



● České fórum pro výzkum, vývoj a inovace 2009

Alokace veřejných prostředků a hodnocení výsledků
vědy, výzkumu a inovací

**Czech Research, Development
and Innovation Forum 2009**

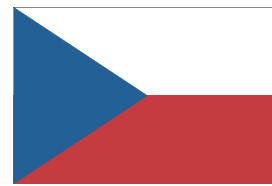
Allocation of public resources and research assessment

Mezinárodní konference organizována Ministerstvem školství, mládeže a tělovýchovy v rámci projektu Mezinárodní audit výzkumu, vývoje a inovací v ČR a implementace jeho výsledků do strategických dokumentů.

● Sborník přednášek

**10. 12. 2009
Pardubice**

Místo konání: Univerzita Pardubice,
Univerzitní konferenční centrum,
univerzitní aula (UA) , Studentská 519,
530 09 Pardubice



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

PROJEKT JE SPOLUFINANCOVÁN EVROPSKÝM SOCIÁLNÍM FONDEM
A STÁTNÍM ROZPOČTEM ČESKÉ REPUBLIKY

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Jitka Moravcová

**International evaluation of research, development
and innovation in the Czech Republic and
implementation of its conclusions into strategic
documents**

**Mezinárodní audit
výzkumu, vývoje a inovací v ČR
a implementace jeho výsledků
do strategických dokumentů**

*International evaluation
of research, development and innovation
in the Czech Republic and implementation
of its conclusions into strategic documents*

Jitka Moravcová

CzechRDIForum 2009
Pardubice, 10.12.2009

Cíl projektu
The aim of the project

Vytvořit
efektivní systém podpory VaVaI v ČR
atraktivní prostředí pro působení pracovníků ve VaVaI

Zvýšit
efektivitu vědecké práce

Zlepšit
postavení ČR v mezinárodním měřítku

To create an effective system supporting R&D&I in the Czech Republic, which establish an attractive environmental for the activities and enhance the position of the Czech Republic within international research.

Klíčové aktivity
The milestones

- mezinárodní audit systému VaVaI
- implementace jeho závěrů do strategických dokumentů
 - ✓ Reforma systému VaVaI v ČR
 - ✓ Národní politika VaVaI v ČR na léta 2009-2015
 - ✓ Metodika hodnocení výsledků VaV
- international evaluation of the R&D&I system
- implementation of its conclusions into strategic documents
 - ✓ Reform of the R&D&I System in the Czech Republic
 - ✓ National Policy of R&D&I in the Czech Republic between 2009 and 2015
 - ✓ Guidelines for Evaluating R&D Results

Klíčové aktivity
The milestones

- mezinárodní audit systému VaVaI
 - ✓ Hodnocení veřejných výdajů na VaVaI
 - ✓ Hodnocení státní správy
 - ✓ Hodnocení programů v oblasti VaVaI
- international evaluation of the R&D&I system
 - ✓ Assessment of public expenditure for R&D&I in the Czech Republic
 - ✓ Evaluation of state administration
 - ✓ Evaluation of R&D programmes

Klíčové aktivity
The milestones

- mezinárodní audit systému VaVaI
 - ✓ Úroveň institucí výzkumu a vývoje
 - ✓ Ochrana práv duševního vlastnictví a intelektuálních práv v ČR
 - ✓ Vztah mezi výzkumnou a aplikační sférou
- international evaluation of the R&D&I system
 - ✓ The level of research and development institutions
 - ✓ Protection of intellectual property and other intellectual rights in the Czech Republic
 - ✓ The relation between research and application spheres

Klíčové aktivity
The milestones

- mezinárodní audit systému VaVaI
 - ✓ Lidské zdroje
 - ✓ Mezinárodní spolupráce ve výzkumu a vývoji
 - ✓ Porovnání současného systému řízení a správy v oblasti VaVaI v ČR s principy „Reformy“, s „Metodikou hodnocení“ a „Národní politikou“
- international evaluation of the R&D&I system
 - ✓ Human resources
 - ✓ International cooperation in research and development
 - ✓ Comparison of the current system of management and administration in the field of R&D&I in the Czech Republic with principles of „Reform“, „Guidelines“ and „National Policy“

Současný stav
The present state

- ☐ řešení projektu zahájeno 1.1.2009
- ☐ výběrové řízení na dodavatele mezinárodního auditu
- ☐ výběrové řízení na podpůrného partnera
- ☐ konference CzechRDIForum je součástí projektu

*☐ the project started on 01.01.2009
☐ the tender documentation for public contract „International Audit“
☐ the tender documentation for public contract „Supporting Partner“
☐ the conference CzechRDIForum is a part of the project*

Očekávané výstupy auditu
The expected outputs of the evaluation

- ☐ **červen 2010:** Metodika hodnocení výsledků VaV, úroveň výzkumných institucí
- ☐ **listopad 2010:** Hodnocení veřejných výdajů na VaVaI, hodnocení státní správy, hodnocení programů v oblasti VaVaI
- ☐ **srpen 2011:** Lidské zdroje, ochrana práv duševního vlastnictví a intelektuálních práv v ČR, vztah mezi výzkumnou a aplikační sférou

*☐ **June, 2010:** Guidelines for Evaluating R&D Results, The level of research and development institutions
☐ **November, 2010:** Evaluation of state administration, financing and R&D programmes
☐ **August, 2011:** Human resources, International cooperation, Intellectual property and other rights*

Webové stránky projektu
Webpage of the project

<http://ipn.msmt.cz>

- ☐ informace o postupu řešení projektu
- ☐ materiály z konferencí (záznamy vystoupení, sborník, fotografie), tiskové zprávy, články
- ☐ dílčí a závěrečné zprávy z mezinárodního auditu
- ☐ internetové diskusní fórum

*☐ information on the progress of the project solution
☐ conference documents (presentations, abstract book, photos), press releases, articles
☐ interim reports, final report of international audit
☐ internet discussion forum*

Victoria Ley

R&D Evaluation and Funding Criteria in Spain



Victoria Ley is the Director of the National Evaluation and Foresight Agency (ANEP) of Spain. Prior (1991 to 2003) she was a senior researcher at the National Institute of Agriculture Research (INIA). The ANEP is the national institution responsible of the scientific evaluation of most of the RTD proposals applying for public funding, including researcher's CV and evaluation of proposals, groups and institutions.

R&D evaluation and funding criteria in Spain

The National Evaluation and Foresight Agency (ANEP) is the Spanish institution responsible of the scientific evaluation of most of the R&D proposals applying for public funding, including researcher's CV and evaluation of proposals, groups and institutions. The ANEP is not a funding agency, but the funding decisions are based on the evaluation informs of ANEP together with other criteria (strategic, specific call criteria) Evaluation and funding criteria of calls designed to fund basic research are based on scientific quality, promoting researcher's freedom and creativity and avoiding politic interference (bottom up). This is the approach of ERC. Criteria used on calls designed for strategic needs have different standards, related with particular requirements (top-down). As a national agency, the ANEP applies both types of criteria depending on the call objectives.

During the last 10 years Spain has improved significantly its R&D indicators: human resources from 21 to 34%, investment from 0.82 to 1.87 of GDP, scientific production from 0,96% to 3,32% and its impact from 0,51% to 1,00%. However, on spite of these numbers, in recent times there is a slowdown on the indicators concerning the impact and relevance of Spanish research.

Therefore, government and agencies are considering new measures to boost the R&D system, identifying the best proposals to be funded, increasing the number of well formed researchers and promoting private investment on R&D. The objective is not only to increase the scientific production, but above all to produce better and more relevant science.

Good practices and updated approaches in peer review are a key feature to achieve these goals. The evaluation processes should be consistent with those applied across Europe and with similar quality standards. On the other hand should promote international collaboration and the consolidation of the European Research Area.

The following issues will also be discussed:

- Best practices for the evaluation of breakthrough proposals with unpredictable wealth creation outcomes and high risk ideas with commercial or technological promise.
- Two models to optimise the investment on R&D: 1) encouraging outstanding researchers by ex-post funding (RAE model, based on the quality of the work undertaken and allowing future researchers' freedom), and 2) promoting relevant and innovative proposals by ex-ante assessment (ERC and NSF model, driven innovation lines, societal and market needs).

