ÓBUDAI EGYETEM
OBUDA UNIVERSITY

Habilitation Thesis Summary

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# Researching individual researcher excellence and innovation policy with an applied approach

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Doctoral School for Innovation Management

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## I. BACKGROUND OF THE RESEARCH

I obtained my doctoral degree in 2018, focusing on the possibilities of utilising research infrastructures by enterprises. The foundation of my thesis came from a practical viewpoint, an approach which is still valid for my research activities. As a researcher, my fields of interest were always those that had the potential to have an impact beyond their scientific content. This can be

called somewhat natural in my case, since by 2018 I was dealing with innovation policy from the policy-making side already for 7 years, and this activity goes on ever since.

All of my research activities can therefore somehow can be traced to some major initiative, be it the scientometrics of researchers, young and talented students, research infrastructures or innovation policies as a whole. I have been promoted to the Manager of the Talent Management Office, where I put into practice my research results regarding young talents as well as my research in researcher evaluation.

Innovation policy was and still is an integral part of the theoretical background of my research, as it primarily seeks to answer how a given country can scale up its innovation capabilities (OECD, 2007). Two significant models have contributed to the development of this capability in the field, both of which are now widely recognised. One of these is the so-called Triple Helix model (Etzkowitz, 2000), which posits that the collaboration between government, academia, and

businesses enhances the level of innovation in a given region. In my doctoral dissertation, one of my proposals was the use of research infrastructures as a shared platform to facilitate the collaboration of Triple Helix actors. As we shall see, this concept—although at that time the Cooperative Doctoral Program had not yet been established—has been partially realized, and its implementation is ongoing.

The other major theoretical framework shaping innovation policy is associated with Mazzucato (Mazzucato, 2018), who introduced the concept of "mission-driven" innovation policy in relation to the European Union's research, development, and innovation (RDI) policy. This concept, complementing the Triple Helix model, has since become a defining approach in innovation policy across Europe. Its essence lies in the idea that the actors of the RDI ecosystem collaborate not in an ad hoc manner but along designated key topics, or missions. The achievements within these missions are expected to significantly strengthen Europe's competitiveness, RDI capacities, and their utilisation.

To understand the trajectory of the research presented here, it is also important to consider that the European Union has established framework programs — the last two of these were the Horizon 2020, and recently Horizon Europe (European Commission 2021) as — which embody both the Triple Helix and the mission-driven RDI logic. These programmes played a major role in shaping the European research and innovation policy up till now[1]. The Horizon framework programmes consisted of three pillars. The first pillar focused on research excellence, curiosity-driven, exploratory research (blue sky research), and research infrastructures. A portion of my research specifically addresses this domain, which is challenging to measure and quantify, as will be presented. The second pillar supported mission-driven logic, funding projects that have a significant impact on Europe's RDI capabilities, with a particular emphasis on ensuring the active participation of EU-13 countries, as these are European-level challenges—an aspect we shall also

[1] Currently there is an ongoing planning about the next framework programme, but this is not the scope of the theses.

examine. Finally, the third pillar supported business innovation.

The current state of the world shows that Europe didn't benefit as much from these programmes as it should have (see the Draghi report for instance, European Commission 2024). Questions of competitiveness are arising especially when it comes to industrial policies. The situation is even worse in RDI. The concept of making innovations within Europe which are based on science as much as possible is still persisting, but again, the framework programmes results' are disappointing. The Matthew effect results in a distorted fund allocation even in the EU-14 countries; meaning that most funds are getting allocated to the major research institutes and for the business sector again a well-defined part of the eligible enterprises are getting a huge part of these funds.

For the individual researchers, there seems to be another layer of distortion: it can be seen that the scientometric numbers are playing a crucial role in fund allocation (regardless of initiatives like the Leiden manifesto (Hicks et al. 2015), and for the evaluators, simple numbers like

the h-indexes are still used as merits. The other layer is the one which is not researched before – nor admitted – but the figures show exactly that researchers from the EU-13 countries have a glass ceiling meaning a majority of them don't get funded which can't be explained – unless we believe that the EU-13 have less talented or skilled researchers which is not the case.

Regarding the Hungarian research and innovation policy, more strategies exist, most notably the RDI Strategy of Hungary (ITM, 2021), the Smart Specialisation Strategy (S3) (NRDIO, 2020) and the John von Neumann Plan (Ministry of Culture and Innovation, 2023). Among these the first two can be considered as traditional strategies with action plans and monitoring system. The key concept of the RDI strategy can be summarized in three words: creation, transition and utilisation – all relevant to the knowledge. This core concept goes well beyond the timeframe of the strategy, this idea remains valid for many years to come. This is at the heart of the S3 as well, where the comparative advantages in RDI had to be identified in the framework of the Entreprenurial Discovery Process

(EDP). The logic of EDP calls for the involvement of stakeholders who will actually carry out RDI activities – a concept which sounds good in theory, but from the practical perspective it's more difficult. EDP identified those areas that are highly relevant for RDI which are present in the grant schemes as well. The John von Neumann Plan which can be seen as an action plan connected to the Strategy and loosely to S3 (with its concept of 4 big thematic fields) intended to call for action for the ecosystem stakeholders to make innovation happen through these major thematic fields.

