

Science policy measures to increase university output

Assoc. Prof. Jitse P. van Dijk MD PhD^{1,2,3}

¹ Lecturer & Expert in Social Determinants of Health, Olomouc University Society & Health Institute, Palacky University, Olomouc, Czech Republic

² Associate Professor in Public Health, Department of Community & Occupational Health, University Medical Centre Groningen, University of Groningen, The Netherlands

³ Scientific Director, Graduate School Kosice Institute for Society and Health, Medical Faculty, Safarik University, Kosice, Slovak Republic

CORRESPONDENCE:

Assoc. Prof. JP van Dijk MD PhD
Department of Community & Occupational Health
University Medical Centre Groningen
Ant. Deusinglaan 1
Building 3217, Room 631
9713 AV Groningen
The Netherlands

ABSTRACT

We explored what can be done with more efficient use of the resources and opportunities we already have such that we produce more output and more high quality output. We advocate measures for improving efficiency, such as focusing on certain research fields, publishing internationally, replacing monographs for PhD students and habilitation, by publishing international articles, educating researchers by establishing graduate schools, selecting young talent and finding international partners. All of these measures can be taken without external interference.

KEYWORDS:

science policy, policy measures

INTRODUCTION¹

We as a scientific community live, whether we like it or not, in a world dominated by rankings and the perceived importance of such rankings. A choice against rankings, or a choice to ignore rankings, is a choice to define one's own university as "of local importance" only. For the moment I don't believe, as a member of our scientific community, that this is our aim. In contrast, I think we as a university want to be as good as possible: the best in the Czech or Slovak Republic, and then to be the best in the Visegrad countries, and ultimately significant in Europe. In order to achieve such a position it is necessary that we produce more output and more high quality output. If we really want to have more high quality output and a more efficient way of creating output, we should realise that nowadays the world of knowledge production is highly competitive, far more than it ever was in the past. For these reasons

we might need to change some of the procedures we have. I will go into some of them here. These steps are mainly focused on the more efficient use of the resources and opportunities we already have. My suggestion is not to wait until someone brings us more money, but the other way around: what we can already do now with more efficient use of the resources and opportunities we do have.

METHODS

The method used is an implicit comparison with successful Western universities. In this contribution we ask ourselves in which aspects these universities differ from ours and what could be learned from their way of producing scientific output. In fact, we want to discover what ultimately gives them a higher ranking, implicitly stating that this is a goal of our university.

RESULTS

Upon a closer look at Western, rather high-ranked universities, some six aspects are different from how science is produced at Czech and Slovak universities. We can change these aspects ourselves, without any help from external partners.

1 Focusing on certain research topics

The first step is to focus on certain research topics, regardless of what field one is working in. Within one group researchers should try to work on just one or two issues together with their colleagues. Focus your research interest as a group and try to have a sufficient mass of research capacity. As an example, perhaps, one could realise that we, as a group of more than 20 people in Kosice, are working on two topics. The idea that one can be good in a lot of topics is no longer possible in today's highly competitive fields of science. For research purposes this idea should be abandoned. I must admit that to a certain extent this is a painful step: when focusing on certain issues, there are also issues which will no longer receive any research attention, or at least not from the side of your group. However, all-in-all, this is a better choice in my opinion than continuing with scattered attention on a variety of topics.

To underline this I will show you some figures from Wusti et al.², who studied this process. The left hand picture depicts the percentage of teams, rising since 1960, in the three main distinguished fields; the right hand picture shows the mean size of those teams.

From the other illustrations in this paper² it is clear that papers from teams are more frequently cited in all fields than those from scientists working alone. This is important, since more international output and/or more frequent citations are the core of all types of

rankings, which is seen as a measure of the quality of scientific output³.

2 Publish internationally

Papers on the research topics should be published internationally. Output in national languages, like Czech or Dutch, will go unnoticed by the rest of the world and will not help to obtain a higher position in the ranking of the faculty or group. Since rankings are dependent on a specific category of journals – those with an Impact Factor – such journals should be the first choice for publication. For some universities even this is not enough. They use some instrument forcing their senior researchers to publish a certain number of times over a certain period in the top 25% of these journals. To make this sentence less abstract: I had to publish over the preceding 3 years 8 papers in top 25% journals. One could of course start with a far lower number, say, over the preceding 3 years 1 paper in a top 50% journal. Such a policy measure would immediately stress the idea that publishing internationally, and if possible as highly as possible, is important and good for the faculty or group.