National Evaluation and Foresight Agency (ANEP) MINISTERIO DE CIENCIA E INNOVACIÓN

Czech Forum on Research, Development and Innovation 2009
University of Pardubice, Czech Republic

R&D evaluation and funding criteria in Spain

Victoria Ley
National Evaluation and Foresight Agency, SPAIN

December, 9, 2009¹

Dirección General de Investigación y Gestión del Plan Nacional

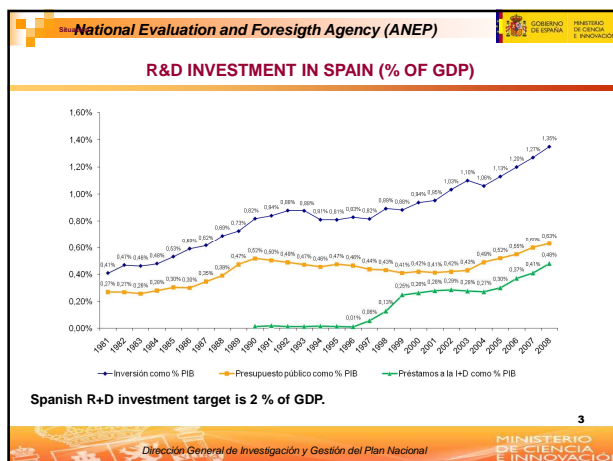
National Evaluation and Foresight Agency (ANEP) MINISTERIO DE CIENCIA E INNOVACIÓN

National Science Context

- During the last 10 years Spain has **improved significantly its R&D indicators**: human resources, investment, scientific production and its impact. However Innovation indicators are still low
- Government and agencies are designing and applying new measures to maintain this trend and to **boost indicators concerning R&D innovation**, identifying the best proposals to be funded, increasing the number of well formed researchers and promoting private investment on R&D.
- The objective is not only to increase the scientific production, but above all to **produce better and more relevant science**

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Dirección General de Investigación y Gestión del Plan Nacional MINISTERIO DE CIENCIA E INNOVACIÓN



National Evaluation and Foresight Agency (ANEP) MINISTERIO DE CIENCIA E INNOVACIÓN

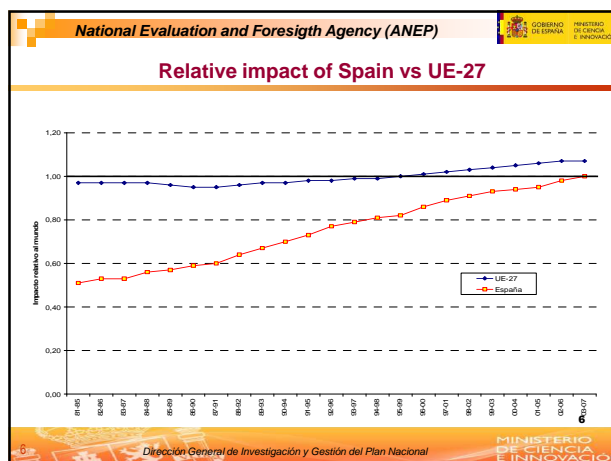
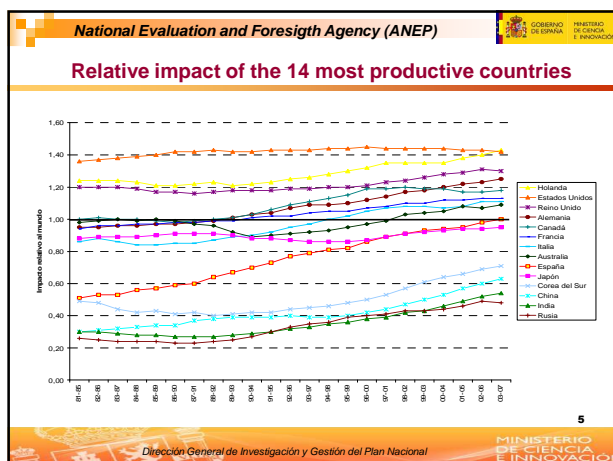
Scientific Production and Impact

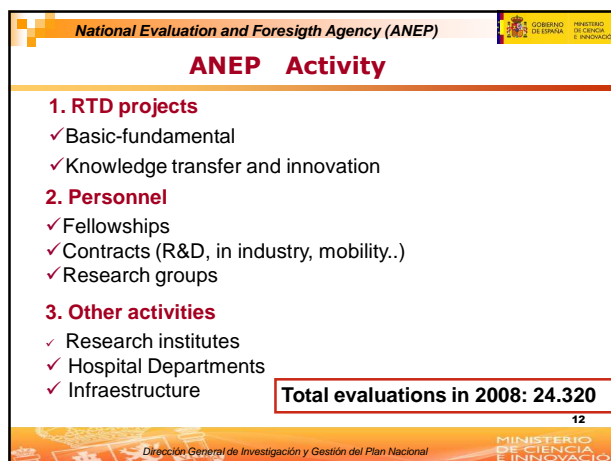
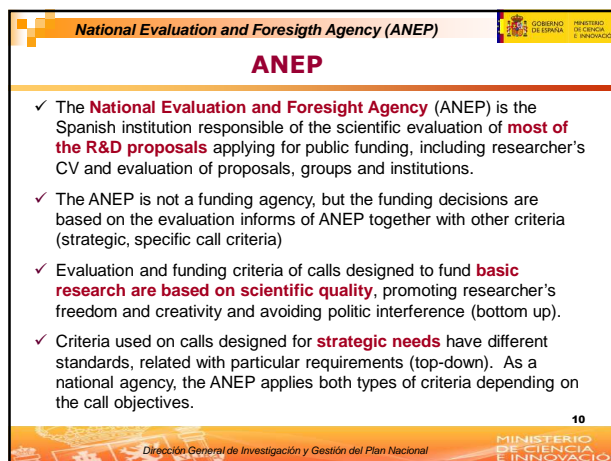
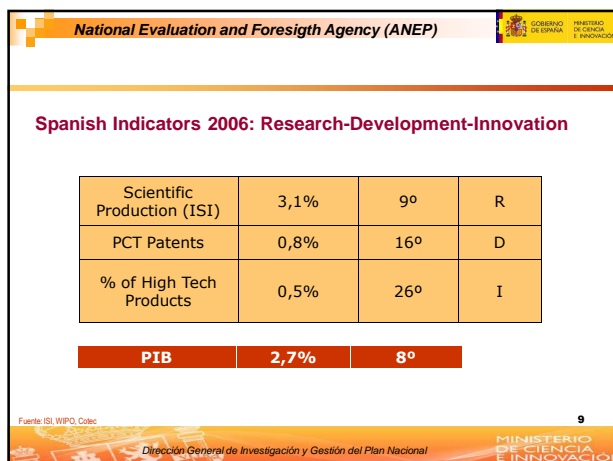
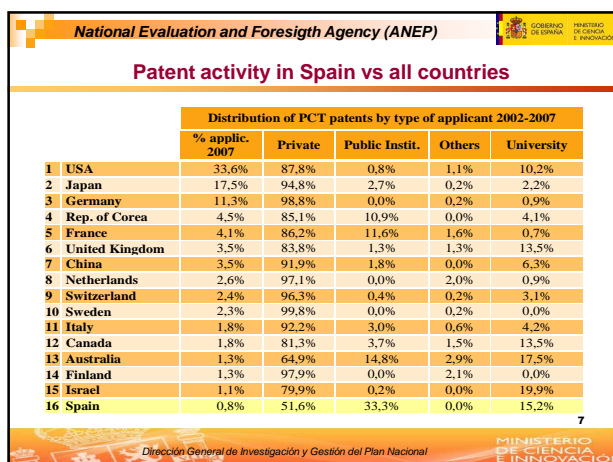
		Number of papers		% (world)		Relative impact	
		81-85	03-07	81-85	03-07	81-85	03-07
1	USA	894.855	1.389.809	39,30	32,65	1,36	1,42
2	UK	200.877	366.880	8,82	8,62	1,20	1,30
3	Japan	148.997	361.575	6,54	8,49	0,88	0,95
4	Germany	172.828	349.959	7,59	8,22	0,95	1,25
5	China	14.149	295.513	0,62	6,94	0,30	0,63
6	France	118.902	249.047	5,22	5,85	0,94	1,13
7	Canada	105.256	201.757	4,62	4,74	1,00	1,18
8	Italy	54.237	189.982	2,38	4,46	0,86	1,11
9	Spain	21.822	141.118	0,96	3,32	0,51	1,00
10	Australia	52.937	127.487	2,33	2,99	0,98	1,09
11	India	65.322	116.862	2,87	2,75	0,30	0,54
12	Russia	119.929	116.199	5,27	2,73	0,26	0,48
13	Netherlands	40.547	111.458	1,78	2,62	1,24	1,43