This is currently happening, though due to macroeconomical factors in smaller scale as desireable. This can be seem in the innovation scoreboard results as well: Hungary is trying to achieve higher position than the one around the 20th. I believe this can be achieved if we make the next step in building the ecosystem. This would involve the increase of fund allocation both in terms of speed and volume, then the next prerequisite of a successful ecosystem will be in place: the critical mass of businesses and research institutes in dedicated fields.

The next step will be the task of a new strategy. This strategy should be adopted from the (Massachusetts Institute of Technology Regional Entrepreneurship Acceleration Programme (MIT REAP) of which I was the co-champion. In the framework of the programme, I learned the concept of innovation clusters throughout the whole value chain. This means that clusters shouldn't be organised for the same activities (say, for manufacturing), but rather for actors of the whole value chain presented in the so-called smile curve.

My recent research activities carried out with 6 PhD students are touching upon this topic from different perspectives. These topics incluce open innovation (researched topic of Márk Végh) and its possibilities at Hungarian enterprises – it would obviously bring better innovation performance of the companies if they were more willing to incorporate ideas from the outside; also, if they could become partners for multinational companies' subsidiaries as suppliers through innovative products and services. Of course the subsidiaries need to be able (topic of Csilla Hegyi) to bring the innovative

projects (and R&D intense projects) to Hungary as well – this depends heavily from the business environment and its factors – another PhD stundent of me is studying this topic. trying to indentify the factors that make subsisiaries capable of achieve the higher added value status. In a recent study we found that country culture is less important than a stable regulatory and business environment – at the same time the importance of company culture is a key factor. This is being researched as well by another PhD student (László Személyi) who tries to find the connection between internal and external factors of innovation. If a company could define which subjects are the most important for its competitiveness and thus, innovative activities, it could undertake innovative projects more efficiently.

Companies in Hungary are still uncertain about innovation, why is it good for them (2/3 of SME's don't see the reason to innovate!), and low hanging fruits like digital marketing innovations could be introduced to tackle this issue (topic by Balázs Deák). Marketing is the key for successful selling of innovation as well, after all.

On a different note, artificial intelligence (topic of Alexandra Kovács) is a hot topic and we all know it will impact not just our personal lives but also business sector performance and competitiveness. Those companies that are lagging behind in AI will not play a role in innovation for sure. Currently, we are trying to map the current status of AI at SME's and more importantly, its potential use cases and managerial attitudes toward it.

When it comes to innovation and Hungarian economy one doesn't need to be an expert to safely say that the agrarian sector is one of the major field for innovation. This is also present in the John von Neumann Plan as well as in the S3 – still, research about the agrarian sector's performance in innovation is not extensive. If the sectoral characteristics (including spillovers, grant efficiency, innovation boundaries etc.) could be identified for this sector (topic of Bence Tóth) this could serve as a model to make a landscape analysis for other key sectors as well. And knowing the current state of pla is the first step for building those innovation clusters which incorporate the parts of the critical mass described before.

While the research topics of my PhD students include many facets of RDI policy, all of them converge to bring innovation in Hungary to the next level.

## *MAIN SCIENTIFIC RESULTS*

The topics covered in this thesis document have four main aspects which can be considered as new scientific results. One of these areas concerns the evaluation of individual researchers' excellence, a highly topical issue both in Europe and globally. Notable in this context are the DORA Declaration (Cagan, 2013) and the Leiden Manifesto, which propose recommendations for assessing research excellence. One of these theses, which played a key role in RDI funding allocation to individual researchers, proven by highly-ranked journal appearances and societal impact is that the principal investigator researcher's prior scientometric performance is the strongest predictor of future outcomes. This also means that the figures showing previous scientific performance can be used as a compass to determine the future potential of researchers. This doesn’t mean that the previous

performance determines, but predicts; meaning that the scientometric data with responsible use (see the Leiden Manifesto for instance, which aims for quality indicators as well) could and should be used for future funding decisions. In some rare cases unexpected performances can happen, meaning that someone with a less impressive track record excels in a publication, but as a rule of thumb it's safe to say, again – past performance is a good predictor about what to expect from a researcher.

