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Sustainable Research Career Models: Applications for Estonia

Executive Summary

Estonian Academy of Sciences
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RITA

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RITA program aims to increase the capacity of the state in the strategic management of research and the capabilities of R&D institutions to carry out socially relevant research and development activities. In the framework of the program, the Estonian Research Council (ETAg) funds socio-economic applied research based on the needs of the state.

Executive Summary

The perspective to build a knowledge-based society crucially depends on whether the country is attractive to smart, educated, motivated and creative people. The core of such people is formed by research scientists. Ideally, they not only have widespread knowledge but are also mastering extensive analytical skills.

An important constituent of an appropriate policy for attracting talents is an accordingly designed model of academic career. A perfect academic career model is a system of rules and agreements that maximises the potential of workers in the academic landscape and ensures the greatest benefit from this landscape to the entire country.

An academic career model is a system of academic positions valid in universities and research institutions, including titles, strategies for filling positions and a description of requirements. Financing schemes, regulations of research organisations, traditions and best practices for filling positions, etc. are often considered a part of such a model. It has two branches: a model for positions that involve teaching (in universities) and a complementary model for experts whose main task is research (research scientists in public and private research institutions). This report focuses on the career model for research scientists.

In a small country whose resources are limited the research career model must be highly flexible. It should enfold various exceptions and tailored solutions such as the so-called nonlinear career paths that contain temporary exits, visits to different sectors and/or skip certain steps.

It is customary that the research career models in small countries, such as Finland or Belgium, exhibit more career path options than those in larger countries. A significant proportion of the so-called horizontal careers (working long time at a certain level without promotion) are typical in small countries. The presence of such career paths may even stabilise the entire system.

An intrinsic feature of science today is a rapid increase in the influence of a small number of excellent scientists. Therefore, a good research career model must be attractive to such (top) scientists. It should be transparent, encourage young scientists to dedicate themselves to research, ensure that excellent scientists are creamed off in an early stage of their careers and, at the same time, guarantee equal opportunities for everyone.

Tenure system opens up the potential of top scientists

There are several variants of viable research career models, e.g. the probation-on-the-job model (a successful scientist is offered a long-term contract at the same level), the two-step model that is widespread in Central Europe, several centralised models, such as the one in France or the so-called tenure system that is common in the USA.

Among these options, the tenure system is the most attractive to top researchers worldwide probably because tenure means a permanent academic position. A tenure system consists of two parts. *Tenure track* is a fixed-term contract advertised with the perspective of a *tenured* (highly secure) permanent position at a *higher* level that is subject to positive evaluation, but without renewed advertising of and application for the next position. Thus, young scientists compete with each other only once when entering the tenure track.

As it is financially feasible to offer a long-term secure perspective only for very few best scientists, many research scientists actually have temporary positions. The tenure system is designed to make a

research career more attractive to talented and motivated young people by offering a *secure* path (by formulating the goals, conditions and a set period beforehand) to reaching a higher, permanent, fairly privileged position.

A scientist usually enters the tenure track after acquiring a PhD degree and demonstrating rapid progress during several successive terms afterwards. Career paths in the tenure system are threshold-based. It is mandatory to fulfil a set of publicly announced conditions to reach a higher position. This measure decreases the risk that a particular academic job turns out to be unsuitable for the chosen candidate during the tenure track or tenured position.

The system is employed in many countries. It can be easily tailored to the conditions of a particular country and/or to the specific needs of different research areas. Its implementation is underway in several major European research universities. Finland created the coherent regulations in 2010 and the first scientists entered the tenure system in 2012.

Based on the described arguments, it is recommended that a) the tenure system is launched in Estonia and b) it is designed for a relatively small cohort of top scientists (about 1/5 of the entire personnel) who would be offered internationally competitive career and working conditions.