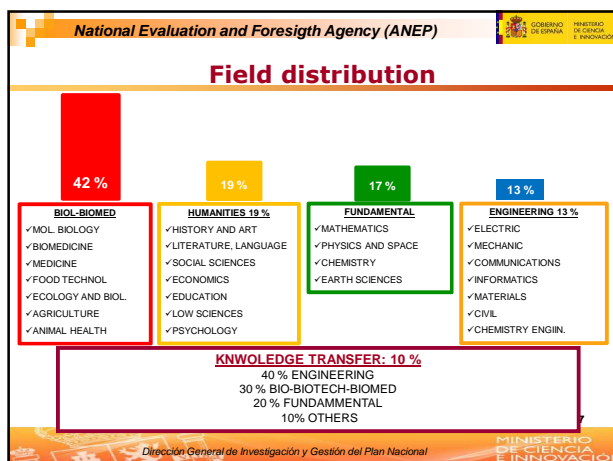
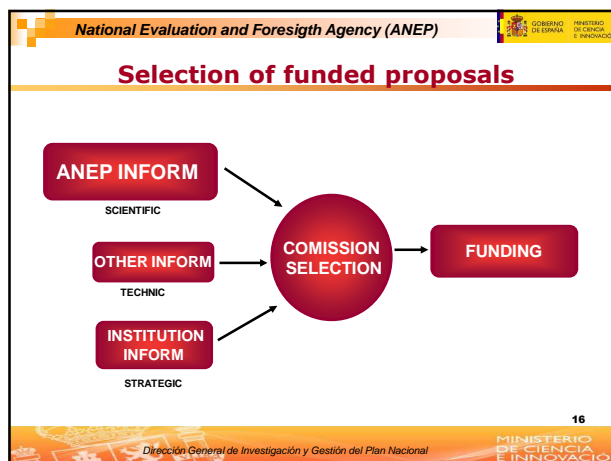
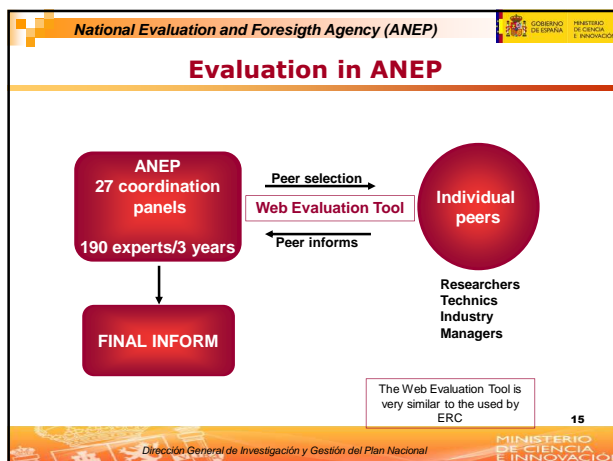
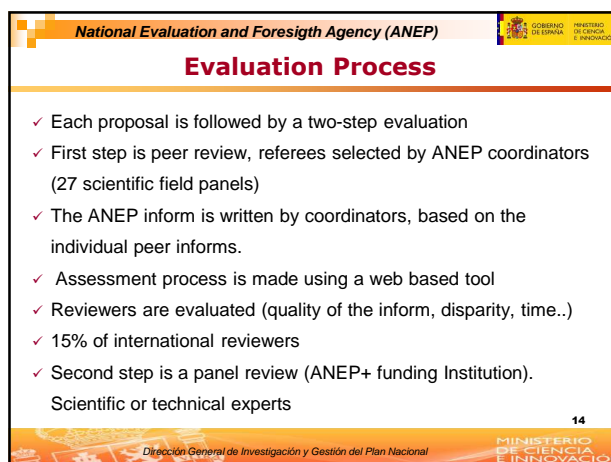
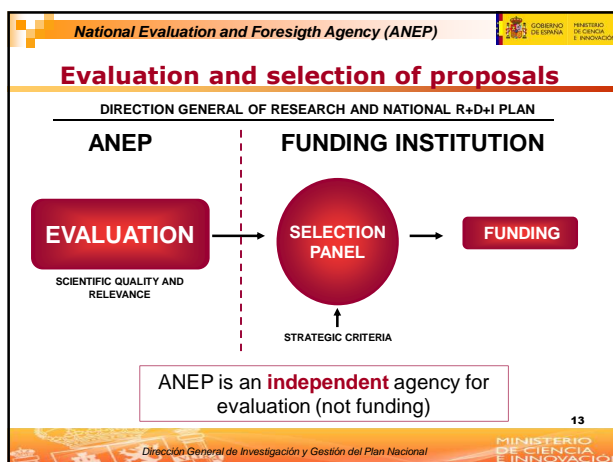
1 indicates mean of impact (4.8 citations/doc). Source: ISI

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Dirección General de Investigación y Gestión del Plan Nacional MINISTERIO DE CIENCIA E INNOVACIÓN







National Evaluation and Foresight Agency (ANEP)

Possible negative aspects

- Disciplinary structure of the ANEP (areas) and Interdisciplinary proposals
- Incorrect use and abuse of bibliometric indicators
- Adaptation of scientific community – behaviour on publications (quantity vs quality; being group leader, etc)
- Reviewers saturation
- Administrative burden
- Too “traditional” criteria and reviewers that benefit routine research
- Low incentives for excellent and innovative researchers and universities
- Low incentives for innovation?
- Measures to boost knowledge transference

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Dirección General de Investigación y Gestión del Plan Nacional

National Evaluation and Foresight Agency (ANEP)

EVALUATION PROCESS (web tool)

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National Evaluation and Foresight Agency (ANEP)

EVALUATION PROCESS (web tool)

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National Evaluation and Foresight Agency (ANEP)

EVALUATION PROCESS (web tool)

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Dirección General de Investigación y Gestión del Plan Nacional

National Evaluation and Foresight Agency (ANEP)

Control and Monitoring

- Conflicts of interest and confidentiality**
 - Experts must sign a confidentiality and conflict of interest declaration prior to beginning their work
 - Applicants may ask to avoid some experts to avoid conflict of interests
 - Panel members identify and correct biases and incompatibilities
- Avoiding biases**
 - Monitoring gender and young researchers participation as peer
 - Monitoring criteria
- Quality of peers**
 - The appointment of experts is based upon their field of expertise in a given area
 - For each single inform, score is compared with other peers (web tool)
- Quality of informs**
 - Assessment exercise in collaboration with European Science Foundation
 - Processes, criteria and panel members are monitored by an external commission
- Statistics controls**

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Dirección General de Investigación y Gestión del Plan Nacional

National Evaluation and Foresight Agency (ANEP)

Benchmarking project ANEP-ESF: Objectives

- To determine the extent to which the evaluation of scientific projects and curricula vitae by the ANEP is consistent with international standards
- To know how Spanish applications would be evaluated in an international context and how they would be rated.
- To determine if the priorities of the foreign evaluators are the same to those of the ANEP
- To analyze and compare the scores given and the qualitative assessments made in ANEP's evaluations with those of foreign experts.

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Dirección General de Investigación y Gestión del Plan Nacional

Methodology

- ✓ **125** project applications and **160** applications for young investigators (Ramón y Cajal Programme), **grouped into 20 fields**.
- ✓ **35 foreign experts** proposed by the **ESF** (keywords and field)
- ✓ Experts were sent a letter explaining the principles and aims of the exercise and applications assigned to those who **agreed** to take part
- ✓ Each evaluator was sent between 4 and 8 projects and between 8 and 10 Ramón y Cajal applications in the same field (max 16).
- ✓ The allocation of projects was verified based on the evaluators' field of **specialisation and by the keywords** provided.
- ✓ **Each group** of applications was evaluated by **two evaluators**
- ✓ **Comparative analysis of the results** of the evaluation by the ANEP and ESF, using the same evaluation forms.

