

## REFORMS OF RESEARCH AND INNOVATION SYSTEMS IN EAP COUNTRIES: 25 YEARS OF EXPERIMENTS IN GEORGIA

Oleg Shatberashvili

PhD

Association European Studies for Innovative Development of Georgia – ESIDG

Tbilisi, Georgia

E-mail: shatberashvilioleg@gmail.com

### ABSTRACT

**This article mainly analyses problems of R&I development in Georgia, but readers interested in development of R&I systems in the post-Soviet countries will find many analogies with other EU Eastern Partnership countries as well (Armenia, Azerbaijan, Belarus, Moldova and Ukraine). The components of R&I system are considered: governance, funding, personnel issues, enterprises and research organizations.**

**It has been shown in the paper that the problems of elaboration of relevant R&I policy are neither economic nor related to lack of knowledge, but are linked to a political will.**

**The attempt to analyze problems in the highlight of the European Integration process is maid.**

**Keywords:** Research & Innovation, policy, European integration, Eastern Partnership, post-socialist countries

**JEL Classification:** O38, I23, P21

### 1. INTRODUCTION

This article mainly describes Georgia, but readers interested in development of R&I systems in the post-Soviet countries will find many analogies with others as well. The reason for the mention of the EaP countries (Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine) in the heading also is that this article is the first in a planned series of articles on R & I systems in these countries. The difference between this article and other articles on the subject (e. g. Shatberashvili, O. 2011; Bregvadze T. at al, 2014; Gzoyan E.at al, 2015) is that it is based on a qualitative rather than a quantitative description of the state of affairs and, to a large extent, on personal observations by the author who is a participant in the development of events.

25 years of independence have passed and we can summarize development results in Georgia's R&I sphere. In the country economy there is a slow progress, though Georgia is still far from the GDP per capita of 1980s when it was about 40% of that of USA, while in 2017 it was only 17%. However, the R&I system is in a long stagnation on the very low level in terms of GERD<sup>30</sup> (0.2% of GDP), resulting into its permanent declining in terms of the number and age of people engaged into R&I activities. The absence of the GERD growth to the acceptable level prevents infusion of youth to the R&I system on one hand, and stimulates instead drain of the highly qualified personnel on the other. This process is observed in all post-Soviet countries. The recent study shows (Shatberashvili, 2018), that 50% of the most qualified Georgian researchers are working abroad and they are on average 25 years younger than those working in Georgia (whose age is around 70 years). Thus, we can conclude that state of Georgian R&I system is close to critical. It happened despite of Georgia's declaring the course to European integration since 1996 and signing in 2014 the Association Agreement with EU where R&I is one of the key issues (including research, innovation, higher

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GERD – General Expenditures on Research and Development as percent of Gross Domestic Product.

education, intellectual property, metrology, etc.) and preconditions in the further European integration process. In this article, I'll analyze qualitatively how the R&I system development in Georgia responds the declared goal.

According to one of the possible graphical representations of the country R&I system that is handy for my purpose (Figure 1) it rests on 7 pillars which I will consider one by one highlighting where appropriate their interaction.

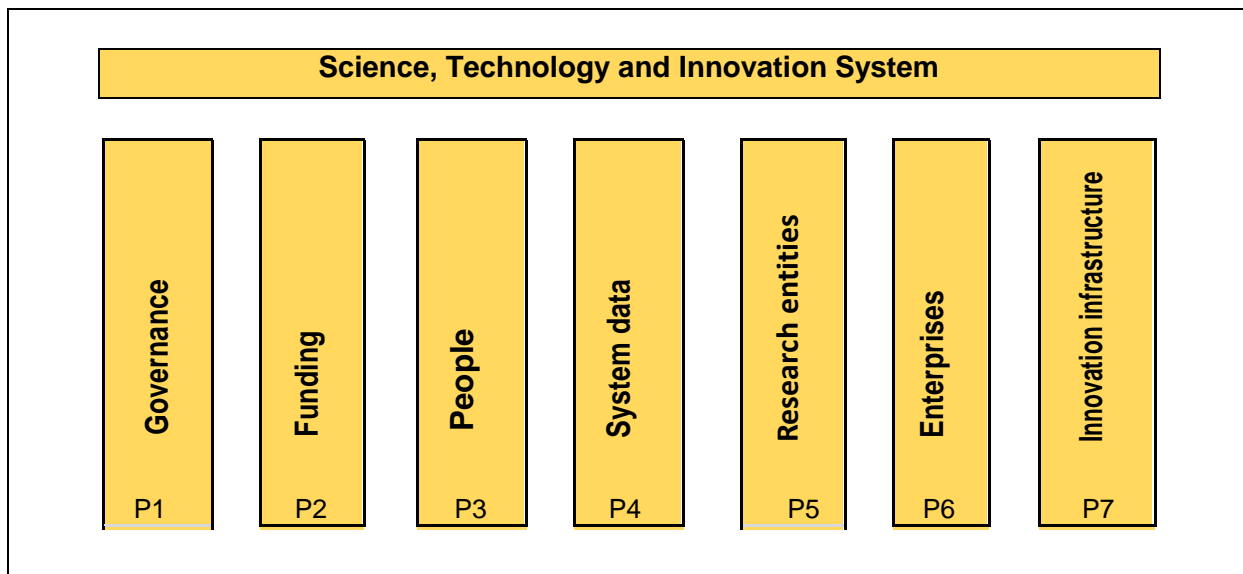


Figure 1.