It is likely that the resulting pool of high-quality tenured scientists will form the core of science in Estonia, with large potential to a) drive and motivate the entire research system in the country, b) provide spillover effects for science and economy alike, and c) motivate the most talented and successful young scientists to choose science as their profession.

The principles of the tenure system are not covered by Estonian legislation. Another drawback is the lack of relevant practice. Therefore, it is necessary to a) create a legal framework, b) set guidelines for the implementation process and c) design appropriate financial instruments.

It is recommended that the principles of the tenure system (permanent positions with extended job security, transfer from tenure track to tenured status, etc.) are established by law (the Universities Act) at least permissively, leaving details for compatible bylaws and/or university-level decisions.

Flexibility and predictability

The system in Estonia should avoid the *up-or-out* principle. It should rather offer an alternative of continuing a successful career in the academic landscape on non-tenured positions. It is not rational to demolish the existing arrangement that has brought science in Estonia to a remarkably high level. It is thus strongly advisable to integrate the tenure system in the present-day research landscape and build it as an extension to the currently existing organisation[1]. The tenure system will eventually make the Estonian research landscape attractive to top researchers whereas a continuation of the existing practice (optionally with limited modifications) will ensure the flexibility of the entire system. This recommendation reflects the decrease in the proportion of tenured positions in the United States down to about 30% in 2007.

The existing legislation in Estonia treats the academics differently depending on whether or not they are involved in university teaching. This is inconsistent with the principle of equal treatment between

[1] "It is evident that arbitrary or hasty adoption of a single model would not only be a bureaucratic nightmare, but would be insensitive and potentially damaging to other important links in the academic chain, particularly to the crucial link between research and education at all levels" (LERU 2010:8).

persons. The emerging trend in the Estonian academic landscape to confine research scientists to temporary positions and lower levels of the academic hierarchy is inconsistent with the efforts towards developing the united European Research Area (ERA). A continuation of this trend may complicate short-term exits from academia to research organisations in private sector, abolish coherence between publicly and privately funded research landscapes and in the long-term perspective hinder the development of private research organisations as well as the industry relying on their research.

Differently from Estonia, about half of the researchers in the European Union are engaged in the private sector. It is thus unacceptable to restrain any academic career models by the needs of universities only. A suitable research career model should a) be consistent with similar models and their trends in the ERA, b) be equivalently applicable in the private sector, and c) encourage the development of the extended academic labour market.

To meet these constraints, it is recommended that a) research scientists are treated in the same manner as teaching academics, incl. the perspective of reaching the highest step of academic hierarchy, and b) relevant definitions and minimum qualifications for the career model or research scientists are established by law.

A research career model is attractive only if its higher steps are genuinely valued (also in terms of remuneration). The target salary of tenured researchers should be comparable with the fourfold current average salary in Estonia. This ambitious goal requires additional funding.

The research landscape functions smoothly only if researchers exit the system in a predictable manner. Currently, researchers tend to stay on research positions as long as possible. This practice is not sustainable and has an adverse impact on the next generation of researchers.

The problem behind this feature is the insufficiency of pension amounts in Estonia. A radical increase in the pensions of tenured researchers (e.g., by investing into relevant pension funds) would be a technically viable option. If this option were chosen, it would necessitate a) establishment of the requirement by appropriate legislation, and b) additional funding.

Steps and choices during a research career

The overwhelming majority (up to 80%) of young scientists who obtain their PhD degrees in Estonia remain connected with the publicly funded academic landscape. The prevailing chronic incapacity for transferring their competence into businesses serving the needs of economy hinders the economic and social progress in this country. There is practically no demand for experts with a PhD degree outside the academic landscape. Various training sessions and popularisation efforts can offer only limited support to efforts towards more intense engagement of young PhD holders in other sectors. It is vital to achieve a more complete understanding in the entire society that the leaders in the private sector as well as high-level officials in the public sector are expected to hold a doctoral degree.