Closely linked to this topic is the question of how to ensure the presence of outstanding and motivated researchers in the future. In this regard, the role of the National Scientific Student Conference (OTDK), which remains relatively under-researched, has also been a subject of my interest. This is a less researched field, though it both shows the quality of talent management at Universities and also provides a basis for future researchers. One of the major achievement here is the independent operation of the OTDT since 20200, which allows it to improve further with far less administrative constraints.

Beyond the topics on basic research, I have also explored the innovation capabilities of enterprises, primarily from a domestic rather than an EU-wide perspective. This focus stems from the fact that, in practice, Hungarian enterprises receive significant innovation support primarily through Structural Funds (e.g., the Economic and Innovation Operational Program, GINOP). In alignment with EU expectations embodied in the Smart Specialisation Strategy (S3), a key challenge has been identifying which countries possess critical mass in specific industrial sectors. Building on this critical mass can facilitate the development of competitive advantages and specialization within Europe. Regarding RDI strategies it's been proven that strategies which aim to focus on defining missions that drive RDI in a country can support the development of Hungary's innovation ecosystem. This statement is also supported by the fact that since the creation of the Smart Specialisation Strategy both at the EU level (see the new plans for the RDI Framework Programmes) and at Hungarian level (the John von Neumann Plan) this concept has been rooted deeply. As outlined before, I'm certain that after the establishment of

these missions that guide the innovation ecosystem, the next step, the formation of critical masses in value-chain based clusters can be established to step further in innovation. This brings the concept of the Triple Helix further, to the Quantiple Helix, where the society is involved in innovation – the building of value chains can't be imagined without the wide involvement of society. The quintiple helix is at the heart of Obuda University's new paradigm in stepping further in innovation as well.

In this dissertation, I present the research findings outlined above, with the hope that they contribute to the advancement of innovation policy and its related fields. Most of my journal publications are almost exclusively co-authored, collaborating with professionals of the given topic and adding the innovation policy perspective to achieve the results. I firmly believe that progress in innovation is best achieved through teamwork.

## II. NEW SCIENTIFIC RESULTS

My theses are structured into four main thematic areas:

1. The evaluation methodologies related to individual research excellence (scientometrics.org, tudomanymetria.com).
2. The identification of enterprises' innovation capabilities in policy and the associated challenges.
3. The examination of researcher training and career initiation support programs, with a particular focus on the OTDK, which, despite its significant impact, remains under-researched.
4. Finally, to demonstrate the practical relevance of my PhD research, an overview of the continued application of my earlier research findings (researchinfrastructures.hu).

At theses 1 and 2 I made a summary of the papers which describe the scientific results in a condensed way using the original papers. The full papers are available with this theis and in most cases online as well.

| | Thesis | Methods | Relevant publication |
|---|---|---|---|

| | | | |
|---|---|---|---|
| T1 | In individual excellence projects, where the principal investigator plays a decisive role, the researcher's prior scientometric performance is the strongest predictor of future outcomes. | Qualitative analysis | P1, P2, P3, P4 |
| T2 | The S3 strategy and its associated programs can support the development of Hungary’s | Literature review, quantitative analysis | P5, P6, P7, P8, P9 |

| | | | |
|---|---|---|---|
| | innovation ecosystem. | | |
| T3 | Talent development and the training of young researchers are key elements for the future success of the RDI ecosystem. | Literature review | P 10, P11 |

**T1. In individual excellence projects, where the principal investigator plays a decisive role, the researcher's prior scientometric performance is the strongest predictor of future outcomes.**

This thesis was extensively studied with the goal of establishing an actual and functional system to support decision-making based on scientometric results. This system, initially named *tudomanymetria.com* and later

*scientometrics.org*, was successfully introduced and is actively used by Hungary's largest funding agency, the National Research, Development and Innovation Office, to assist reviewers in their work.

While the system aims to be as fair and balanced as possible—taking into account factors such as the researcher's age and the specificities of their scientific domain, while also maintaining transparency in its operation—it must be emphasized that the system serves as a **compass**, not a **GPS** that provides precise navigation. Expert reviews should always be considered in final decisions, but reviewers must also be aware of the correct figures related to the individual being evaluated, rather than relying solely on indicators such as the h-index.

To ensure transparency and validate the system's scientific approach, we published a series of articles. Two of these discuss the rationale behind the system, one presents actual user feedback (which was overwhelmingly positive), and another proposes a change in the evaluation of scientific excellence in the field of economics and

management—a topic that still requires further discussion within the Hungarian academic community.

**Publication 1**

**Research funding: past performance is a stronger predictor of future scientific output than reviewer scores**

### 1.1 Background of the Research and Research Aim(s)

Research grant financing is a cornerstone of scientific productivity, yet the effectiveness of review-based allocation remains debated. This study examined the predictive validity of reviewer scores within the National Research, Development and Innovation Office (NRDIO) by analyzing whether grant evaluation outcomes anticipated later scientific performance.

