this is that, from a bureaucratic perspective, it's easier to pay one grant of 1 million EUR, than 100 microgrants of 10000 EUR. Of course, it is not feasible for the EU agencies to directly organize OI competitions, but some intermediary organizations, (e.g. universities, national agencies, or even SMEs) could easily do it.

Such a funding scheme, capable to direct relatively small amounts of research money, in the form of microgrants, awarded through OI competitions, wherein the challenges are directly proposed by SMEs interested in innovative solutions for their activity, has some important advantages:

- brings a paradigm shift in what concerns funding of the research,
- gives a chance to any researcher, including beginners, to get funding for their ideas,
- involves minimal bureaucracy,
- promotes direct contacts and long term partnerships between industry and academia,
- the money is not wasted on worthless publications, which nobody reads, but directly used to solve specific problems inspired by practice,
- attracts more human resources in the RD&I sector,
- after an initial startup time, the system can become self-sustainable, with funding provided by the SMEs interested in submitting OI challenges.

V. CONCLUSION

The RD&I sector in Romania is in critical condition. The new National Strategy for RD&I for the period 2014-2020 (http://www.research.edu.ro/ro/articol/3343/strategia-nationala-de-cercetare-si-inovare-2014-2020) does not bring any real novelty compared to the previous one, and it is unlikely that it will change the course of the evolution in this sector.

Continuing to direct the limited available funds towards centers of pseudo-excellence is the recipe for a total failure (paraphrasing a famous saying, when I hear the word “excellence” in the context of a discussion about Romanian research, I feel an urge to reach my gun).

Europe is not really the nourishing mother we were expecting, when it comes to distributing research funds: EU funds are awarded through fierce competition, and most of us are ill prepared for this race.

Something has to be done, and we have very limited options: open innovation is one of the few available action directions that could make a difference, and it is definitely worth to be considered by any attempt to reform the RD&I sector in Romania.

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