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Concluussions

- ✓ The overall analysis of the data shows patterns of behaviour which are **highly similar** between **national and ESF** experts
- ✓ ESF experts give **slightly higher scores** than those given by the ANEP
- ✓ **Disparities** between experts are of the **same order**. However, ESF and ANEP **ranking are often different**

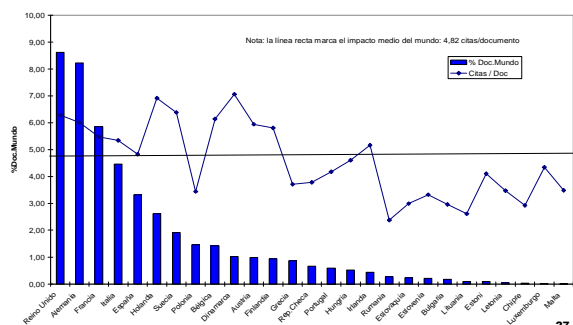
GENERAL OPINION OF ESF EXPERTS

Answers to questionnaire about some of the aspects of the evaluation process

Aspect assessed	Score (1-10)
Scientific Quality RyC applications	7,8
Scientific Quality of the Group Leader	7,6
Scientific Quality of Projects	7,4
Project Evaluation Form	7,0
RyC Evaluation Form	6,9

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Production and Impact in UE-27



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Thank you!
Dēkuji!

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Michael Dinges

R&D Evaluation in Austria: The State of Play



Michael Dinges is researcher and project manager at the JOANNEUM RESEARCH Forschungsgesellschaft mbH - Institute of Technology and Regional Policy, Vienna since 2003. Since 2005 he is in charge of the research area evaluations at the Institute of Technology and Regional Policy. His main research areas and fields of expertise are research and innovation policy, indicator development, evaluation methods and transition economics. He carried out innovation research and evaluation studies both on national and international level. Michael Dinges actively participates to the European Network of Excellence "Policies for Research and Innovation in the Move towards the European Research Area (PRIME) and to the Austrian Platform Research and Technology Evaluation.

R&D Evaluation in Austria: The State of Play

Evaluation mechanisms and the evolving of a specific evaluation culture follow specific trajectories over time. This contribution will describe the Austrian situation, the individual levels of evaluations and will try to link these levels to historical developments and governance structures.

Starting with the project level the main Austrian funding organisations have employed appropriate ex ante evaluation mechanisms for more than four decades. A highly autonomous research council developed international peer review, while the likewise independent industrial research promotion fund employed in-house expertise; both standing a step apart from research policy. Monitoring and ex post evaluation came in much later.

From the 1990s onwards many funding programmes were established in line with technology policy and innovation systems approaches; consequently programme evaluation became a ubiquitous and highly visible instrument of policy intelligence, with ministries stronger in charge. Extended peer review, method mixes and rather formative approaches are typical properties on this level. This development was supported by Austria's participation in the EU Framework Programmes and to a much lesser degree in the Structural Funds.

A third level of evaluations in the 2000s deals with comparative, institutional and systems properties; also as a reaction of an originally (too) simple innovation system having become (too) complex. Such evaluations in the last years had considerable influence on the development of funding and governance structures. It has to be seen however, whether the recently published Austrian RTDI systems evaluation will have a similar impact, as now the commissioning ministries themselves have also been under scrutiny.

Universities and research institutes have – compared to the levels described above – been for a long time remarkably untouched by evaluative pressure. Some however employ self-evaluations. In the university sector we still find strong General University Funds, few meaningful indicators and toothless performance contracts, while summative performance assessments or comparable steering instruments have not been adopted. This contrasts with a recent reform leading to much stronger university autonomy.

Overall evaluation in the Austrian RTDI policy has rather developed from the fringes of the system, from pockets of excellence and from bottom up initiatives like the Austrian RTDI Evaluation Platform FTEval and less as a result of strong top down legal measures. The upside of this development is the now established strong and broad evaluation culture. The price to pay is the often friendly and formative character of the whole evaluation business.

Evaluation of Research and Technology Policies in Austria: The State of Play

www.joanneum.at

Contribution to the Pardubice Conference

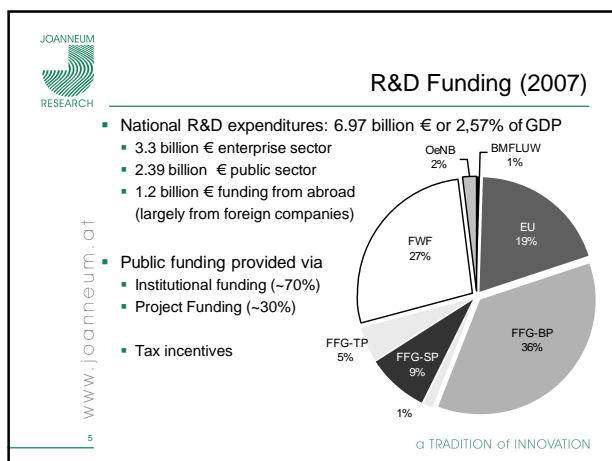
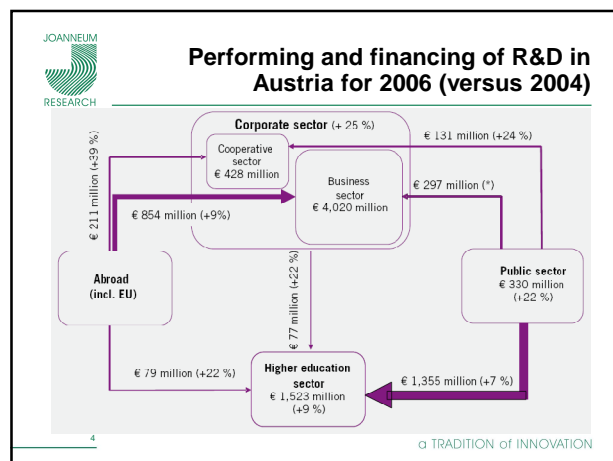
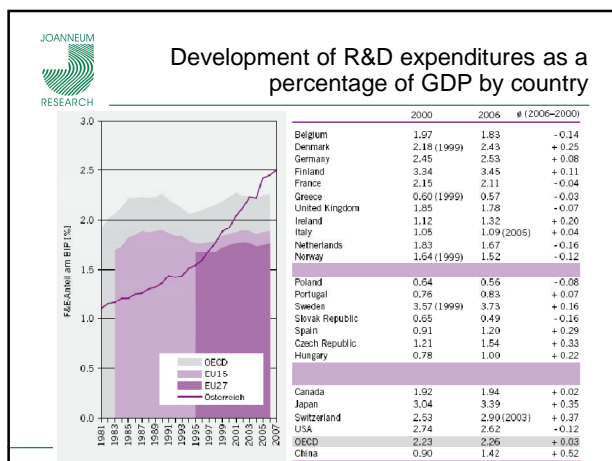
Michael Dinges
michael.dinges@joanneum.at
10/12/2009

TRADITION of INNOVATION

Some stylized facts on RTI policy in Austria

- Research, Technology and Innovation Policy (RTI – Policy) have considerably gained importance in Europe and Austria:
 - Lisbon Strategy, Barcelona Targets
 - European Innovation Scoreboard „On the move from an innovation follower to an innovation leader“
- Common reasoning:
 - Investments in RTI positively affect economic growth and quality of life
- Indications for increased relevance:
 - Prominence in government declarations
 - Increased media attention
 - Measures for Public Understanding of Science and Technology
- Increased spending on RTI since 1990s

TRADITION of INNOVATION



Defining the Austrian Evaluation Scene: Actors and Responsibilities

- 3 ministries cope with public RTI Agenda:
 - Ministry of Science and Research
 - Ministry of Transport, Innovation and Technology
 - Ministry of Economic Affairs, Families and Youth
- Delegation of RTI programme funding towards agencies
 - Austrian Research Promotion Agency (FFG)
 - Austrian Science Fund (FWF)
 - Austrian Economic Service (AWSG)
 - European Union Framework Programmes
- Evaluation of RTI policy provided by
 - Private Actors (Technopolis)
 - Research and Technology Organisations (Austrian Institute of Technology, Joanneum Research, SME Research Association, WIFO)
 - Foreign Actors
 - HEI institutions play a very limited role

TRADITION of INNOVATION

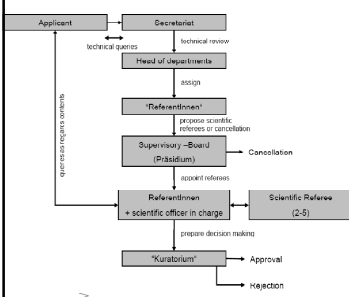
Role of Evaluation in RTI Policy: Information, Legitimation, Learning, Control