An important note should be made in the context of the post-Soviet space. The situation in Georgia is not unique, as R&I systems in the majority of post-soviet countries are in more or less similar position. Some are more advanced/lagging in particular components, some in others. Georgia's difference from others is that it is especially lagging in the research system component (World Bank, 2014; H2020 PSF, 2018). We can say that many observations regarding Georgia are valid for other post-Soviet countries as well.

### 1. R&I SYSTEM GOVERNANCE

The Georgian Government as any democratic country government takes responsibility for the country's innovative development, elaboration of an appropriate R&I policy and ensuring support to the process. The formal scheme of R&I system governance in Georgia is as follows:

1. The highest governing body is Georgian Research and Innovation Council (GRIC) chaired by the Prime Minister. Its members are ministers of: Education, Science, Culture and Sport (MESCS); Economy and Sustainable Development (MESD); Environment Protection and Agriculture (MEPA); Health, Labor and Social Affairs (MHLSA); Regional Development and Infrastructure (MRDI); Defense (MD) and some others. Members are also: President of National Academy of Science (NAS); Chairman of the Parliamentary Committee for Education, Research and Culture; Chairman of the Parliamentary R&I Council; Director of Shota Rustaveli National Science Foundation (SRNSF); Director of Georgian Innovation and Technology Agency (GITA) and several leading scientists. GRIC function is to set the overall research and innovation strategy for Georgia.
2. The Ministry of Education, Science, Culture and Sports (MESCS) elaborates research priorities to R&I system, as well as distributes about 70% of all public funds for research, both institutional and project based (the last one through SRNSF). All public universities and the great majority of research institutes are subordinated to MESCS.

3. The MESD funds innovation projects in SME (through GITA).
4. GITA manages innovation infrastructure entities (Technopark, several mini-technoparks and regional innovation centers) and the grant scheme supporting innovation startups. It also serves as a working body for GRIC.
5. The MD manages amalgamation DELTA uniting 6 research institutes, sets their research targets and distributes to them funds (about 30% of all funds for research in the country).
6. MEPA and MHLSA set research targets to subordinated research institutes (one to each). MEPA also manages the network of agriculture consultancy services.
7. NAS advises the Government on the R&I policy issues and evaluates research results by universities and institutes: the only function left to NAS after 2006 when about 40 subordinated institutes were taken from NAS and transferred to universities.

Formally the overall governing scheme is not very far from common in many EU countries. The differences become evident when we consider it in details. The R&I is an interbranch issue usually coordinated in EU countries by a dedicated governmental body, but *also reflected* in the statutes of all ministries as well, because practically all of them are responsible for R&I in their sectors of economy. It is not like this in Georgia where many ministries have no formal responsibility for R&I as the corresponding issues are not reflected in their statutes. The R&I policy related activity of these ministries emerges from time to time when international donor projects invite them (often attracting their staff through appropriate incentives) and fades away as the projects are completed. It happens even with the activities prescribed by the EU -Georgia Association Agreement Action Plan items which often are supported by the EU projects. Decisions by these ministries related to development of the sectors of their responsibility are not research based because they neither have their own research institutes nor funds for commissioning research at universities or other research organizations.

In 2017-2018 the Policy Support Facility (PSF) mission (H2020 PSF, 2018) requested by Georgian Government had studied Georgian R&I system. The mission had found that the overall R&I governance and management lacks coherence and competence. I would add to this the lack of the political will, giving examples of it below.

Many recommendations elaborated by the PSF mission were as well repeatedly submitted to Georgian authorities in the past years by other groups of researchers studying R&I processes in Georgia (e. g. IncoNet EECA 2009; CSO Coalition 'Innovative Georgia', 2013; World Bank 2014; IncoNet EaP 2015). The recommendations, especially those elaborated by the local researchers, were based on the European and World experience adapted to the local conditions. The problem is that they were either ignored or fulfilled selectively and often formally.

Box 1

#### **The recommendations fulfillment by the Government**

From the recommendations of CSO Coalition 'Innovative Georgia' (2013) only three were implemented: 1. Establishing of the Innovation Council chaired by the Prime Minister; 2. Establishing of Georgian Innovation and Technology Agency and 3. Establishing of the Technopark. The rest 10 were ignored. The recommendations were implemented in such a manner that have acquired to the large extent a symbolic character or lacked logic. Namely, the Innovation Council gathered only twice in 4 years. GITA operates in isolation from the research sector and, therefore is not able to be a reliable working body for the Innovation Council. The Technopark instead of being placed near university campuses is constructed outside the city in a picturesque place and serves to a great extent for the venue of conferences. Even recommended 'Law on Innovation' was adopted before elaboration of the innovation strategy (as it was advised) so cannot be considered as a recommendation fulfillment

An example of a surprising attitude of the MESCS to its responsibilities is the research priorities setting assigned to MESCS since 2004 (statute of MESCS). In 13 years MESCS has not elaborated any set of priorities. In fact there were not even attempts to do it. I will allow myself in the Box 1 to dwell on my personal observations on the discussion of the issue of prioritization, since they are very relevant in this case.

Box 2

#### **The research priorities discussion**

In 2016 at the meeting on the Black Sea Horizon project in Vienna, senior representatives of the MESCS claimed that MESCS is carrying out the projects financing scheme on the basis of 83 priorities that the NAS determines to them and they are not entitled to reduce their number. It turned out that this is not true. In January 2018, at a meeting in the Parliament of Georgia in which the same representatives of MESCS participated, the vice president of NAS said that MESCS has to determine 5 -7 priorities, instead of finance projects on more than 80 'priorities'. The representative of MESCS had nothing to answer because could not repeat in the presence of the NAS representative that NAS determines the priorities.