The problem could be partially solved by radical advancement of PhD holders' intersectoral mobility. Mobility in its various forms has become an intrinsic component of a research career. This feature is reflected in the current concept of international, interdisciplinary and intersectoral PhD studies. On the one hand, an optimal research career model should enhance both temporary and permanent intersectoral mobility. On the other hand, it should be able to adequately evaluate performance indicators demonstrated in different sectors.

An important alternative to the classic PhD study is the so-called industrial PhD education (alternatively, innovation PhD education in public sector). It is strongly recommended that this option is further institutionalised as a valued branch of research career.

To ensure the necessary scientific level of this branch, it is recommended that a) only highly qualified scientists are accepted as PhD supervisors, b) mandatory participation of industrial PhD candidates in a relevant doctoral school is foreseen, and c) a longer term (recommendably five years) is established for such PhD studies.

A common trend in Estonia, just like in many other smaller countries, is that conducting research and training on a post-doctoral position is a precondition for pursuing an academic career. This requirement contains a brain drain threat (because larger countries tend to treat cross-border mobility as a channel for importing talented young people). To mitigate the associated negative effects, it is necessary to a) keep tight contacts with younger researchers who are temporarily working abroad, b) take their plans into account when projecting tenured positions, and c) increase the competitiveness of postdoctoral positions in Estonia by making research career in Estonia attractive to top scientists.

A perfect research career model accepts the so-called scatter-gather careers (often a highly successful mode of working successively in different realms of science) as well as for temporary exits from the (publicly funded) research landscape.

The existing research funding system of in Estonia supports continuation of studies in a chosen field and implicitly hinders the scatter-gather types of career and temporary exits. To ensure support for these paths, it is recommended that the *right for temporary exits* from the tenure track or a tenured position is explicitly formulated.

A feasible way to realise such exits would be through implementing the *topical Academy Research Professors'* (TARP) institution. The idea is to create an option enabling top researchers to concentrate on solving specific practical problems during a limited time (usually from one to three years) without explicit departure from the publicly funded research institution.

Currently, the Academy Research Professors are financed by the Ministry of Education and Research. They are selected by the Estonian Academy of Sciences on the basis of the scientific excellence of candidates and their research proposals, irrespective of its topic. In contrast, the research problem or topic for a TARP will be formulated and relevant financing will be secured by a third party (ministry, enterprise, etc.).

It is recommended that the selection of TARP candidates is made by the Estonian Academy of Sciences (to ensure that the same level of quality applies to all the research professors) together with the funding body (to make sure that the candidates' profile matches the prescribed topic). As the prestige of the Academy research professorship is remarkably high, it is likely that very good candidates will apply. As a rule, a TARP may physically stay in his/her research institution and continue using the habitual research environment, contacts, networks, etc.

Adverse impacts on a career path

Serious dedication to research is an intrinsic constituent of academic life. If it is not counterbalanced by advanced organisational culture, a university or research institution may exhibit features of a greedy institution (first indicated by Lewis Coser already in the 1970s). Overexploitation of

researchers and poorly justified institutional reforms may have a strong and adverse impact on the performance and productivity of researchers. According to many authors (and also according to self-reflections of several leading universities), such problems are widely spread in European universities where the administrative culture frequently tends to dominate over professional culture of teaching and research.

Under such conditions, the burnout threat of dedicated scientists is prone to drastic increase and the entire research landscape may lose its performance. It is thus important to design the research career model so that negative scenarios of this nature are either eliminated or effectively mitigated. In particular, it is important to recognise and emphasise the principle that universities and research institutions in Estonia should not consider each other competitors.

It is probably not possible to avoid the described detrimental features by regulative means only. Much more feasible is to extend the basic principles of ethics in research and good research practices towards research bodies. They should be invited to define standards that researchers may expect and monitor the practise of following these standards.

The topic of equal rights (incl. gender issues) is critical for small countries like Estonia where literally every person counts and features like the Matilda effect (systematic underestimation of achievements of female scientists) are unacceptable. The viable design of the research career model must provide equal opportunities for everybody.