### 1.2 Presentation of Methods

The analysis covered 13,303 proposals submitted between 2006 and 2015, with 42,905 reviewer reports and at least three years of follow-up. Scientometric data of principal

investigators (PIs) were collected from the Hungarian Scientific Work Archive, standardized with SCImago Journal Rank, and limited to Q1 publications. Indicators such as H-index, independent citations, and yearly publication outputs were compared using Mann–Whitney tests and Pearson correlations.

### 1.3 Presentation of Results

Out of 13,303 proposals, 3,455 (26%) were funded. Funded PIs had significantly more Q1 publications, especially as first or last authors, and international collaborations and larger budgets correlated with higher outputs. However, reviewer scores showed only weak associations with later productivity. In contrast, scientometric parameters at submission—such as H-index and citation counts—strongly predicted future performance for both funded and unfunded applicants. Biases were evident in peer review, including favoritism toward established scientists and institutions, stricter scoring linked to claimed expertise, and disadvantages for interdisciplinary projects. International reviewers proved

less effective than national ones, possibly due to inconsistent reference systems.

### 1.4 Theses (New Findings)

The study concluded that past scientometric performance is a far stronger predictor of future research productivity than reviewer scores, highlighting the structural limitations of peer review. A proposed solution is integrating standardized bibliometric pre-ranking systems to filter applications, allowing reviewers to focus on uncertain cases. This approach could streamline evaluations, reduce bias, and improve efficiency. Although some limitations remained—such as exclusion of co-investigators and funding histories—the findings suggest that objective indicators offer a more reliable basis for grant allocation than traditional review mechanisms.

## Publication 2

## Evaluating individual scientific output normalized to publication age and academic field through the Scientometrics.org project

### 1.1 Background of the Research and Research Aim(s)

Grant agencies traditionally award funding based on researchers' documented achievements, particularly publications as leading authors. Yet evaluating scientific careers across disciplines and age groups poses challenges, since raw metrics such as citation counts or journal prestige fail to allow fair comparison. The central aim of this study was to establish a transparent, reproducible framework for ranking researchers by normalizing performance relative to peers of the same age and field.

### 1.2 Presentation of Methods

Using the Hungarian Scientific Work Archive, the team assembled a reference database covering over 17,000 Hungarian researchers. For each individual and year, four

key parameters were computed: H-index, independent citation counts, number of publications in the past five years, and number of high-quality publications in the past ten years. These data were integrated into an online platform that generated a composite “overall score” for each researcher. Algorithms were tailored to field-specific practices, and all steps were designed for transparency: the workflow was openly documented, the database made available for download, and every record linked back to its source.

### 1.3 Presentation of Results

The resulting platform, available at *www.scientometrics.org*, enabled rapid comparison of researchers within age-matched peer groups. Unlike common tools such as Google Scholar or Scopus, the system corrected for disciplinary differences and career stage. Importantly, journal impact factor was deliberately excluded due to its methodological weaknesses and lack of transparency. Instead, the framework emphasized open, author-level indicators, ensuring accessibility and

reproducibility. Although the dataset was limited to Hungarian researchers, the system provided meaningful rankings and percentiles within this context, while also being adaptable for international use.

### 1.4 Theses (New Findings)

The study demonstrated that a transparent, field- and age-normalized scoring system can objectively rank researchers, complementing grant review processes. By offering standardized benchmarks, the platform supported evidence-based decision-making and reduced subjectivity in evaluations. While initially limited in geographic scope, it provided a foundation for international expansion, thereby promoting more efficient, equitable, and transparent grant allocation.

## Publication 3

## Supporting grant reviewers through scientometric ranking of applicants – reception and impact

### 1.1 Background of the Research and Research Aim(s)

The study examined the impact of a newly introduced scientometric decision support tool on grant allocation and reviewer satisfaction in Hungary. The aim was to assess whether the tool, which ranked applicants against age-matched peers using standardized metrics, improved the efficiency and fairness of reviewer decisions in the national basic research grant scheme.

### 1.2 Presentation of Methods

Launched in 2020, the online platform applied four metrics across eleven disciplines: H-index, yearly independent citations, publications in the last five years, and highly cited publications. It screened all 6,662 applicants to the national grant program. The study compared three allocation rounds prior to implementation with two rounds afterward. Reviewer feedback was

collected via questionnaires from 540 experts across all disciplines, while quantitative analyses evaluated shifts in allocation outcomes and correlations between rankings and funding decisions.