Knowing these facts, the government's request to the EC formulated in 2017 as 'Support in identification of promising research fields (prioritization)' (H2020 PSF, 2018) can only be explained by the desire just 'to mark activity' in this becoming stumbling-stone direction, because the 13 years delay cannot be excused by the absence of the external support.

Another issue on which the Government addressed the EC for assistance is very sophisticated area of 'Performance Based Funding of research entities'. The PSF mission (2018) pointed at the wide complex of measures which should forerun implementation of sophisticated mechanisms, namely, research priorities setting, clear definition of management responsibilities at all levels, establishment of the R&I activities recording and analyses system, etc.

The PSF mission recommendations (as well as all recommendations submitted to the Government in the past) represent a coherent set of measures. Selecting arbitrary some of them for implementation as was mentioned above, while ignoring others Government makes to R&I system more harm than good.

Thus, we have to conclude that the Government is informed on the problems of R&I system, but does not react to them except the cases interesting for its own purposes, which are not clear for other stakeholders. Some recommendations can be used as loud slogans beneficial to the Government for the PR purposes (e.g. establishment of RIC), while others for attracting some funds in the form of grants and loans from international financial organizations (e.g. for construction of Technopark or the network of innovation centers. I should confess that in Georgia (and in the majority of the post-Soviet countries) R&I policy is limited to that. Otherwise, one cannot explain very frequent referring by the Governments to importance of innovation process and, at the same time, keeping research activities at a very low level. Even if the governmental strategy is a technological catch-up based on the technology absorption (non -R&D -based innovation) the process' research support is needed urgently. It is evident that an efficient R&I policy is not the Government's real/priority target, despite of its reflection in the Association Agreement Action Plan. Therefore, the declared integration in the European Research Area (ERA) became de facto spontaneous process stimulated only from the EU side.

The H2020 PSF mission (2018) had also pointed out at the high level of bureaucracy in Georgian R&I system's operation related in the first place to the procurement rules. I can add to their observation additional bureaucratic hurdles (missed in the PSF report), which were created by the depriving the research institutes of the legal entity status and brought even worth results than the procurement rules do.

The most adequate description of the governance quality of R&I in Georgia was given by the World Bank mission (2014): ‘*Although major structural reforms in Georgian science and education were undertaken over the past 10 years, a 2007 EU Commission study found that overall results were largely negative, and since then, deterioration has continued*’.

Based on the foregoing, we can conclude that, despite the formal similarity of the R&I management system with the European one noted at the beginning of the chapter, the poor quality of regulations, as well as of decisions made the governance ineffective. Against this background, the request by the Government for assistance from the EC in such complex issues as 'Performance Based Funding of Research Entities', and 'Measures for narrowing the gap between research and industry/business' looks not corresponding to the most urgent current problems of R&I system governance. More basic issues have to be solved first and that was pointed out by the H2020 PSF mission (2018).

## 2. FUNDING

The main funding institution for research is MESCS allocating funds for universities and governmental research institutes. The funds consist of two parts: allocated for institutional funding of the research institutes and allocated for the project based funding. The institutional financing is implemented directly by the ministry, while the project grant scheme is implemented by SRNSF (the agency subordinated to MESCS). One more governmental support to innovation activities is the grant scheme for innovation projects in small enterprises (mainly start-ups) implemented by the MESD through GITA.

The most important shortcoming in R&I funding practice in Georgia has been mentioned above: the lowest level of GERD among EaP countries (0.2% of GDP) which themselves have rather low level of GERD. The low level is kept for more than 20 years and already led to outmigration of the most qualified part of researchers who were not too aged to leave. However, there are more problems. In 2005 according to Presidential decree the Shota Rustaveli National Science Foundation (SRNSF) had been established with aim to finance research through the competition based project grants. For this purpose half of the funds allocated annually in the state budget for the institutional funding of research institutes had been transferred to the SRNSF not having itself any experience of project funding (12 years later, in 2017 the SRNSF with letter signed by the Deputy Minister of MESCS asked EC DG R&I support in elaboration of a sound scheme of financing).

This extraordinary abrupt dropping of the institutional funding had caused great difficulties in the research institutes' operation that had not been overcome since then. So the necessary new financing mechanism was created in such a way that caused irreparable harm to the R&I system. The established ratio of institutional funding to project funding equal to 50/50 is not appropriate for Georgia. According to Steen (2012) the ratio 50/50 or more of the grant (project) funding to the institutional one is observed only in several well developed countries with high level of GERD (New Zealand, Korea, Belgium, Finland and Ireland), while the most common value is 40/60 or less. In contrast with Georgia, in all countries the ratio is changing gradually via redistribution of the annual increase of the total funding.

In the absence of thematic research priorities, competition for grants is reduced just to scoring awarded by international reviewers for each project. The projects with the highest scores are financed *regardless of the research discipline*, i.e. projects in thematically distant disciplines compete with each other. As time passes, this evidently leads to thematic biases in the research system, since those disciplines that were well developed during the Soviet period continue to grow, while the rest, regardless of their relevance, lose the chance to compete with them. One of the main objectives of competitive financing is lost: to promote the restructuring of the thematic profile of research in accordance with the country social needs.

R&D funding by the private sector/industry in Georgia is negligible. Enterprises lack their own research facilities and have very limited contracts with universities and research institutes. In this regard

changes made by the Georgian government in legal statuses of research institutes play a negative role. I'll come back to this in the chapter 'Research Organizations'.