- Public sector demands an appropriate basis for decisionmaking as well as specific knowledge in order to legitimise the use of public funds
- Programme management (within agencies) seeks to optimise funding portfolio and project selection (fairness, bias, efficiency)
- Use of evaluations:
 - Increased demand: Between 2003 and 2007 more than 60 RTI policy evaluations were performed in Austria
 - High Transparency – public availability
 - New Methods

Evaluation at the project level

- Since 1967 two agencies have been responsible for the largest share of project funding:
 - The Austrian Science Fund (FWF)
 - International Peer Review
 - The Industrial Research Promotion Agency (FFF, 1967-2004) which was later on merged into Austrian Research Promotion Agency (FFG)
 - In-house review (FFF, FFG- Basis Programmes)
 - Technical & Economic Evaluation at the project level
 - Technical & Economic Evaluation in relation to the company
 - Two step panel reviews (FFG Thematic/Structural Programmes)

Evaluation at the project level: Austrian Science Fund (FWF)



Eligibility:
-Open for all scientific disciplines
-No formal calls
-No social/economic impact dimension

Critical factors for funding procedure:
-Responsibility for selection of peers „ReferentInnen“
-Constitution of Präsidium/„Kuratorium“

Peer Review Process:
- Exclusively international peer review
- Minimum 2 peers
- Funding criteria (scientific excellence, novelty, clarity of hypotheses, quality of proposal, capacity of researchers, quality of co-operation)
- Numeric judgement, but decision with

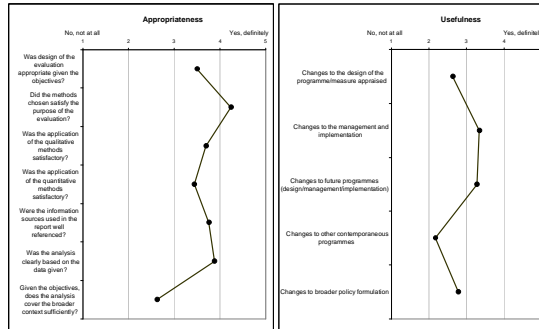
Evaluation at the programme level I

- Emerged along with introduction of new funding instruments
- Large number of programmes and large number of evaluations

		Appraisal Purpose				
		summative	formative	both	other	Total
Timing	ex ante	0	5	0	0	5
	accompanying	1	2	1	0	4
	interim	4	10	4	0	18
	ex post	5	0	0	0	5
	other	0	1	0	1	2
Total		10	18	5	1	34

Source: Inno – Appraisal (PRO – Inno Europe)

Evaluation at the programme level II Quality and Usefulness



Evaluation at the Institutional & System level

- 2004: Evaluation of the two main research promotion agencies
 - Merger, Adaption of funding strategy
- 2007/2008: Research Dialogue (Ministry of Science & Research)
 - Forum to discuss nearly all aspects of science and research
- 2007/2009: System evaluation (Ministry of Transport Innovation and Ministry of Economic Affairs)
 - „to analyse the research promotion and financing with regard to the performance of the Austrian Innovation System and identify any need for action to improve it“
 - Interaction between direct funding (project/institutional) and indirect R&D funding (tax incentives)
- 2009: CREST – Policy Mix Report
- 2009/2010: Research and Innovation Strategy

Legal framework for performing Evaluations

- For quite a long time no statutory framework for evaluation in Austria's RTI policy
- University Act (2002)
 - Creation of a quality management system for universities
- The Research and Technology Promotion Act (FTF-G) (2004)
 - Standardised evaluation principles at a legislative level
 - Evaluation plan
 - purpose, objectives, procedures, timeline, indicators
 - Monitoring system
- Council for Research and Technology (2005)
 - Evaluation should be incorporated in policy decision making
- Evaluation Standards – Platform Research and Technology Evaluation

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α TRADITION of INNOVATION

White spots

- Universities
 - Research activities in Austria
 - Only some exceptions (University of Applied Agricultural Sciences, University of Vienna)
- Activities of Research and Technological Institutes
 - But mainly focused at competitive research contracts
- Principal-Agent Problematic: The interaction between ministries and agencies
- Long-term impact analysis: development of realistic expectations as regards impact assessment

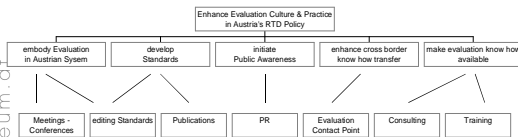
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α TRADITION of INNOVATION

The Austrian Research and Technology Policy Evaluation Platform fteval:

- A working group/network which aims to enhance the evaluation culture in Austria (since 1996)



- Which organisations are members of the Austrian Platform?
 - Those who are commissioning evaluations
 - Those who are evaluated
 - Those who are evaluating

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α TRADITION of INNOVATION

Conclusion

- Evaluation of Austrian RTI policy is very much alive...
- A culture of evaluation has evolved along with the professionalisation of research funding
- Corner Stones:
 - Creation of Austrian Science Fund and Austrian Industrial Research Promotion Fund (1967)
 - Evaluation at the project level
 - Accession to European Union – Introduction of RTI Programmes and Funding Agencies managing these programmes
 - Evaluation at the programme level
 - Political debate on innovativeness and competitiveness
 - Evaluation at the system level
- But there is room for improvement...
 - Danger of becoming a painful routine without impact
 - CREST "more thought should therefore be given to the mechanisms needed to ensure that the results of evaluations do feed back into policy formulation and implementation"

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α TRADITION of INNOVATION

Barend van der Meulen

**Evaluating the Contribution of Research to Society;
Examples from Agriculture, Health and Engineering**



Barend van der Meulen, is senior researcher at the Rathenau Institute, department Science System Assessment, responsible for research on “evaluation and quality of science” and “internationalisation of science and science policy”. He was member of the management team for the evaluation of the research council of Norway and Austria, and evaluated research programs of the Netherlands Asthma Foundation and the Ministry of Agriculture.

Evaluating the contribution of research to society; Examples from agriculture, health and engineering

Evaluation of research, of research organisations and research policies is a key element of well functioning R&D systems. Over the past two decades, many research funding organisations have improved the assessment of research proposals, research organisations have implemented quality control and instruments to stimulate research excellence and at the national level audit systems have been built up to guarantee governments that public money is well spent. Most of these evaluation systems, whether they focus on ex ante assessment or ex post evaluation, rely on peer review and focus on the scientific quality and performance of the proposals, programs or products of research.

Along with the development of evaluation systems, a second policy development is the increased emphasis on research as investment for the future well being of society and economy. This has been the case in sectors as agriculture and health, in which governments used to be responsible for research investments, but now is true more generally. This emphasis is not just a result of a need of governments to be accountable for spending public funds – that is just one of the driving forces. It is equally due to the key role of knowledge in today’s economy and society. The development of knowledge based societies, has made investments in research a prerequisite for the strength of a nation – in terms of the public services towards the own people, in terms of the international economic and industrial position and in terms of larger challenges like public health, environmental quality and climate change.

New investments in research come with socio-economic objectives attached to it and with related evaluation needs for which peer review is insufficient. While research funders tend to look for concrete impacts of research, the actual relation between research and social and economic developments is often too complex and impacts occur too far in time. So instead

evaluation has to focus on other aspects. In this presentation the possibilities for evaluating societal contributions of research are presented. The presentation draws on experiences and experiments of evaluating programs and research groups in agriculture, health and engineering. Drawing on insights in evaluation methodologies and R&D evaluation practices, realistic evaluation tools will be presented that may inform researchers and policy makers.

10 December 2009

Science System Assessment



Evaluating the contribution of research to society

České fórum pro výzkum, vývoj a inovace 2009, Pardubice 10-12-2009

Barend van der Meulen | 1

10 December 2007

Science System Assessment

Introduction

- Evaluation of research in the Netherlands
- Examples for
 - Health
 - Agriculture
 - Electrical Engineering
- Opportunities for "Evaluating societal contribution"

10 December 2007

Science System Assessment

Evaluation of research in the Netherlands

- What is evaluated
 - 13 research universities
 - Basic research institutes of Research Council and Academy of Sciences
 - Other research institutes
 - Research programmes
- General protocol: self assessment + international peer committee
- Started in 1990s as disciplinary evaluations organised by the Association of Universities
- Evolved in several rounds to an evaluation approach with
 - Strong focus on scientific performance
 - > 80% evaluated as very good or excellent

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Science System Assessment

New evaluation protocol 2009-2015

Evaluation of three vital tasks:

- results for the academic community,
- *producing results that are relevant for society*,
- educating and training the next generation of researchers.