### 1.3 Presentation of Results

After adoption, the average scientometric score of funded applicants increased by 94%. Correlations between rankings and grant decisions were strong in life and material sciences, though weaker in social sciences and humanities, where books and monographs carried greater weight. Most reviewers (83%) found the rankings useful, particularly younger ones, and reported that the system allowed them to focus on intermediate cases where proposal quality mattered most. Criticisms of metric overreliance were addressed by safeguards against manipulation, including adjusted H-indices and detection of abnormal citation patterns. The framework was further adapted for disciplines such as archaeology and linguistics, broadening publication types considered.

### 1.4 Theses (New Findings)

The study demonstrated that integrating scientometric rankings into grant evaluation improved both the quality of funded applications and reviewer efficiency. While not a substitute for peer judgment, the tool served as a valuable pre-screening mechanism, increasing transparency and consistency. Its methodology could be extended to institutions for performance-based funding, and its successful adoption suggested potential long-term benefits for national research competitiveness.

**Publication 4**

**The need for a reliable and objective model of publication performance measurement: The demand of business sciences to be change and the tudomanymetria.com project**

**1.1 Background of the Research and Research Aim(s)**

The study explored the role of international high-quality journal publications in Business, Management, and Accounting (BMA), emphasizing their importance for researcher excellence, international visibility, and global scientific contribution. The central aim was to highlight

the policy need for prioritizing funding toward researchers capable of advancing science internationally and to assess how evaluation tools—particularly the *tudomanymetria.com* project—could support this objective.

### 1.2 Presentation of Methods

The article reviewed existing publication practices and evaluation systems in BMA, with a focus on their alignment with national and international science policy goals. The *tudomanymetria.com* platform was presented as a motivational and evaluative tool that accounts for both disciplinary characteristics and researcher age. The study also examined institutional expectations and policy frameworks shaping researcher performance, including career progression pathways.

### 1.3 Presentation of Results

The analysis revealed that fragmented and sometimes contradictory evaluation systems risked misaligning individual publication strategies with national policy

objectives. In BMA, the title-based academic advancement system was found to be overly segmented, with limited emphasis on international publications. The study argued for restructuring performance expectations across academic stages—from PhD to professorship and Academy membership—by giving greater weight to international research outputs. The *tudomanymetria.com* initiative emerged as a potential driver of change, offering an objective and unified framework for assessing publication excellence while fostering transparency and comparability.

### 1.4 Theses (New Findings)

The findings stressed that international journal publications must form the cornerstone of researcher evaluation in BMA to maintain global competitiveness. The abolition of outdated requirements, such as the habilitation degree, alongside a stronger emphasis on international visibility, was proposed. The *tudomanymetria.com* model could provide a consistent, professional basis for evaluation, aligning individual

researcher strategies with broader policy goals. Achieving consensus among policymakers, academic bodies, and the research community was identified as a crucial step for ensuring BMA's future relevance in the international scientific landscape.

**T2. The S3 strategy and its associated programs can support the development of Hungary's innovation ecosystem.**

This theis examines the main question of innovation policy: How can a contry become more innovative? Since I don't have the Philosophers' Stone with me we tried to make use of different approaches that try to boost innovation. One of this is the aforementioned Smart Specialisation Strategy with close connection with the Triple Helix concept. In our publications we both intended to show the rationale behing the S3 in Hungary, how it is (and was) formed and that it should be quite a living document. An integral part of this process is the Entreprenurial Discovery Process, where the involved stakeholders themselves are finding out (in a mediated way) which could be the specialisations for each region –

in our case, for Hungary as whole. This work had a preparatory phase as well, where the use of statiscical tools were put into practice to make sre that the selection possibilities have realistic basis – these formed the „long list" of priorities which were later discussed during the EDP and resulted in the S3 priorities of Hungary. We had time to learn this, since I was lucky to be part of the first and the second round of S3 in Hungary – the second (now ongoing) round resulted in a much better and coherent document – it's up to the policy now to make good use of it. It should be noted that many scientific dissemination events took place in Hungary and abroad in conferences and were very well recieved. In other publications we tackled the issue of the two-shifted Europe, where RDI funds are getting allocated to the EU-14 countries in vast majority. An analysis showed that keeping a healthy balance and taking the "risk" of allocating funds in a less concentrated way could boost the EU competitiveness. In innovation it's also a widely known perception, that much depends on the attitude towards it – while this is true, it shouldn't be taken as a predestination, rather as part of the landscape analysis, which element can be changed. There

is no “curse of Turan”, and measures to make change in innovation (from the institutional side for instance) do have a key role in transforming the ecosystem.