Box 3

#### Direct contracts with industry and work with donors

Being deprived of the legal entity statuses in 2005 they have to work through the university financial offices addressing them even for a smallest purchase or contract. They also do not have their own letterheads and right to address officially to outer organizations themselves. Whenever they have such need they ask a vice-rector or rector to sign the letter on the university letterhead. This bureaucracy is enhanced by the distant location of institutes from the university campuses where administrations sit. As the result, even the institutes having in the past contracts and foreign grants of the volume equal to their funding from the Government have dropped this source to zero.

The private sector financing of R&I activities are not encouraged by the Government, as far as no incentives for investments in R&I are envisaged by the Georgian law.

### 3. PEOPLE

Considering people working for R&I system it is necessary to distinguish a large number of involved groups that must have appropriate competence: political decision makers; high level R&I managers; programme and project managers; researchers; R&I technical personal; consultants; etc. In absence of sophisticated R&I statistics (H2020 PSF, 2018) it is difficult to judge all groups, though in some of them the situation in Georgia is clear.

First of all, the dramatic drop of the total number of researchers should be noted. In this regard Georgia is no exception from the trends in other post-soviet countries, though process in Georgia is more acute (Table 1). Another alarming circumstance is aging of researchers, especially of their most qualified part. A special comparison (Shatberashvili, 2018) of the number and age of Georgian scientists having high bibliometric characteristics (equal to the average level of leading western university professors) working in the country and abroad shows that their number is equal, but the diasporans are 25 years younger (their average age is about 45 years).

Country	Number of employees		Reduction, N <sub>1985</sub> /N <sub>2017</sub>
	1985	2017	
Armenia	30,000	3,800	7.9
Azerbaijan	na	na	-
Belarus	107,000	30,000	3.6
Georgia	40,000	3,200	12.5
Moldova	25,000	5,000	5.0
Ukraine	440,000	100,000	4.4

Table 1. Reduction of number of employees in research organizations

One of the factors hindering development is the high mobility of leaders at the upper level of the R&I system management. In the period 1992-2017 years 13 prime-ministers, 17 ministers of MESCS and 9 ministers of MESD had changed. Each time for a new minister of MESCS the R&I sphere was absolutely unknown area. That was complicated by a change, simultaneously with the minister, of his deputies as well. In the absence of any long-term formal strategies such rotation did not facilitate quality of the R&I system higher level management.

The PSF mission (2018) pointed out as a shortcoming of R&I system that the rectors of Georgian universities are not *innovation leaders*, but just *managers*. Their bibliometric indexes also show that they have not sufficient academic level from European point of view. It is so because in Georgia there are no well-thought-out rigorous rules of nomination and election of rectors. The frequent trajectories of people becoming rectors of the large public universities are as follows: ‘politician → deputy minister of MESCS → rector’ or ‘head of NGO → deputy minister or minister of MESCS → rector’. This is a serious shortcoming, especially in situation when tenth of research institutes of various profiles are suddenly merged with universities and problem of their adjustment to the existing university research and academic process has to be solved. This could not yield a positive result. All the more strange is the requirement of the PSF mission to ‘complete the merger’, which, most likely, will lead to the destruction of the remnants of institutes.

The age is the main problem related to people in the positions of heads of university departments, faculties and chairs, as well as leading professors, directors of the research institutes and heads of departments in the institutes, who cannot be substituted by ‘managers’. The majority of highly qualified researchers (of the level of PhD from the western university and higher) in Georgia have the age above 65. The younger generation of highly qualified researchers is mainly abroad forming Georgian scientific diaspora. There is now an acute shortage of the younger highly qualified researchers in Georgia. Together with the problem of the not the best use of the still available human resources it leads to the drop in the level of both the teaching and research.

The researchers’ age evidently is the highest danger for Georgian R&I system giving now less time for experiments like those of 2005 when institutes were reorganized (see below the chapter ‘Research Organizations’). A special study has shown (Shatberashvili, 2018) that the diasporan researchers may be addressed to save the situation. There are enough high quality researchers having the highest productivity age in diaspora for selection of several tenths of them aimed at their return to Georgia for appointment to the key positions in R&I system. This is feasible though not a trivial task requiring a special governmental policy.

Two important notes should be made related to almost all post-Soviet countries, including Georgia. In these countries there has been an increase in the number of annual publications in international scientific journals, which in itself is a positive development. However, it is not an indicator of the growth in the quality of researchers, as interpreted in national reports. This interpretation is misleading, since the growth is due simply to adaptation to the international system of scientific communication, the availability of which was limited in the Soviet era. The growth is the result of foreign languages learning, the expansion of international collaboration, the emergence of ‘circular migration’, and the decrease of publications in Russian-language journals.

There is also an increase in the number of annually defended doctoral thesis, which, in the face of a decline in the volume of research, is a negative phenomenon, indicating a decrease in the qualifications of doctors.

#### **4. R&I SYSTEM RELATED DATA**

The data on the Georgian R&I system allowing follow its time changes and elaborate its development policy is rather scarce. Researchers studying R&I processes in Georgia have to use mainly data of international organizations (WB, UNESCO) and individual projects. R&I data provided by Georgian Office of Statistics is very limited.

Another sort of data necessary for R&I management are DBs on scientific publications (domestic and international), R&D reports, dissertations, patents, as well as data on research organizations and teams, research programs, international projects with Georgian participation, Georgian local and diasporan scientists, etc. It is evident that without availability of information on R&I system its rational management cannot be carried out, let alone perfect management. The lack of this information in Georgia was underlined repeatedly

without success in publications (Shatberashvili, 2011; Gogodze, 2013; Bregvadze et al., 2014) and recommendations to the Georgian government. H2020 PSF mission (2018) has to repeat it again.

