Eesti Teadusagentuur
Estonian Research Council

A New Framework of Research Grants and Baseline Funding in the Estonian Research and Development Funding System

Starting point and background

The new framework of research grants and baseline funding was initiated by the documents ***Estonian Research and Development and Innovation Strategy 2014-2020 "Knowledge-based Estonia"***[1], produced by the Ministry of Education and Research (MER) and the Ministry of Economic Affairs and Communications, and ***Proposals for the Organisation of Research Funding*** (proposals outlined by the MER working group), produced by a working group specialised in research funding, which was appointed by the Minister of Education and Research on 2.10.2014.[2]

The **key issues** mentioned in these documents include

- coordination problems, lack of unity;
- lack of critical mass in many fields, which sets forth certain limitations;
- insufficient motivation and capacity for cooperation between universities and enterprises;
- separation of research from the economy and society, as a result of which the social benefit (efficiency) of R&D&I is low. The research system excessively focussed on public money, with little effort made to attract private money;
- predominantly project-based, not results-oriented or quality-based approach.

In order to tackle the issues addressed in the R&D&I strategy and by the MER working group, the Estonian Research Council (ETAg) sought consultation with the target groups, analysed different possible scenarios and the practices of R&D funding used in other countries, and in collaboration with several interest groups produced a new framework of research grants and baseline funding.

The aim of the framework of research grants and baseline funding is to make the changes that would ensure the achievement of the objectives established in the *Estonian Research and Development and Innovation Strategy 2014-2020 "Knowledge-based Estonia"* (hereinafter R&D&I strategy) and to

[1] https://www.hm.ee/sites/default/files/estonian_rdi_strategy_2014-2020.pdf
[2] https://www.hm.ee/sites/default/files/ettepanekud_teaduse_rahastamise_korraldamiseks.pdf (in Estonian)

support the effective functioning of the Estonian R&D funding system, which will hopefully receive more funding.
The framework describes the changes research grants and baseline funding – the two main instruments of Estonian R&D [3] funding – should undergo in relation to other R&D funding instruments in order to ensure a logical, coherent, and comprehensive system.

Actions necessary for implementing the framework:

a) change national legislation regulating R&D;
b) consider the reorganisation of other funding instruments upon our withdrawal from the European Union Structural Fund aid (in approximately 2022);
c) increase the rate of indirect costs gradually from 20% to 25%;
d) reduce periodic fluctuations in funding resulting from the available reserve funds of the projects that are near completion.

The timeline concerning the transition to the new system of research grants and baseline funding depends on whether R&D will receive more funding as well as on the size and duration of funding.

The transition to the new system begun in 2017, so that it could be implemented in 2018.

New system of research grants and baseline funding

R&D funding instruments

The premise of proposing changes to research grants and baseline funding is the creation of a clearer structure of the various fragmented R&D funding instruments depending on the recipient of funding:

1. **research grants** intended for researchers (incl. research teams),
2. **baseline funding** intended for R&D institutions and
3. **funding instruments** intended for the R&D system.

The new framework describes the first two – research grants and baseline funding as the main instruments of R&D funding – in more detail. For the sake of completeness, the connection between these grants and the funding instruments of the R&D system will thereafter be briefly described as well.

[3] Research and development (R&D) is an umbrella term used in the meaning of all three of its components (fundamental research, industrial research, and experimental development). In case it is necessary to make a distinction between these R&D components, they will be mentioned separately.

Objectives for restructuring research grants and baseline funding:

- support the implementation of researchers' career models[4] at R&D institutions;
- place greater responsibilities on R&D institutions by promoting key areas, incl. guaranteeing high-quality research basis necessary in higher education;
- stimulate the cooperation between R&D institutions and enterprises as well as the acquisition of non-state budget funds;
- reduce the lack of unity of funding instruments and facilitate the application process and report writing;
- prepare for our withdrawal from the European Union Structural Fund aid.

1. Research grants

Content:

Research grants (hereinafter grants) are financial resources allocated to researchers and research teams for a particular purpose, upon which the size and duration of the grant depend. Grants are awarded through open calls. The organisation responsible for the distribution of grants in Estonia is ETAg.

Grants are targeted at researchers and research teams. Grants are restricted to being used via a contractual relationship with at least one Estonian R&D institution, since the purpose of grants is, inter alia, to support R&D in Estonia.