Evaluation process

- Self evaluation document prepared by university
- Site visit by international peer committee

Four main criteria:

- quality,
- productivity,
- *relevance for society*,
- and vitality & feasibility.

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Science System Assessment

Evaluation gaps

- Evaluation = Evidence + Assessment
- Gaps
 - Evidence focussed on scientific performances
 - Unclear how to present contribution to architecture related practices and policies
 - Assessment by scientific peers
 - Unclear how to include assessment of other stakeholders

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Science System Assessment

Three examples

- Evaluation of research program of the Asthma Foundation
 - Relevance of research for patient care and cure
- Evaluation of agricultural research program
 - Contribution of program to innovations in agricultural sector
- Evaluation of university research on Electrical Engineering
 - Indicators for interaction with industry
- NB: selected results

Evaluation of Asthma Foundation Research Program



10 December 2007

Science System Assessment

- Evaluation of relevance of research program for patient care and cure
 - Relationship between portfolio of research projects and priorities of *stakeholders*
 - Products and impacts

Contribution to priorities



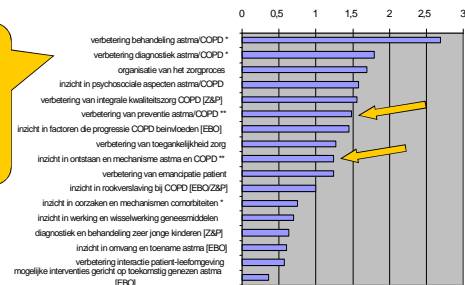
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Science System Assessment

- Please indicate (1-5 scale) to what extent your research contributes to

List of priorities from program texts and from interactive priority setting exercise.

** indicates very high priority
* indicates high priority



Impact of Asthma Foundation projects

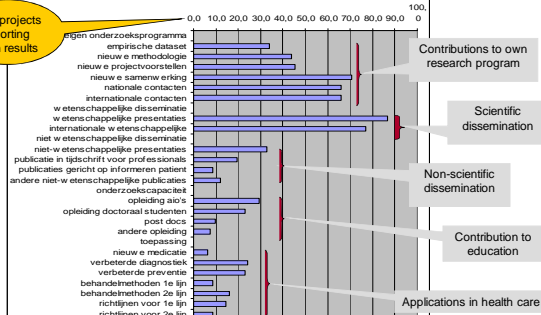


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Science System Assessment

Did your research project had one of the following results?

% of projects reporting such results



Evaluation of Agricultural research program



10 December 2007

Science System Assessment

- Evaluation of contribution to the developments of new animal farming systems
 - How did the projects result in new innovation dynamics?
 - Assessment of long term impacts?

Outputs en impacts



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Science System Assessment

output/ outcome	PROJECT 1 Inspiratie- bronnen voor innovatieve kolonistategie n	PROJECT 2 Be good and tell it	PROJECT 3 Houden van hennen	PROJECT 4 Wel-zijn	PROJECT 5 Veer- krachtige	PROJECT 6 Koe onderne- mer in balans	PROJECT 7 Groeps- huis- vesting konijnen
Concepts	-	✓	✓	✓	-	✓	-
New Initiatives	-	-	✓	✓	✓	✓	-
Publications	-	-	✓	✓	✓	✓	✓
For the sector	-	✓	✓	✓	✓	✓	✓
For the public	-	-	-	✓	-	✓	-
Impacts	✓	-	✓	✓	✓	✓	✓
Sector	-	-	✓	✓	✓	✓	✓
Policy	-	-	-	✓	✓	-	-
Societal Acceptance	-	-	-	-	-	-	-
Innovation dynamics	✓	-	✓	✓	✓	✓	-
Mode 2 research	-	-	✓	✓	✓	✓	-
Learning about managing radical innovations	✓	✓	✓	✓	✓	✓	-

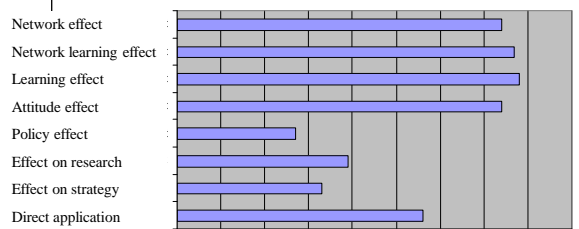
Impacts



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Respondents reporting effect (%)



Electrical Engineering



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Science System Assessment

- Strong research culture which is in many ways similar to sciences
- But also mission to contribute to
 - technology development and innovation
 - Communication, health, sustainability
- Can these contributions also be evaluated? Can indicators be constructed?

Example ELE – industry



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Science System Assessment

	<i>Funding support</i>	<i>Mobility of graduates</i>	<i>Knowledge outputs</i>	<i>Personal interfaces</i>	<i>Organization & Infra</i>
Uptake of knowledge		PhDs in industry MAs in industry	Market introduction New projects in industry		Spin offs with industry contracts
Provision of knowledge			Proofs of concept Presentations at dedicated conferences	Part time professors from / in industry	Spin offs
External appreciation	Valorisation grants Industry support		Invited presentations	Exchange of staf (Casimir, kennisregeling)	Consortia with industry

Summary and conclusions



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Science System Assessment

- Evaluation of socio-economic impact has become very important
- But procedures and approaches are underdeveloped
- Many different kind of productive interactions:
 - Recognize variety of interactions and possible indicators
 - Data issue: availability, interpretation,
- Differences between groups have to be recognized
 - From ranking and benchmarking ...
 - ...towards managing portfolios

Juraj Černák

**Complex Accreditation of Pavol Jozef Šafárik
University in Košice**



Juraj Černák is professor of inorganic chemistry at the P.J. Šafárik University in Košice, Slovak Republic. He was appointed to the post of Vice-rector for Science and Research in 2008. Prior that, he was Head of the Department of Inorganic Chemistry (1998-2005) and Vice dean of the Faculty of Sciences (2005-2008). His research activities are focused on the coordination chemistry, X-ray structure analysis and low-dimensional magnetism. As the Vice-rector, he was involved into evaluation process within the Slovak higher education system.

Complex accreditation of Pavol Jozef Šafárik University in Košice

Pavol Jozef Šafárik University in Košice (UPJŠ) was founded in 1959 but the tradition of university education in Košice goes back to 1657 when the first university *Academia Cassoviensis* was founded. In 1997, following some turbulences, the University split into UPJŠ in Košice and Prešov University in Prešov. At present UPJŠ with over 8,000 students ranks among smaller public universities in Slovakia. The University consists of five faculties, the Faculty of Medicine, the Faculty of Sciences, the Faculty of Law, the Faculty of Public Administration, and the Faculty of Arts.

In accordance with the University Education Act ^[1] the University was evaluated by the Accreditation Commission ^[2]. The complex accreditation covered the period of previous six years (2002-2007). The evaluation process encompassed the re-accreditation of all study programs and the habilitation and inauguration rights as well as the assessment of the level of research and other creative activities. The criteria for assessment of different research fields were elaborated by the Accreditation Commission ^[2]. In general, the focus was on the quality of publications, the research environment and the awards obtained. The majority of the examined research areas were positively evaluated as meeting the A or A- quality level on a four-degree scale (A: excellent international quality; B: satisfactory international quality; C: satisfactory national quality; D: inadequate national-level quality). The whole accreditation process was aimed to classify Slovak universities into three categories. The best of them, including UPJŠ, belong to the category of “research universities”. The details of the evaluation process and our experiences will be discussed during the presentation.

[1] ZÁKON č. 131/2002 Z.z. z 21. februára 2002 o vysokých školách a o zmene a doplnení niektorých zákonov.

[2] <http://www.akredkom.sk>



Complex Accreditation of Pavol Jozef Šafárik University in Košice Slovakia

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Wisdom of the past, knowledge of the present, education of the future.

Outline

UPJŠ – its history and the present state.

Complex accreditation - what does it mean?

Re-accreditation of the study programs.

Re-accreditation of the habilitation and inauguration rights.

Assessment of the research activities.

Ranking of the university.

Conclusions.