3 Reorganisation the PhD and habilitation structure

The PhD trajectory at Czech and Slovak universities should be reorganised. PhD students or young researchers and Medical Doctors writing their PhD are currently writing a monograph, and most such monographs will end up on the bookshelf. In other words: they take a lot of effort, but the University does not really gain anything from them; this is not efficiently spent energy. It should be realised that during the same period the same PhD student or MD-researcher could have written three international papers which would

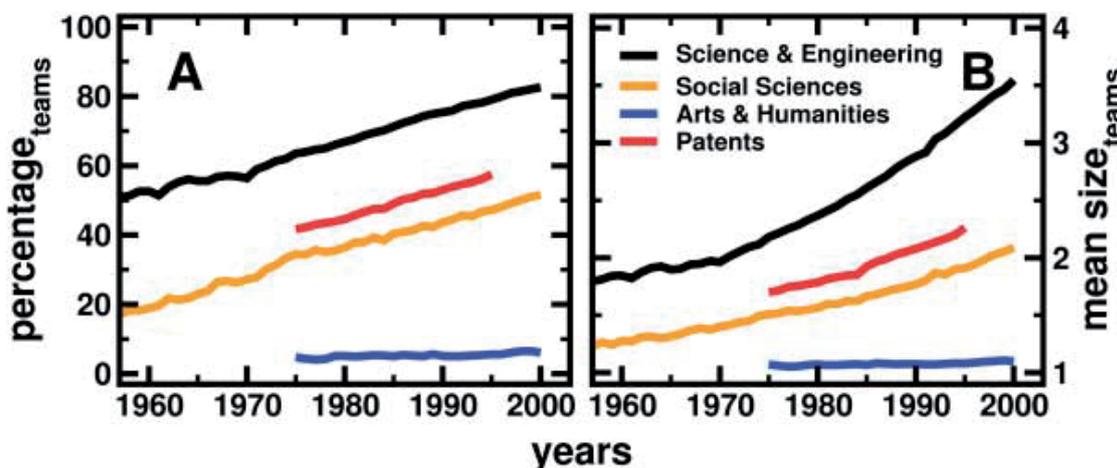


Figure 1 Percentage of teams since 1960 in three scientific fields (A), and the mean size of the teams in these fields (B). Source: Wusti et al.²

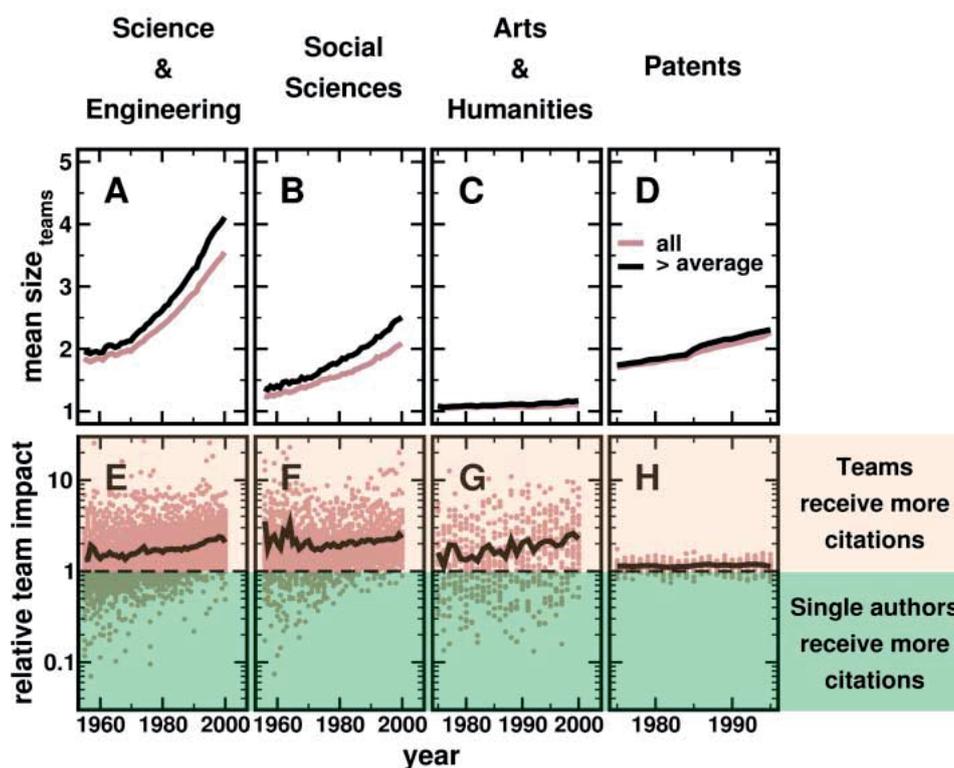


Figure 2 The mean size of the teams in three different scientific fields (A, B, C), and the relative impact of those working in teams in these fields compared with single authors (E, F, G). Source: Wusti et al.²

have contributed to the ranking of the University. Together with an Introduction and a Discussion a PhD study would have also been ready. The same is more or less valid for the inefficient way which leads to habilitation. Here, also, those who want to be habilitated have to do things which don't contribute to the University's ranking – and of course this could be changed in a similar way.

A Dutch PhD study, as an example, means, in general, that a student has to have submitted five manuscripts to international journals with an Impact Factor. Such a PhD thesis consists of an introductory chapter, the five submitted articles and a general discussion. The student has four years to finish this thesis, a Medical Doctor six years. Some 70% of the Groningen Medical Faculty's output is produced by PhD students. They are to a certain extent very valuable people; their contribution to the educational process of medical students is very much restricted. To have some idea: during the first three years of their PhD trajectory their educational effort is some one hour per week.