**Publication 5**

**The change of the methodology of the Entrepreneurial Discovery Process in defining the priorities of Hungarian Smart Specialization Strategies**

**1.1 Background of the Research and Research Aim(s)**

The study examined the introduction and evolution of smart specialisation strategies (S3) in Hungary, with particular focus on the entrepreneurial discovery process (EDP) and prioritization methods. Unlike traditional top-down innovation policies, S3 emphasized stakeholder involvement in identifying areas with potential to generate new regional growth paths. The research aimed to assess how prioritization was implemented in Hungary, what challenges arose, and how lessons shaped the transition from the 2014–2020 to the 2021–2027 programming period.

## 1.2 Presentation of Methods

The analysis compared two strategic planning cycles, assessing differences in stakeholder participation, prioritization tools, and policy communication. It tested the hypothesis that prioritization could not rely solely on one-time regional stakeholder input but required systematic tools and validation mechanisms. Sources included the outcomes of county-level planning, the distribution of RDI support, and the establishment of new institutional structures such as Regional Innovation Platforms.

## 1.3 Presentation of Results

During 2014–2020, the EDP methodology went through a learning phase. While bottom-up involvement increased awareness, the resulting priorities were overly broad, sectoral in focus, and weakly aligned with actual regional strengths. Policy communication remained limited, and EDP became a one-time event rather than a continuous process. In the 2021–2027 cycle, improvements included stronger management, clearer prioritization, and broader

perspectives reflecting global trends. Stakeholder participation increased through the National Innovation Forum and Regional Innovation Platforms, which enhanced cooperation and knowledge transfer. New tools, such as the S3 questionnaire, further aligned priorities with national strategies and global megatrends.

### 1.4 Theses (New Findings)

The findings confirmed that S3 prioritization is a multifactorial decision problem requiring both broad stakeholder involvement and top-down validation. Effective implementation depends on continuous monitoring and adaptive frameworks rather than static plans. Institutionalized platforms and improved communication were identified as key enablers of sustained stakeholder engagement and more targeted allocation of RDI resources, supporting competitiveness and innovation.

## Publication 6

## Handling regional RDI disparities in Hungary: new measures of university-based innovation ecosystem

### 1.1 Background of the Research and Research Aim(s)

The study investigated regional innovation capacity in Hungary, with a focus on regional inequalities, their policy relevance, and the design of new measures to address them. Innovation's systemic nature and its role in competitiveness had gained prominence in EU and Hungarian policy, particularly with the 2021–2027 cycle, which integrated innovation, enterprise development, and digitalisation. Hungary's case was notable due to its newly adopted RDI and Smart Specialisation Strategies, the financial resources available from the EU, and the policy shift toward university-centered innovation ecosystems. The aim was to map inequalities at county and regional levels and analyze the intervention logic of new policy tools.

### 1.2 Presentation of Methods

The analysis explored the strategic framework introduced in 2021, emphasizing universities as central regional actors. It reviewed the intervention logics of recently launched or planned programs, examining how they mobilized local RDI capacities, fostered cooperation, and supported systemic innovation processes.

### 1.3 Presentation of Results

Universities were placed at the center of regional innovation ecosystems, with programs designed to enhance their knowledge transfer and networking roles. Initiatives included the Cooperative Doctoral Program (linking doctoral research to local needs), the Thematic Research Excellence Program (focusing academic research capacities), Competence Centers (building sustainable business–academia partnerships), and the University Innovation Ecosystem (acting as a one-stop shop for RDI services). Regional Innovation Platforms and Science and Innovation Parks complemented these by fostering collaboration among stakeholders and creating infrastructure for long-term cooperation. Although these

measures were still in early stages, they were expected to strengthen regional ecosystems and reduce inequalities.

### 1.4 Theses (New Findings)

The study confirmed that Hungarian innovation policy had undergone a paradigm shift, with universities positioned as key intermediaries in regional knowledge flows. While concrete outcomes could only be evaluated later, the new institutional and programmatic framework was anticipated to significantly enhance regional RDI capacity, mobilize local strengths, and narrow disparities across Hungary.

## Publication 7

## Concentration versus excellence: lessons learned of European R&D &I framework programs

### 1.1 Background of the Research and Research Aim(s)

The study analyzed institutional concentration in EU Framework Programmes (FP7 and Horizon 2020), focusing on its implications for research and innovation. Institutional concentration refers to the dominance of a

small number of institutions in project participation and leadership. The aim was to explore the dual nature of this phenomenon: its potential to strengthen efficiency and excellence, but also its risks for inclusivity, diversity, and long-term innovation capacity.

### 1.2 Presentation of Methods

The analysis combined qualitative assessment of institutional roles in EU consortia with modeling exercises to evaluate how concentration influenced performance. Attention was given to efficiency gains, network formation, power asymmetries, and the relationship between concentration levels and research outcomes. Comparisons were made between the benefits and risks of involving highly experienced institutions versus smaller, less prominent actors.