Unfortunately, organizations maintaining currently existing DBs are left without proper support, nothing to say about support of their proposals to develop new ones. In spite of their long experience in scientific information processing and, even more important, their vision based on this experience they have no chance to do the job.

Box 4

#### **Information on research outputs and products**

In 2018 the USAID supported project team wrote (Bregvadze et al., 2014):

*The main Georgian research institutions generally try to compile and maintain a track record of their research output. For example, the Georgian Technical University has a dedicated interdisciplinary scientific center (Techinformi) which performs this task among others. But even in this latter case, databases are incomplete because they depend on the willingness of the institutes to update.*

TECHINFORMI (The Institute of Scientific Information and Analyses of Technological Sphere) was a leading Georgian organization in developing DBs. It was a leading organization of the Soviet Union in developing search software for WIPO retrospective patent DB CAPRI. TECHINFORMI in Georgia pioneered the distant work with DBs long before emergence of Internet, as well as long ago introduced to Georgia citation analyses and other bibliometric studies. It kept all research project reports of Georgian research organizations (except classified ones) since 1980s. It maintains database on all scientific publications by Georgian researchers published in Georgia and publishes *Georgian Abstract Journal*. It also maintained an instrument of technological information exchange between enterprises and research organizations on the bases of printed bulletins which should be transformed into an on-line form. Being well known institute it represented first the Soviet Union and then independent Georgia in a number of international organizations (International Federation for Information and Documentation, International Center for ST Information, UNESCO). TECHINFORMI systematically organized and published comparative analyses and recommendations on innovative development of Georgian economy sectors. Only NGOs do it now in Georgia and only in the cases when they have an international donor supported projects, making an important state function 100% donor-driven, thus leaving large thematic lacunas. Half of TECHINFORMI's financial resource was provided by the Government as the institutional funding, while another half was earned on the basis of contracts with industrial, agricultural and other organizations.

The reader may notice that a past tense is often used above. It is because TECHINFORMI was deliberately weakened. In 2005 it had been deprived of a legal entity status and, in spite of its interdisciplinary functions, subordinated to one of universities, which has no formal responsibility for its activities.

*Note: In contrast with Georgia, Belarus and Ukraine not only preserved their institutes similar to TECHINFORMI, but even strengthened analyses functions and international cooperation of the institutes.*

The TECHINFORMI case characterizes also the current conditions for research institutes in Georgia in general.

## **5. RESEARCH ORGANIZATIONS**

In 1990 there were about 200 autonomous research organizations having legal entity status in Georgia. As in all Soviet republics, they were grouped as follows:

- 50 research institutes of the Georgian Academies of Sciences (National Academy of Sciences and Academy of Agricultural Science);
- 30 research institutes of the Georgian ministries (among them 20 of the Ministry of Health);
- 2 research institutes of Georgian universities;



- About 50 research labs, experimental farms and experimental enterprises of Georgian universities and institutes;
- 10 research institutes of the USSR Academies of Sciences (e.g. Academy of Medical Science, Academy of Agricultural Science, etc.);
- 50 research and design institutes (notably large) of the different ministries of the USSR (federal).

These entities counted to 40,000 personnel which is a large figure for a Republic with 5 million inhabitants. All research institutes were legal entities fully responsible for the ‘people’s property’ entrusted to them (including buildings, plots of land, equipment, etc.), having bank accounts and right to sign contracts. Contracts with other research organizations and enterprises especially for research, consultancy and any sort of knowledge transfer were encouraged by the Government. Only the labs into universities did not have these rights having to do administrative operations through the university administrations. Despite the fact that contract money could not be spent on permanent staff salaries, contract work was an attractive tool for institutes. Some of them managed to attract amount of funds equal to institutional ones provided by the Government.

After obtaining independence, in Georgia as in all post- Soviet countries the general process of privatization had been started. In 2005 it was accelerated in relation to research institutes and universities. The acceleration was stimulated by the interest of speculative business emerged throughout the post-Soviet space toward the property assigned/entrusted to research organizations. All the located in Georgia institutes subordinated to the USSR ministries and academies of sciences (federal) were closed and their buildings and equipment were sold. The 22 medical institutes of the Georgian Ministry of Health were privatized and turned into ordinary clinics having no research activities. The agricultural research institutes were merged with Agricultural University and bought out together with it by the former Prime Minister of Georgia thus left without both the status of legal entities and the institutional financing. Institutes subordinated to the Georgian NAS (which was organizationally a close analogue, e.g. of the German non-university research associations like the Max Planck Society, the Leibniz Association or the Helmholtz Association), as well as institutes subordinated to Georgian ministries were deprived of the legal entity status and merged with universities. Their buildings’ ownership was mostly transferred to the MESD and then either sold (privatized) or used for the governmental administrative purposes.

The merger with universities was made in a hurry as a one moment action. There were no clear principles of making decision about the hosting universities choice. As a result the choice was in the most cases made on a bases of personal relationships of an institute’s and a university’s management. So the *merger was an arbitrary process* hindering their real cooperation and cross-fertilization. Institutes had lost the legal entity status and, accordingly, the bank accounts and right to communicate directly with the potential contractors, donors, etc., though the amount of an institutional funding allocated to them before the merger was preserved to each of them through the universities. This reform led to negligible funds received by institutes from contractors and donors, practically ending their work for the non-government sector. I failed to find analogues of such action in the world publications on the organization of research. The popular world practice is creation of institutes in universities for solving interdisciplinary problems more administrative and financial rights then the faculties have.