4 Research skills should be taught systematically to PhD students

For publishing internationally PhD students and Medical Doctors doing their PhD need knowledge of the

research skills they will use. It cannot be expected in today's highly competitive scientific world that they have already mastered these skills when they graduate. The term for such an educational program for PhD students is 'Graduate School'. Such a 'School' offers an educational programme – mostly competence-based – on the research skills needed by PhD students and is usually compulsory in part. Topics could be, for example: How to perform data collection; How to write an article; Basic descriptive statistics; How to cope with reviewer's comments; etcetera. What is advocated here is a structural education for researchers with the aim of increasing the University's output – quantitatively and qualitatively. Perhaps formerly this was not so necessary, when the professor-PhD student relationship closely resembled the master-pupil relationship, but in the very competitive scientific world we are living in now, we should support young researchers as much as possible with the knowledge and skills necessary for success on this battlefield. Only in this way will our university or faculty or department gain from their efforts.

5 Selecting promising students early during their studies

Another possibility might be to select young promising students as early as their undergraduate studies, in their

second year, and offer them an extra, research-oriented education. They will be the future staff of the university, or the future staff of universities in the country, so we might consider investing in their education early in their careers. In Western universities they are mentioned as 'honours students' or students following an 'honours program' or a 'junior scientific master class'. They can participate in ongoing research projects in the field of their interest and see how the knowledge production process takes place in reality. In general, this will stimulate them.

6 International partners

The sixth step is to find international partners working in the same field that your group has decided to focus on and to collaborate with them. International collaboration is not simply one-way traffic for your partners from abroad. Partners from abroad are also confronted with high demands from their own competitive scientific field and need highly ranked international output as well; thus, intensive collaboration brings more output for both partners.

DISCUSSION

We have explored what we can already do now with more efficient use of the resources and opportunities we have such that we produce more output and more high quality output. We identified six possibilities which could be changed without external interference. First, a process of focusing on certain research topics was mentioned; next, publishing internationally was recommended. Furthermore, a reorganisation of the PhD structure and the habilitation structure was suggested; as a part of these, research skills should be taught to PhD students systematically. Then selecting promising students early in their studies with the aim of teaching them research skills could be considered, and finally, it is possible to look for international partners in the field a group is focusing on.

Opposite these changes in the internal organisation of knowledge production is a change in the main external source, in the allocation of money. The results, however, contradict each other. One would expect that the higher the percentage of the gross national product spent for research & development, the more the scientific output of universities would increase. In the Netherlands over the period 1994–2010 such expenditures⁴ decreased slightly, but the output⁵ doubled. In the Czech Republic over the same period such expenditures⁴ increased substantially, and the output⁵ also doubled. And finally, in the Slovak Republic over the same period such expenditures⁴ decreased substantially, but the output⁵ increased slightly. To conclude: more

money is not the one and only answer to the question of how to produce more.

The Czech allocation model, the financial model the Ministry of Education uses to distribute money to Universities, contains a parameter on research⁶. It represents a certain percentage in the model. 'Research' as such is not good enough: the Ministry uses the Item-oriented field normalised citation score average from the SCImago report⁷ for a small percentage of this research part of the model. The Czech allocation model supports the development which is advocated here: more international output brings more money to the university.

Recommendations

A university should look to see where it could use the money it does have in a more effective way without external interference. The consequence should be that a university becomes more visible to others. Furthermore, the research part of the allocation model should increase in five years to a rather substantial share of the model. Only a rather substantial amount of the model will in general stimulate Universities to do their utmost to publish internationally.

JP van Dijk graduated in Medicine, Law, and Public Administration, and was for a period of 8 years member of the University Council (comparable with the University Academic Senate); science policy belonged to his portfolio.

ACKNOWLEDGEMENT

This article was supported by the project 'Social determinants of health among socially and other health disadvantaged groups of the population' (CZ.1.07/2.3.00/20.0063).

REFERENCES

- 1 Van Dijk JP. Improving the ranking of Slovak universities: is more money the only answer? ARRA newsletter 2009: 5–6
- 2 Wuchty S, Jones BE, Uzzi B. The Increasing Dominance of Teams in Production of Knowledge. *Science* 2007: 1036–1039
- 3 Van Dijk JP. Rankings and their impact on university's science policy. *Profese* 2013: #-#
- 4 Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/science_technology_innovation/introduction
- 5 Web of Knowledge, <http://sub3.webofknowledge.com>, Thomson Reuters
- 6 Ministerstvo školství, mládeže a tělovýchovy, *Zásady a pravidla financování veřejných vysokých škol pro rok 2012 a další*, Praha 2011
- 7 Scimago Institutions Ranking, http://www.scimagoir.com/pdf/sir_2012_world_report.pdf