### 1.3 Presentation of Results

Findings showed that leading institutions enhanced collaboration quality, attracted strong partners, and delivered high-level results, while building durable

international networks. However, high concentration created barriers for smaller institutions, reduced diversity, and increased risks of power imbalance within consortia. Overreliance on dominant actors sometimes constrained creativity, as established organizations favored familiar methods over innovative alternatives. Excessive participation also led to resource overload and performance decline. Modeling confirmed that while concentration initially improved efficiency, benefits plateaued beyond a threshold, after which risks of fragmentation and diminishing returns grew.

### 1.4 Theses (New Findings)

The study concluded that institutional concentration carries both opportunities and risks. Excellence from leading institutions is vital, but excessive dominance undermines inclusivity and innovation potential. A balanced approach is needed: ensuring strong roles for top organizations while creating fair opportunities for smaller actors. This balance between excellence and diversity is key to safeguarding adaptability, resilience, and long-term

scientific impact in the European research and innovation system.

**Publication 8**

## Innovation in Your Blood? Exploring the Influence of Culture on National-Level Innovation Performance in the European Union

### 1.1 Background of the Research and Research Aim(s)

The study explores how national cultural values influence innovation performance across EU member states. Previous research often lacked EU-focused longitudinal perspectives and a clear empirical link between cultural theory and innovation outcomes. The main aim was to test whether Hofstede's six cultural dimensions—particularly indulgence (IND) and individualism (IDV)—affect innovation performance, measured by the European Innovation Scoreboard's 2024 Summary Innovation Index.

### 1.2 Presentation of Methods

The analysis applied a two-stage quantitative design. First, multiple regression models assessed the predictive strength of cultural dimensions on innovation performance across member states. Second, t-tests compared cultural indicators between countries that improved their innovation group ranking (2017–2024) and those that did not. Hofstede's dataset provided cultural variables, while innovation data were drawn from the European Innovation Scoreboard.

### 1.3 Presentation of Results

Regression results revealed indulgence (IND) as a robust, statistically significant predictor of innovation performance. Individualism (IDV), often emphasized in prior studies, was significant only in a reduced model. However, t-tests indicated that neither IND nor IDV significantly distinguished countries that advanced in innovation ranking over time. Thus, permissive and individualistic cultures appear linked to higher baseline innovation capacity but not to subsequent progress. These findings suggest that while cultural values shape structural

conditions for innovation, they are insufficient drivers of long-term advancement.

### 1.4 Theses (New Findings)

The study demonstrated that cultural traits such as indulgence and individualism contribute to explaining cross-country differences in innovation capacity but do not determine dynamic improvement. Instead, institutional, political, and structural factors likely play a stronger role in sustained innovation advancement. Policy implications are clear: innovation strategies should be culturally informed—recognizing the background role of values—but not culturally determined. Overemphasizing culture risks overlooking more decisive levers of progress.

**T3. Talent development and the training of young researchers are key elements for the future success of the RDI ecosystem.**

Talent development and its main forum, the National Students Societies are mostly taken as obvious by most

actors in the higher education sector in Hungary. Its importance is increasing steadily, not just because the number of participants in each of the contests, but also because it's a seal of quality for higher education students' performance. Its importance can be seen when we look at its financial impact on universities as well: the universities that schanged their operations model from state owned to private universities gt a part of their funding on their students' results at this conference. Also, the newly introduced University Research Excellence Programme (EKÖP), builds heavily ont he same results, just as its predecessor, the New National Excellence Programme (ÚNKP) did.

In the light of this it's somewhat surprising that scientific research was carried out only seldom in connection with the OTDK. Also, form time to time decision makers have to be reminded and presented the concept of the OTDK, ensuring their support. This is luckily not very difficult and maybe this is the reason why extensive research wasn't carried out. I took part in the dissemination of OTDK's activities in one of the most prestigious

Hungarian journal, and also took part in a conference paper which provide the background for further research. As a matter of fact, in the future I intend to intensify my research activities in connection with OTDK with the logic of researching the inputs, outputs and outcomes of it.

## III. IMPACT OF THE RESULTS

My research activities have two different, but in my view equally important impacts. One of them is the “formal”, which is embodied in citations and journal scores. My strategy was to strive towards excellence when it comes to publications. As a result, the publications have appeared in the following categories since I obtained my PhD: D1 (3x), Q1 (3x) and Q2 (3x), Hungarian HAS classification A (1x), B (2x). Among these, some articles are under publication (with acceptance from the journal – at the time of the thesis submission a Q2, and a conference article are under publication with approval from the

publisher)[2]. The citation figures also show that there is significant interest from the scholarly side for these publications, most notably in the scientometrics topic. With 131 citations, I firmly believe that these publications are and will be relevant for science. I also co-authored the teaching supplement “Innovációpolitika” with a chapter on research infrastructures. Many of my publications are scientific presentations about the concepts of the RDI ecosystem, policy, research infrastructures or scientometrics. Though these are not considered to be as the same weight as a journal paper, for instance, from a scientometric point of view, I believe they play a very important role in building innovation in Hungary. Having about 100 people on average from the senior members of the academic and business sector as the audience is an impact, though not quantifiable.