Box 5

#### **Research institutes and the Policy Support Facility mission of 2017-2018 (1)**

Today for the smallest purchase the directors of the institutes have to address university administration sitting far away from the institute’s location for permissions and signatures. In one of universities for 3 years in a row the institutes had no Internet connection in the first quarter of year because the university administration had to make contract with the Internet provider for all of them together. Such a large contract got to the procurement regulated range and became very slow.

The case refers to the state of research institutes (and to the R&I governance in Georgia as well). The ‘Recommendation 2. Overcome bureaucracy’ by the PSF mission addresses such cases directly. In its justification (H2020 PSF 2018, p. 34) we read: ‘. . . in Poland, the institute directors can decide on spending on R&D-related goods and services, and are responsible for public procurement’. Indeed, if the director does not have these rights then it is no institute.

Since the reform did not have a rational basis, it has not given any positive result in 13 years. The slogan under which the ‘reform’ was carried out was the strengthening of universities and the research system as a whole, but as the figures show, the Georgian research system fell into disrepair. As it was mentioned the leading personnel’s age at the institutes is critical while the younger highly qualified researchers are working abroad. These give Georgia very short time for rescuing the research system from the complete ruining and no right for the additional experiments. In this complicated situation H2020 PSF mission ‘Specific Support to Georgia’ had to make analyses and submit recommendations.

Box 6

#### **Research institutes and the Policy Support Facility mission of 2017-2018 (2)**

The H2020 PSF mission submitted 23 recommendations related to all aspects of R&I in Georgia, most of which if implemented in the right sequence may benefit the R&I system in Georgia. However, in relation to research institutes status there are some contradictions. The mission’s Report says (p.29): “. . . *meeting with the university rectors indicated the following: University leadership appeared to have little leadership experience. Most of their activities are better described as ‘administration’ rather than ‘leadership’*”.

In this situation, also taking into consideration notes in the Box 5, the recommendation by the PSF mission (2018) to ‘*finish merger with universities*’ (p.57) without any explanation what it means, looks somewhat vague. To entrust about 20 research institutes to each ‘administrator’ who in 13 years proved to be unable to find solution looks contradictory to anyone, but the PSF mission. At the same time, the solution could be recovering legal entity rights of institutes leaving them in universities. That is allowed by the Georgian law, was allowed by the Soviet law and is practiced in the World. In this case institutes would not lose their capacity to work with private sector, while universities together with institutes would have time to improve cooperation. Not doing so means that the purpose of the merger was not efficiency growth, but introduction of research governance scheme handy for the Government while harmful for R&I.

It is worth recalling here that the government's attacks on the existing ‘USSR-type’ schemes of science management were undertaken in all post-Soviet countries (except, perhaps, Belarus) under the pretext of ‘optimizing under new conditions’ and ‘convergence with world practice’. Under the greatest pressure were the National Academies of Sciences, as the largest single property managers: of prestigious buildings and large plots of land in the centers of the state capitals. In general, on closer examination the ‘reform’ proposals in fact suggested the reducing research activity, using the property for commercial purposes, increasing control of flows of funds by administrators who are non- professionals in the field of research, and ultimately bring negative results to R&I systems. The reforms are suggested on the background of reducing or freezing of research expenditures, i.e. the most needed actions are replaced by the most profitable for the interested groups. Georgia in this direction was ahead of all, and has got therefore the most negative results. In other post-Soviet countries, the resistance of scientific communities, and perhaps also the healthy conservatism of societies, has delayed ‘reforms’. In Russia, the taking away of the property of the Academy of Sciences (which, unlike other national academies, was a scientific organization of global value) became only possible in 2014. In Moldova the process has been launched actively in 2017 and in Ukraine the disputes around the issue are still ongoing. The desire to carry out ‘reforms’ is so great that even the 13-year-long Georgian experiment with negative results does not stop the rest of the countries.

## 6. ENTERPRISES

In Georgia acquiring more freedom by enterprises after privatization was accompanied with stopping of production in those of them which intensively consumed and developed technology. Among large traditional production industries practically only mining is operating. In parallel, services like in tourism, trade, transport, communication, etc. are developed quickly. As a result, the profile of demand for the research and research services has changed dramatically leading to a need of the profile change in the research system, which, unfortunately, due to the lost of freedom by the institutes mentioned above (e.g. legal entity statuses) became even less thematically mobile than in the soviet period.

The innovation process in the business sector is based mainly on the use of imported ready-made technologies. The in-house research in industry sector is very rear even in high-tech companies (e.g. in communication sector). Nevertheless, there are not numerous examples of very successful research-based SMEs which are either remains of the closed research and design institutes or new spin-offs from research institutes and universities. Their personnel often work at enterprises and universities in parallel.

Georgian legislation does not provide incentives for either in-house or contracted research by companies. The private sector is not eligible to apply for research grants of SRNSF either. The only sources of the governmental support to enterprises is GITA's support to innovation start-ups and a scheme called 'Produce in Georgia' which supports SMEs (not necessarily innovative) covering bank interest on their loans from the governmental budget. R&D financed by enterprises is negligible.

## 7. INNOVATION INFRASTRUCTURE

In recent years steps had been taken toward development of an innovation infrastructure under MESD:

- The National intellectual property office SAKPATENTI was established
- GITA was established
- An agriculture consultancy network covering Georgia's territory was established
- GITA has established Tbilisi Technopark
- GITA started regular competition based support scheme for innovative start-ups
- The SME Development Agency was established, pursuing to a certain degree innovation goals.