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UPJŠ – its history and the present state

- 1657 foundation of *Academia Cassoviensis*
- 1660 Golden Bull awarded by Leopold I
- 1921 end of university education - for 38 years
- 1959 Pavol Jozef Šafárik University in Košice (UPJŠ)
- 1997 university splitting into UPJŠ in Košice and University in Prešov
- 2009 public university with more than 8,200 students, five faculties:
 - Faculty of Medicine (1949)
 - Faculty of Sciences (1963)
 - Faculty of Law (1973)
 - Faculty of Public Administration (1998)
 - Faculty of Arts (2007)



Pavol Jozef Šafárik
1793-1861



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Complex Accreditation - what does it mean?

- Legislation:
- §84 of the University Education Act № 131/2002 and the Decisions of the Accreditation Commission
 - assessed period 2002-2007
 - deadline for UPJŠ - 1st October 2008

- Content:
- complex evaluation of the educational and research activities of the University
 - 1. re-accreditation of the study programs
 - 2. re-accreditation of the habilitation and inauguration rights
 - 3. assessment of the research activities

- Goal:
- classification of the University (finances and reputation) into the category of:
 - "research universities" (the best results)
 - "universities"
 - "colleges"

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1. Re-accreditation of the study programs

Basic requirements:

- guarantee(s) of the study program, qualified university teachers (not older than 65)
- research activities in the field of the study program (required for M.A./M.Sc. and Ph.D. study programs)

Guarantee(s) for:

- B.A. /B.Sc. degree – associate professor
- M.A./M.Sc. degree – full professor
- Ph.D. degree – one full professor + 2 co-guarantees (associate professors or full professors)

UPJŠ : 222 study programs within all three levels including double-major (two subjects) study programs were re-accredited – including 34 Ph.D. (doctoral) programs

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2. Re-accreditation of the habilitation and inauguration rights

Basic requirements:

- one guarantee (full professor) and two co-guarantees (associate professors or full professors), neither older than 65
- research activities in the corresponding study area
- scientific criteria for habilitation and inauguration
 - (e.g. inauguration criteria in sciences: 5 years of teaching activities after habilitation, 3 textbooks, 1 monograph, 50 peer-reviewed research papers (30 CC), 65 citations (40 SCI), leading researcher in 2 research projects, supervisor of 2 Ph.D. students, recognition by the research community)
- final decision is taken by the Research Board of the University (by secret vote)

UPJŠ : the rights in 31 research fields accredited

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3. Assessment of the research activities

Assessed domains:

- a) research output (40 - 60 %)
- b) research environment (15 - 35 %)
- c) recognition of the research results (10 - 30 %)

Scale of the evaluation for a) and c):

- A excellent international quality (4 points)
- B satisfactory international quality (3 points)
- C adequate national quality (2 points)
- D other (1 points)

Marks used
for classification
(bottom values):

A/3.75; A-/3.50;
B+/3.25; B/2.75;
B-/2.50; C+/2.25;
C/1.75; C-/1.75;
D+/1.25; D/1.00

Scale of the evaluation for a) and c):

- A excellent national quality
- B above-the-average national quality
- C average national quality
- D below-the-average national quality

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Assessed research areas at UPJŠ:

Faculty of Medicine - Medical and Pharmaceutical Sciences

Faculty of Sciences

- Chemical Sciences
- Environmental Sciences
- Information Sciences
- Life Sciences
- Mathematical Sciences
- Pedagogical Sciences
- Physics and Earth Sciences

Faculty of Law - Legal Sciences

Faculty of Public Administration - Social and Behavioural Sciences

Faculty of Arts - not assessed (less than 4 years of its existence)

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Assessed domain: **Research Outputs**

The quality of 50 publications published within the period of 2002-2007 was assessed.

Example:

In Chemical Sciences - the quality scale is based on the impact factor (IF) of the journal

- A over 90 % of IF median, or international patent
- B 30-90 % of IF median, or national patent
- C 15-30 % of IF median
- D below 15 % of IF median

UPJŠ score in Chemical Sciences (weight of 60 %): 50 papers in A category;
profile (100;0;0;0)

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Assessed domain: **Research Environment**

a) results of doctoral studies (weight 1/3)

two components: number of graduating Ph.D. students

A – at least 50 % of Ph.D. students graduate in set time

research outputs of Ph.D. students:

A – at least 1/3 of students has published a paper in CC journal

UPJŠ in Chemical Sciences: A; profile (100;0;0;0)

b) research funding received from grant agencies (weight 1/3)

A – more than 2490 € per capita (creative co-researcher)

UPJŠ in Chemical Sciences: A; profile (100;0;0;0) (mean is 7370 €)

c) quality of the research infrastructure (weight 1/6)

assessment *ad hoc* (laboratories, instruments, libraries and electronic resources, etc.)

UPJŠ in Chemical Sciences: A; profile (70;20;10;0)

d) other aspects (weight 1/6)

assessment *ad hoc* (HR for research, internat. cooperation, centres of excellence, etc.)

UPJŠ in Chemical Sciences: B-; profile (50;30;20;0)

Total profile for research environment (weight 30 %): A (85;10;5;0)

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Assessed domain: **recognition of the research results**

a) citations (weight 2/3)

citations of the 10 most cited papers published during the last 6 years (2002-2007)

A – more than 20x of the median IF (absolute number of citations)

B – 10 - 20x of the median IF

C – 1 - 5x of the median IF

D – no citations

b) other aspects (weight 1/3)

assessment *ad hoc* (invited lectures, memberships in scientific committees and editorial boards, etc.)

UPJŠ in Chemical Sciences: B+; profile (35;65;5;0)

TOTAL PROFILE of the research activities in Chemical Sciences is
(90;10;0;0): A

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Ranking of the University

To evaluate “research university” six criteria are used:

- KZU-1: assessment of the research activities
- KZU-2: ratio of the amount of money vs . the number of professors, associate professors, and other creative researchers
- KZU-3: number of graduated Ph.D. students vs. number of professors
- KZU-4: research outputs of Ph.D. students
- KZU-5: ratio of the number of Ph.D. students vs. the number of professors and associate professors
- KZU-6: ratio of the number of students vs. the number of professor

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Criteria KZU-1:

Assessment of the research activities;
2/3 of the faculties should achieve a better mark than B-

Assessment of the research areas at UPJŠ - results :

Faculty of Medicine - Medical and Pharmaceutical Sciences	A
Faculty of Sciences	A
- Chemical Sciences	A-
- Environmental Sciences	A-
- Information Sciences	A
- Life Sciences	A
- Mathematical Sciences	A
- Pedagogical Sciences	B-
- Physics and Earth Sciences	A
Faculty of Law - Legal Sciences	A-
Faculty of Public Administration - Social and Behavioural Sciences	C+
Faculty of Arts - not evaluated (less than 4 years of existence)	

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Criteria KZU-2:

Ratio of the funding obtained for research projects vs. the re-calculated number of professors, associate professors and other creative researchers should be above 2 k€.

Year	Re-calculated number of professors etc.	Funding for research projects (k€)	KZU-2 (k€)
2002	230	473	2.06
2003	242	610	2.52
2004	248	861	3.47
2005	239	1317	5.51
2006	251	2081	8.29
2007	261	2640	10.12
Sum	1471	7981	5.43

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Criteria KZU-3:

Average ratio of the number of graduated Ph.D. students vs. the number of professors should be above 1/3 for at least 60 % of faculties.

Faculty of Medicine	1.13
Faculty of Sciences	1.56
Faculty of Law	1.17
Faculty of Public Administration	no Ph.D. study program
Faculty of Arts - not evaluated (less than 4 years of existence)	

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Criteria KZU-4:

Research outputs of the Ph.D. students; the quality of 25 selected papers from the period 2002-2007 is assessed and the final mark should be better than C+ for 60 % of faculties.

Faculty of Medicine - Medical and Pharmaceutical Sciences	A
Faculty of Sciences	A
- Chemical Sciences	B
- Information Sciences	A
- Life Sciences	A
- Mathematical Sciences	B+
- Physics and Earth Sciences	A
Faculty of Law - Legal Sciences	B+

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Criteria KZU-5:

Ratio of the number of Ph.D. students vs. the number of professors and associate professors should be equal or higher than 1 in every assessed year of the period of 2003-2008.

year	Number of Ph.D. students	Number of prof. and assoc. prof.	KZU -5
2003	178	178	1,00
2004	202	176	1,15
2005	239	170	1,41
2006	252	176	1,43
2007	288	186	1,55

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Criteria KZU-6:

Ratio of the re-calculated number of B.A./B.Sc. and M.A./M.Sc. students vs. the number of teachers with the title Ph.D. or higher degree should be lower than 20.

year	Re-calculated number of students	Number of teachers with Ph.D.	KZU -6
2002	4480	311	14
2003	4899	303	16
2004	5152	295	17
2005	5476	310	18
2006	6369	340	19
2007	6619	375	18

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Conclusions.