Another aspect, which is somewhat harder to quantify is the societal impact. When we talk about societal innovation in most cases we are talking about spreading

[2] Articles under publishing in: Marketing és Menedzsment (HAS B); Progress in Agricultural Sciences (Q2)

the culture and the mindset of innovation. This can be done most efficiently when someone has the expertise and professional background – a phenomenon which I was lucky to experience through the many scientific events and conferences I took part. I find very important the excellent research infrastructure initiative for this very reason as well, along with its direct impact on innovation policy. Research infrastructures in Hungary became a cornerstone of the policy and through my active participation researchers from all fields have now the possibility to access their respective top research infrastructure in Europe. Conducting these researches enabled me to be part of many great European initiatives and getting insights from RDI.

Recently (in 2024) I took part in the international assessment of the HUN-REN research institutes with experts from abroad. This resulted in reports which are being used in the innovation policy as landscape analyses for forming the future strategy of both HUN-REN as well as Hungary's future RDI strategy.

In 2022 I established the Innovation Department at the Hungarian Economics Society, with the aim of bringing the academic sector, governmental sector and businesses together – a logic which pretty much mirrors the concept of the Triple Helix on a smaller scale. Right now there are about 100 members in this Department making it a potential basis for conducting researches in the field of innovation as well.

I represented Hungary during the past years in many international organisations: In connection with the research infrastructures, I was part of the CERN Council (which is the biggest research infrastructure in Europe) and served in various roles in the ELI (still representative), the biggest research infrastructure in the EU-13 countries located in Hungary. As a representative in the European Strategy Forum for Research Infrastructures, I had the opportunity again to put research in practice: the concept of socio-economic impact by now became a widely and naturally accepted concept. As member in various science and innovation policy organisations like the Joint Research Council, European Science Advisory Forum, I

made contribution to science policy as much as it was possibl. The RDI calls which were published by the NRDIO through the multiple bi-lateral meetings with partner countries also reflect by now the concept of inter-sectoral cooperation. I was co-champion in the aforementioned MIT REAP programme, which aimed to bring the innovation to the next level (through the identification of the potentilal Hungarian innovative enterprises and the formation of clusters). I was also selected as an evaluator in the Horizon 2020 research infrastructure funding scheme.

From the Hungarian RDI policy side I coordinated the establishment of the RDI Strategy 2021-2030, the Smart Specialisation Strategy, established the National Research Infrastructure Committee (still a member), the National Position Paper for Open Science and served as secretary at the Cooperative Doctoral College. I was the secretary of the first Hungarian Council for National Science as well. On another level I played a key role in stabilising the Hungarian Center for Excellence in Molecular Medicine (HCEMM), which project aimed at having excellence

centers in the EU-13 countries as well. Currently I'm member of the Advisory Board of the Young Scientists Academy of HAS, member of the Advisory Board to the Dean of ELTE Faculty for Natural Sciences, member of the transformation working group of MTMT3, and a member of the Programme Committee ot EISZ.

From an individual perspective, I tried to be involved from a scholary side in innovation as well. This involved the organisation of conferences at the University of Pannonia (European Conference for Innovation Management, ECIM), acted as a reviewer at Vezetéstudomány, Külgazdasági Szemle or Sustainability and in other journals. I was the opponent of PhD students (Klaudia Horváth and recently Csilla Tóth) and as lecturer I mentored about 30 thesis of BA or MA students. At the Univerity of Pannonia I'm teaching at the Research and Innovation Manager seminar, and in the past years I was teaching at the Budapest University of Economics. Since 2022 I'm teaching at the Doctoral School of the Óbuda University, being a founding member of the Innovation Management Doctoral School and supervisor as well.

My efforts in RDI were recognised by the National Scientific Students Conference golden insignia and with the medal for Prosperity of the Ministry of Innovation and Technology. I also recieved the honorary associate professor title from MATE.

Finally, when it comes to impact, it's always the human factor which is the most important one. I'm proud to have 6 PhD students (4 at Obuda University and 2 at the University of Pannonia), but not because of their number, but because all of them approached me after working together on different topics in innovation or innovation policy. Their topics now cover the most interesting fields where Hungary can have the potential to excel – something which I try to help with my limited powers as much as possible.

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## V. SCIENTIFIC PUBLICATIONS ASSOCIATED WITH THE THESIS STATEMENTS

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