The drawback of these activities is their almost complete isolation from the research system dew to isolation of the Ministries responsible for research and innovation development (MESCS and MESD).

## 8. ANALYSES IN THE EUROPEAN INTEGRATION CONTEXT

Post-socialist countries can be divided into two groups: those that have joined EU and those that belong to the ENP (including those that we call EaP countries some which have signed the Association Agreement with EU). On the Figure 2 their GERDs are compared

It is evident, that the main problem of the EaP countries is the low level of research funding, aggravated by the lack of its growth (and even a decline in some countries). Under these conditions, any reform, let it be the transfer of scientific organizations from one agency to another, or the introduction of new financing schemes, is meaningless. Consequently, the less reforms are carried out under these conditions, the better. An example is the relative success of Belarus, where the governance schemes for R&I have been reorganized to the smallest extent compared to other EaP countries. In particular, in Belarus scientific organizations continue to be subordinated to the Academy of Sciences of Belarus, as well as to ministries and governmental departments, something that was quickly and radically abandoned in Georgia, but without positive results. In Belarus just the objectives of the R&I system have changed in accordance with the new economic realities.

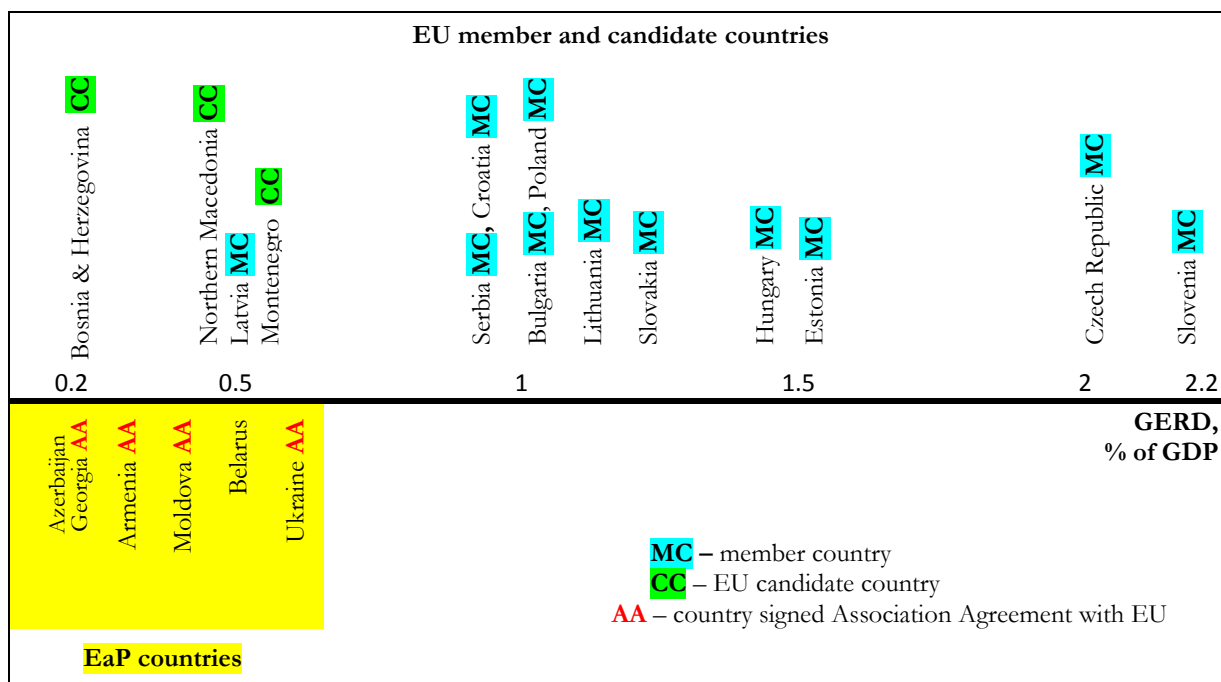


Figure 2. General Expenditure for Research and Development in post-socialist countries

At this stage the systematic increase in funding will be the only real sign of the serious attitude of the governments of EaP countries to the R&I issues, or in other words, to the future of their countries. In the countries which have signed Association Agreements with EU the declared European integration process should stimulate such an attitude, but positive results have not yet been observed. In this regard, it makes sense to analyze the impact of significant support rendered by the EU to the EaP countries on the R&I development throughout the post-Soviet period. We can conditionally divide the support into three directions.

Box 7

**Inconsistency of the state and needs of the R&I system with the requested EC support**

Despite the recommendations of international organizations and local experts, the Government of Georgia is keeping R&I expenses for the past 20 years at the lowest level among the post-Soviet countries, is pursuing ill-conceived reforms, and is not setting priorities for investments in R&I during this period. Unexpectedly, it is requesting assistance (H2020 PSM, 2018) in the implementation of the fine-tuned Performance Based Funding mechanism, which requires correction, according to the conclusion of the PSM mission (2018) of all the listed shortcomings as a precondition. The task also requires highly skilled executives at the management level of the R&I system, whom Government lacks.

The PSF mission in Georgia was called *Improving the Effectiveness of the Research and Innovation System of Georgia through Prioritization, Selectivity and Links to Business*, in contrast to similar missions in Moldova and Ukraine, where they were called modestly *Peer Review of the Research and Innovation system*.

The minister who had requested assistance, by the time the recommendations were ready, was already released from work. This paradoxical, if not anecdotal, situation proves that the requested assistance should not be perceived as a real attempt by the Government to correct the state of affairs.