Types of grants:

1.1.Research career grants

Modelled on the grant scheme (Starting Grant, Consolidator Grant, Advanced Grant) of the European Research Council (ERC), competitive grants have been divided into three categories which, by corresponding to the different levels of a research career and by taking their (field-specific) details into account, differ in terms of duration, the requirements imposed on the project leader, and the size of the research team (see Table 1 below for more details):

1. **Postdoctoral grants** are grants designed for postdoctoral researchers to help them gain research experience by working in an Estonian or foreign (depending on where their PhD defence took place) research organisation or research team and to support them in

[4] Researchers' career models determine the conditions for their entry into, progress in, and retirement from the research system. According to the proposal submitted to the Ministry of Education and Research in December 2014 by a working group specialising in the development of the concept of researchers' career models at the Institute for Advanced Study at the Estonian Academy of Sciences, the components of the (tenure-track) career model are as follows: 1) right to request a promotion after having fulfilled certain conditions, 2) right to obtain a permanent position after being promoted from the lowest to the next rank (tenure), and (in order to implement components 1 and 2), 3) obligatory international attestation (peer-review) after the first five-year term. Whether a certain candidate will be eligible to receive tenure will be determined during this process.

launching independent research careers. This grant is awarded to one person for up to three years. Postdoctoral grants can be used once, but it is possible that the receivers of the grant have used or will use other funding opportunities to extend their postdoctoral studies or to secure a successful beginning of their independent research career (e.g., by applying for a start-up grant). Postdoctoral studies or equivalent research experience is the prerequisite for launching an independent research career. Compared to the former postdoctoral grant, the possible duration of the new grant will extend (up to three years instead of the former two) and funding will increase.

2. Start-up grants are grants designed to support launching independent research careers, putting research teams together, and investing in the next generation of researchers (incl. doctoral candidates). Start-up grants allow successful young researchers, who possess appropriate skills as well as a wealth of knowledge and international experience, to come (back) to Estonia where they could develop into the leaders of R&D. The duration of this grant is up to four years and it is possible for a researcher to use it once. When the grant has come to an end, researchers can explore different career opportunities: enter the so-called tenure-track system that is, inter alia, being promoted through baseline funding; successfully apply for a team grant; join a research team; proceed working in the private or public sector; embark on the career of a lecturer, etc. The function of supporting returning researchers, which is currently being carried out by the Mobilitas Pluss programme, will be fulfilled by start-up grants. Compared to the former start-up grant, the funding of the new start-up grant will increase and the principles of budgeting will become simpler, but the possible duration of the grant will remain the same.
3. Team grants are grants designed to support researchers in continuing their independent research careers, ensuring high-quality research, leading a strong research team, and engaging with the next generation of researchers (incl. doctoral candidates). Unlike the previous two, which are personal grants, this is a grant awarded to several researchers to conduct joint research for up to four years. The number of times a team grant can be used is not limited, since established researchers can conduct high-quality research for more than a decade. Team grants will gradually replace the existing exploratory and institutional grants intended for more advanced researchers.

1.2. Topic-specific grants do not necessitate a research career, although they are targeted at researchers and research teams. It is a grant characterised by a separate decision-making mechanism to finance unforeseeable, unexpectedly topical, or critical R&D of the highest quality. Topic-specific grants are in essence team grants with an undefined size and duration of funding as well as with an unlimited number of times possible to submit applications. There is an analogy between this grant and the Distinguished Professor Programme and Strategic Research Funding scheme of the Academy of Finland.

The demand for topic-specific grants could, for example, stem from strategic national necessity, societal relevance, the need to finance exploratory or innovative projects with great potential,

the wish to instigate new interdisciplinary or transdisciplinary research ideas, the objective to ensure field-specific disciplinary diversity, etc. Topic-specific grant could therefore establish itself as an important link between research, society, and enterprises, e.g., by integrating the elements of the so-called citizen science. This type of grant is scheduled to take effect in 2022, depending on how much the total funding of the grant system will grow.

1.3.Research Professor grants

At present, Research Professorship, the funding instrument of the Estonian Academy of Sciences, is also included in the category of research grants. Although the Professorship is not discussed in detail in this paper, devising and implementing its funding system does need clarification proceeding from, inter alia, the R&D&I strategy.

Criteria for evaluating research grant applications:

The main criteria for evaluating researchers' and research teams' grant applications are their

- quality of research;
- capacity for conducting research projects.

Additional criteria for evaluating grant applications can be established to support the balance of field-specific R&D and the components (fundamental research, industrial research, and experimental development) of R&D, strategic national developments, or entrepreneurial and societal necessities. The latter especially deserves more attention when determining the evaluation criteria.

In order to be eligible for a grant, the project leader cannot hold several grants simultaneously and must work as a lecturer or researcher at an Estonian R&D institution during the execution of the project.