It is likely that studies of single career paths of female scientists do not provide necessary information about problems they may encounter. In order to identify what issues need attention, it is necessary to understand the organisational culture of research institution (as this provides the context in which female scientists make their decisions).

A crucial issue in the design of the research career model is how to evaluate the performance of scientists who have exited the system (or country) for some time, or have worked part-time (e.g. female scientists). The core of the problem is that cumulative success strongly nonlinearly depends on the time (e.g. full-time-equivalent, FTE) spent for research (so-called Matthew effect). The decisions based on the cumulative portfolios tend to eliminate female scientists.

It is strongly recommended that *the performance* with respect to the time and efforts (e.g. in terms of FTE) spent for research be consistently *normalised*. Routine use of various performance matrices is discouraged as they are often misleading. In cases involving a long-term perspective (such as selection of candidates for the tenure track or evaluation of performance within the tenure system) it is also necessary to take into account the qualitative aspects and to seek advice from internationally renowned experts.

Dimensions of the research career model

It is not rational to set any formal age limits for the candidates on any steps throughout the entire career model. It is reasonable to dimension the research career model based on its mid-term event – reaching the highest step in the model. On average, scientists reach this step (equivalent to full professor) at the age of 45$\pm$5, depending on their area of study.

Their performance at this stage basically remains stable until they retire. Academic occupation on this step (about 20 years) may be structured, e.g., by different salary levels. Relevant procedures and decisions should be left to universities and other research institutions.

A career path from obtaining a PhD degree up to this point takes, on average, 15±5 years. It corresponds to three or four usual terms of post-doctoral positions or contracts on the tenure track. It is not rational to make this time interval any longer in a single country.

Therefore, it is recommended that the PhD holders who enter the model are a) first appointed for one or two periods of post-doctoral (or equivalent) research and then, if selected to the tenure track, b) appointed for one or two fixed-term contracts (from3 to 5 years each, depending on the area of study and institution).

It is recommended that implementation of the tenure system in Estonia is started from the filling of a few of its higher steps. As the service time on these steps is shorter than the entire career path through the tenure system, doing so provides an option to monitor the functioning of the system and to make timely corrections.

Usually, not all researchers who enter the tenure track reach the tenured position. Also, it is probably unavoidable that some people leave the system on its different steps. Compensation for such "leaking" should be strongly asymmetric: entering the tenure system directly to its higher levels should be possible in duly justified cases, but increasingly more complicated the higher they are.

Financing

As the tenure system has never been used in Estonia, the implementation of a necessary financial mechanism will inevitably require a change in the line of thinking. An appreciable amount of funds will be bound by the tenure system for a long time. The amount of required resources may increase even if no one enters, because people in the system move to higher career levels.

A stable financing system is the cornerstone of enhanced job security. If positions are permanent, the funds must be permanent as well. The funding of the tenure system must therefore be the responsibility of the entire institution. This responsibility should not be mandated to single research units.

It is rational to subsidise the tenure system from three sources: a) the gradually increasing base funding, b) institutional block grants, and c) funds that are currently assigned to teaching (as many tenure candidates are also university teachers).

It is necessary to prepare a policy, rules and regulations for two mechanisms that may have a significant impact on how the tenure system will be populated: a) continuing the careers of successful researchers either in the tenure system or in alternative positions, b) transferring positions of elderly scientists to the younger generation. The current holders of institutional block grants are most likely strong candidates for the tenure system. Therefore, it is rational to allocate a certain portion of their current block grants to the tenure system.

On the one hand, it is rational to harmonise the currently running system of competition-based grants with the geometry of the tenure system (incl. the terms of its steps and post-doctoral positions). On the other hand, the system of grants should also be one of major sources of funds for non-tenured research landscape. This landscape should be dimensioned so that those excellent scientists who do not enter the tenure system by any reason could continue their research.