Of course, the mission had pointed out to the Government at the numerous preconditions that need to be fulfilled in order to implement the requested recommendations. However, there are no guarantees that once again the Government will not extract from the set of recommendations for implementation only those in which it is for some reason interested, leaving the rest unheeded, as it has already happened more than once. Arbitrary-selective implementation can aggravate the state of the R&I system. In the recommendations of the PSF missions for EaP countries there are no precautions on preventing such a scenario already happened more than once. Arbitrary-selective implementation can aggravate the state of the R&I system. In the recommendations of the PSF missions for EaP countries there are no precautions on preventing such a scenario.

.The first direction is: to familiarize researchers and industrialists in EaP countries with existing mechanisms for supporting R &I in the EU; to expand systematically the access to these mechanisms; to expand contacts with European scientists and cooperation with them. However, these mechanisms can only be used effectively by organizations that have professional knowledge, have a material base, have staff fluent in English and are legal entities.

In the conditions of long-term under-financing, few organizations have this set of qualities. Considering that in Georgia most of the research institutes are not even legal entities, their participation, for example, in programs like the Horizon 2020 is insignificant and stays at a low level for many years, i.e. does not expand. *Nevertheless, the positive experience gained, although limited, is invaluable.*

Box 8

#### **National Academies of Sciences or Universities?**

In Ukraine and Moldova (as well as in Belarus, Armenia and Azerbaijan), formally the ‘Soviet’ model of the National Academy of Sciences is preserved, in which a significant number of institutions are directly subordinated to the Academy of Sciences, while being legal entities. In the conclusions of the missions in Moldova (H2020 Policy Support Facility, 2016) and Ukraine (H2020 Policy Support Facility, 2017), the subordination of the institutes to the Academy of Sciences is not assessed as a shortcoming, only wishes are expressed regarding the institutes financing schemes. In Georgia, where the Government took all the institutes from the NAS and handed them over to the universities, depriving them of the legal entities status, while NAS retains only the function of assessing the outputs of institutes. This action of the Georgian Government is assessed by the PSF mission as positive. Moreover, the mission proposes to deprive the NAS of this last function, and ‘to complete’ integration of institutes with universities. The question arises, which model is appropriate? Judging by the macro indicators, Georgia has the worst results. Then what is the basis for considering Georgia's actions positive? The reader is confused. *It is also well known that almost all leading countries successfully operate non-university research systems (having different names in Germany, France, the United States and others), which does not interfere with development of university science. There is also a world practice of university institutes (institutes in the university structure subordinated to university management) being legal entities.*

the report on Georgia H2020 PSF (2018) mission notes, that the rectors of universities ‘are not the leaders of research and innovation’ that they should be, but are just ‘administrators’. The questions arise: is not the unsuccessful integration of research institutes with universities in Georgia (World Bank, 2014) a consequence of this shortcoming? Should not the meeting of higher standards by university rectors be required as a precondition for integration?

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The second direction is the support of mobility of students and young scientists, which really gives positive results.

The third direction is the provision of methodological assistance in the field of governance of R&I processes and R&I system reorganization and increasing of its efficiency at all levels, which is the main interest of this article. The above data indicate that in this, in my opinion key direction, there are no results. This circumstance requires attention, since for many years in different European projects the recommendations that are not implemented are repeated again and again.

The R & I systems in the post-Soviet countries, with the exception of the EU member Baltic countries, are in more or less the same conditions that stem from similar paradigms of economic development in these countries, namely, the orientation of ruling groups on short-term projects that yield the maximum profit for the shortest time. It is obvious that, despite the differences between countries, there should be general recommendations for the rehabilitation of their R&I systems. In order to elaborate them, it is necessary to compare not only the standard formal indicators of national R&I systems (this is not difficult to do today), but also the organizational arrangements in the countries, normative acts adopted, the relationships and attitudes of the main stakeholders, and so on. Aiming at this I hoped for reports of H2020 PSM missions across Ukraine (H2020 PSF, 2017), Moldova (H2020 PSF, 2016), and Georgia (H2020 PSF, 2018). However, it turned out that it is practically impossible to do this, despite the fact that some of the mission members were the same in all three countries. The events and the state of issues to which missions do not have comments in one country are considered in another as flaws that need to be corrected. The examples are in Box 7 and Box 8.

It is obvious that the real scientific generalization of the 25-year experience of transforming R&I systems in post-Soviet countries is still waiting for us ahead. H2020 PSF missions could not do this because they have to take into account the subjective opinion of the Governments for which they work, i.e. their conclusions are a combination of objective reality and political considerations.

A lack of positive shifts in the state of the R&I system gives rise to skepticism among researchers about European expert assistance and the European integration process as a whole, cultivating the view of the process as a kind of purely ritual phenomenon that does not affect the R&I system. Who benefits from this attitude of the intellectual elite to European integration? Only ruling groups in post-Soviet countries, for which the very existence of the intellectual elite is a danger, and a perceived danger. It was very unequivocally formulated by H. Gref (2017), CEO and Chairman of the largest Russian bank 'Sberbank': 'If we give education to people, how then are we going to govern them?' It is not difficult to understand that the stagnation and even the shrinking of R&I systems (and the related drop in the level of education) is not a random process, but a manifestation of the latent resistance to European integration (covered by loud pro-European slogans). However, this process is not beneficial to the peoples of post-Soviet countries and the EU, since it negatively affects democracy, as well as security in the region. Therefore, the issue of cooperation between EU and EaP countries in the development of R&I systems requires closer attention.

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