Size of grants:

The number and size of research career grants proceed on the basis that, a) when implementing research career models, the so-called pyramid scheme applies (the number of those on a lower level is large, but it decreases at each higher level), b) the number of R&D employees in the public sector remains at the level of 2014 (3,902, incl. 2,976 researchers and engineers and 926 technicians on a full-time basis), and that c) the size of a grant will generally cover the direct and indirect costs of the research project.

Based on these aspects, the grants aimed at young researchers are smaller than those intended for the researchers who have reached higher ranks, i.e., the duration and size of grants increase at each higher career level. This scheme does not apply to postdoctoral grants, since it is

assumed that many young researchers wish to gain research experience in a foreign country and that they also receive postdoctoral grants distributed by other countries.

Compared to the former system, the size of the grants will increase considerably at all levels to ensure that the earnings and research devices are internationally competitive as well as to generally cover all the direct and indirect costs of research projects.

In order to facilitate the application process and management of grant funding, the size of different types of grants each correspond to a fixed amount (i.e., to a unit price; see Table 1). The basis for calculating the unit price is the estimated cost of labour. In case of experimental research projects, the coefficient used for multiplying the so-called cost of labour of the unit price is 1.2. The size of a grant is estimated to generally cover the full costs that might arise in the conduct of a research project. The cost items (such as the cost of labour) on which the unit price of a grant is based, are a rough estimate; the budget lines are not fixed. The reports on grants will give an account of the cost items one by one in order to provide statistical overviews and analyses. The size (so-called unit prices) of the new grants should be adjusted annually in view of the changes concerning the average salary or consumer price index.

Table 1. Research career grants in the new grant system

			Size of grant (EUR per year)		Average duration	Total grant allocation Total grant allocation per year (mln EUR)	Total number of ongoing grants	Annually allocated new grants
			Small	Large				
Type of grant	Postdoctoral grant**	non-exp.	54,000		up to 3 yrs	1.9	36	12
		exp.	57,000			2.2	39	13
	Start-up grant	non-exp.	72,000	110,000	up to 4 yrs	6.0	60	15
		exp.	76,000	117,000		6.0	60	15
	Team grant	non-exp.	200,000	290,000	up to 4 yrs	14.2	60	15
		exp.	212,000	307,000		14.2	60	15
	Topic-specific grant***	non-exp.	size of one grant 500,000-1,000,000 (flexible)		up to 5 yrs	3.0	5-7 (6)	1-2
		exp.						
TOTAL						47.6	321	87

* The numbers of the grants shown in the table are indicative and describe the approximate ratio between different types of grants. Neither the number of different types of grants being distributed nor the proportions between them are rigidly fixed and instead depend on the budgetary scope of a particular year as well as on the number and quality of applications submitted during that year.

** When implementing the research career model, the so-called pyramid scheme applies: the number of the researchers at the early stages of their career is large, but it decreases at each higher level. This scheme does not apply to postdoctoral grants, since it is assumed that many young researchers also receive postdoctoral grants distributed by other countries.
*** Topic-specific grants, which do not necessitate a research career and are characterised by a separate decision-making mechanism, have been listed in the table in order to give an overview of all grant types.

2. Baseline funding intended for research and development institutions

Baseline funding is **aimed at supporting the achievement of institutional and strategic national objectives**, incl. the aim to guarantee high-quality research in the areas of responsibility of higher education and to support research careers.

Baseline funding will be developed on the basis of the existing baseline funding system and some other currently separate funding instruments. Baseline funding consists of financial resources allocated to R&D institutions to achieve institutional and national objectives of R&D. Baseline funding will be distributed under a contract between a particular ministry and an R&D institution; the size, duration, and conditions of funding will be defined by contractual arrangements. The distribution of baseline funding will be coordinated by a ministry responsible for the supervision of a particular R&D institution.

Objectives:

1) Support R&D institutions in
   - working on the consistency of R&D aims in accordance with the statute and development plan (incl. the implementation of researchers' career models) in order to guarantee field-specific excellence as well as field-specific diversity;
   - maintaining, upgrading, and complementing their infrastructure, incl. open access to the specific (incl. core) infrastructure and research collections belonging to the institutions;
   - cooperating with the Estonian public and business sectors;
   - international cooperation.

2) Allow R&D institutions to fulfil tasks of strategic national importance that will be assigned in agreement with the ministry responsible for the funding.

Depending on the objectives, baseline funding is made up of **formula-based funding** and **target-based funding**. In view of the R&D&I strategy, the formula for calculating baseline funding should retain (the so-called non-formula-based) 5%, which will be allocated to support the research areas of national significance. Should there be a significant increase in funding, it would be reasonable to use this component to cover other institutionally specific activities,

which are currently being funded by various schemes, both in order to reduce administrative burden and to realise the autonomy of R&D institutions.

Target group:
Baseline funding is targeted at Estonian R&D institutions.

Criteria:
In order to achieve the first objective of baseline funding, the basic funding of baseline funding will be allocated in accordance with the evaluation concerning the achievement of the said objective during a certain period (e.g., the last three years). The evaluation is based on three criteria:

1) Quality of research papers (indicators: total number of high-quality papers, percentage of papers among the top 10% most-cited publications);
2) Investing in the next generation of researchers and supporting research careers (indicators: number of doctoral graduates per year);
3) Cooperation in innovation as well as in knowledge and technology transfer (indicators: number of R&D contracts; quantity of industrial property rights).

In order to guarantee the consistency of R&D, the aforementioned criteria for distributing baseline funding will be taken into account only within the established framework of financial stability and in accordance with the current formula used for baseline funding, which will provide enough stability with its moving average over a period of three years.

Compared to the current criteria for providing baseline funding, the formula-based funding will generally remain the same: quality of research papers, investment in the next generation of researchers, and cooperation in innovation as well as in knowledge and technology transfer.

In the future, it will be necessary to develop the indicators regarding the support for research careers and cooperation with enterprises, since the current indicators do not sufficiently support these aspects.

The achievement of the second objective of baseline funding (fulfilling contractual tasks of strategic national importance) will be financed by the target-based funding for a certain period (e.g., to carry out an activity during three years or during the period of external evaluation) or for an unlimited period.

3. Funding instruments intended for the research and development system

National R&D programmes are action plans stemming from the strategic development plans of R&D that are aimed at improving the areas of cultural and socio-economic significance and at

initiating studies necessary for shaping and carrying out field-specific policies in Estonia. A national R&D programme is a collaboration between several ministries and the activities established in the programme will be financed from the state budget via the budgets of the ministries involved. The funding of national R&D programmes is coordinated by a particular ministry or by an institution authorised by the ministry to act on its behalf.

Funds for centres of excellence are the financial means intended for Estonian R&D institutions, with special emphasis on guaranteeing the sustainability of high-quality interdisciplinary and collaborative R&D, on supporting top researchers in conducting research, and in doing so, creating a basis for bolstering Estonia's international cooperation and competitiveness in research. The distribution of the funding instruments intended for centres of excellence is coordinated by the Ministry of Education and Research or by an institution authorised by the Ministry to act on its behalf.

Endowment funds for supporting research and development and R&D institutions (e.g., R&D funding provided by the ministries, roadmap of research infrastructures, infrastructure expenses, databases, ELNET (Estonian Libraries Network Consortium), embedding the so-called open research, internationalisation, ad hoc grants, development grants (Enterprise Estonia), research prizes, etc.) are earmarked financial allocations intended for R&D institutions to create the conditions that support their work, to conduct long-term national and international processes related to R&D, and to implement the development plans aimed at specific enterprises and the public sector. The distribution of endowment funds is coordinated by a particular ministry.

The funding instruments of the R&D system form an integral part of the R&D funding system. These instruments have not been discussed in this overview in detail, but when devising and implementing a comprehensive system the funding instruments belonging to this category do need to be examined, coordinated with one another, and consolidated; the components of R&D (fundamental research, industrial research, and experimental development) especially need to become more economically stable and coherent, and this could be achieved by supporting technology transfer and innovation.

The main emphases should be as follows:

- The prerequisite for a successful implementation of the research career model is the reorganisation of doctoral studies. Since the current doctoral programmes are designed to develop the next generation of researchers, doctoral graduates are not being prepared enough to proceed working in the public and private sectors, and that is a crucial factor that hinders innovation.
- In order to promote knowledge and technology transfer and innovation, more attention should be paid to increase innovation readiness and innovation capabilities. The funding instruments of innovation and technology transfer intended for enterprises should be

reshaped so that they would follow the specific stages of innovation processes and/or technology transfer processes. In addition to additional funding, (tax) advantages, too, should be regarded as financial resources. The Norwegian innovation and technology transfer funding system serves as a good example.

- The cooperation between the parties of technology transfer (R&D institutions and enterprises) should be promoted through the development of new forms of cooperation. Several universities have indeed allocated greater resources to seek cooperation with enterprises, but that does not solve the problem arising from the universities' mission, according to which R&D employees are required to mainly focus on their primary activity (teaching and research). By the same token, enterprises are not prepared to take all the risks related to technology transfer and experimental development. The creation of new forms of cooperation could take place in the context of reorganising R&D institutions and under the leadership of Enterprise Estonia and the Ministry of Economic Affairs and Communications.