1. UPJŠ was ranked to the category of “research universities”
2. Are the used criteria exact?
3. Was the complex accreditation useful?

References:

1. ZÁKON č. 131/2002 Z.z. z 21. februára 2002 o vysokých školách a o zmene a doplnení niektorých zákonov (University Education Act).
2. <http://www.akredkom.sk/> (Official site of the Accreditation Commission and documents published there)

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Acknowledgement

I wish to thank the Conference Organizing Committee for their kind invitation and for the opportunity to give this short presentation.

Thank you very much for your attention!

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Wisdom of the past, knowledge of the present, education of the future

Peter Samuely

**Research Assessment of the Research Organizations of
the Slovak Academy of Sciences**



Peter Samuely is a member of the Presidium of the Slovak Academy of Sciences (SAS), responsible for the evaluation of the research institutes of SAS. He is in the position of Head of the Centre Very Low Temperature Physics in Košice. His fields of scientific activities cover experimental condensed matter physics at very low temperatures and high magnetic fields, highly correlated electron systems, and novel superconductors. He is active in the methods of research assessment as a member of committee accounted for complex research assessment exercise for 56 institutes of the Slovak Academy of Sciences. The system is based on a combination of the peer review and accounting for the quantified partial indicators.

Research assessment of the research organizations of the Slovak Academy of Sciences

National legislation on Slovak republic requires from any organisation applying for public funds for research and development to be certified for R&D. Such a certification is provided by a special commission at the Ministry of education. The Slovak universities and the research organisations of the Slovak Academy of Sciences, the both groups under their own legislation acts, are regularly assessed by their own evaluation/accreditation committees. Subsequently the results and conclusions of the assessment of the particular university or research organisation are approved and certified by the above mentioned commission at the Ministry of education.

I will resume the present standards and form of the research assessment exercise at the Slovak Academy of Sciences which is based on a combination of the analysis of quantified parameters (as obtained from public databases and/or provided by the assessed organisation) and a peer review.

Research Assessment Exercise of research organisations of Slovak Academy of Sciences

Slovak Academy of Sciences - largest Slovak research body of organisations
56 research institutes – legal entities
supervised by Presidium of SAS – distributing overall budget of ~ 65 MEuro/year

Research institutes are divided in 3 sections:

Section I - Physical, Space, Earth, and Engineering Sciences (15)
Section II – Life, Chemical, Medical, and Environmental Sciences (21)
Section III – Social Sciences, Humanities, Arts, and Culture (20)

All competing in ERA for all different projects
EU structural funds, EU FPs, CERN, EMBO,...
Slovak R&D Agency, VEGA (SAS agency), ...



Research evaluation system in Slovakia

guaranteed by laws:

• Act No. 172/2005, Article 10
(The Act of 2005 on the Organisation
of the State Promotion of the Research and Development)
*Every organisation applying for public funds for R&D must be certified
by the State commission of R&D evaluation*

• Act No. 133/2002, Article 10
(The Act 133 of 2002 on the Slovak Academy of Sciences)
*Obligatory research assessment exercise by special commissions
State commission of R&D evaluation acknowledges the research assessment exercise*

• Act No. 131/2002, Articles 81 and 82 on the Universities in Slovakia
*Obligatory research assessment exercise by special commissions
State commission of R&D evaluation acknowledges the research assessment exercise*



*Fundamental research performed mostly
@ universities
@ institutes of SAS
but there is no unique evaluation system*

In past different forms of research assessments were applied regularly every 3-4 years to
every research organization of SAS

In 1990s after conclusions and suggestions from evaluations several institutes were
closed, heavily reconstructed, merged,...

In 2006 major reforms made in the system of the research assessment exercise.
Approved by the Assembly of SAS.



Innovations

- I. To define the minimal necessary attributes of any individual institute of SAS
(generally, for any scientific discipline)
- II. Account for individual and specific character of different fields & disciplines
Benchmarking & rating rather than ranking of 56 institutes
of all different fields from natural sciences to humanities
- III. Revisions in logistics
- IV. Redefine the Result and Consequences



Ad I. Attributes/indicators

1. Research output
2. Responses to research output/Evidence of esteem
3. Status within the EU & national context
4. Structure of the projects, grants and other resources
5. PhD studies & other educational activities
6. Direct output to society: applications and/or popularisation
7. Background & management: infrastructure, staffing policy and application of the
previous evaluations



Ad II. Benchmarking

More autonomy : Nomination of **three independent evaluation committees / EC**

EC I: Math, physical & technical sciences

EC II : "Life" sciences (chemical, bio, medical & agro sciences)

EC III : Social sciences & humanities

accounting for specificities in **definitions of 7 attributes** in relation to the international
excellence. At least 1/3 of EC members from outside of SAS

3 referees / specialists on subjects of the assessed organisation to work out the report on
the institutes performance
Minimal requirements: 1 referee from "old" EU, 1 from V4 states, 1 from Slovak universities

Combinations of quantitative indicators and PEER REVIEW

Members of evaluation committees marked finally everyone of 7 indicators by marks
4 points – excellent, ..., 0 points - insufficient

Ad III. Logistics

4 years of activity documented by a detailed questionnaire (in English) with many indicators of 7 attributes allowing for statistics, normalisations,... (Excell) plus 4 annual reports.
All available on the institute's web site & sent to the Evaluation committee & to referees

Detail check of questionnaire. Corrections of mistakes.
Referee reports delivered to Evaluation committee as well as the assessed organisation.

Evaluation meeting at the institute with a presence of Evaluation committee, referees & assembly of institute. Visit of the labs.

Protocol of evaluation to the institute and Presidium.
Assessment proposal to Presidium. Presidium decision. Appeal. Final decision.



Ad IV. Result & Consequences

- A* International excellence of most of research groups; no significant objections or reflections
A International excellence in some groups and very good standard in the rest; suggestions for improvements
B Mostly very good standard but not international excellence; objections and tasks to accomplish till next exercise
C Not enough good quality; tasks to be fulfilled in specified period
D No credit; proposal to dissolve, append to another institute...

To redistribute funds for research selectively on the basis of quality

Some examples of indicators

1. Research output

Research outputs	2003		2004		2005		2006		total	
	number	as No. FTE	number	as No. FTE	number	as No. FTE	number	as No. FTE	number	as No. FTE
chapters in monographs, books published abroad	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000
chapters in monographs, books published in Slovakia	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000
CC publications	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000
scientific publications indexed by other databases (specify)	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000
scientific publications in other journals	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000
publications in proc. of international scientific conferences	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000
publications in proc. of nat. scientific conferences	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000
active participations at international conferences	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000
active participations at national conferences	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000

vi. Renormalized publications*

Renormalized publications = number of CC publications in the given year times
author's portion of the Organisation times the journal impact factor in 2005 divided by
the median impact factor in the research field

2. Responses to the scientific output

Table Citations shows specified responses to the scientific outputs; these entries are then divided by the FTE employees with a university degree (from Tab. Research staff) for all Organisation of the respective year; finally these entries are divided by the total salary budget from Tab. Salary budget.

Citations	2002		2003		2004		2005		total	
	number	as No. FTE	number	as No. FTE	number	as No. FTE	number	as No. FTE	number	as No. FTE
Wides of Science	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000
specific (Database 1)	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000
specific (Database 1) ...	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000
in monographs, conf. proceedings and other publications abroad	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000
in monographs, conf. proceedings and other publications in Slovakia	0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000

i. List of 10 top-cited publications and number of their citations in the assessment period

[1]
[2] ...

ii. List of top-cited authors from the Organisation (at most 10 % of the research employees) and their number of citations in the assessment period

3. Research status of the Organisation in the international and national context

i. International/European position of the Organisation

- List of the most important research activities documenting international importance of the research performed by the Organisation, incl. major projects (details of projects should be supplied under Indicator 4). Collective membership in the international research organisations, in particular within the European Research Area

[1]

[2] ...

ii. List of international conferences (co-) organised by the Organisation

[1]

[2] ...

iii. List of international journals edited/published by the Organisation

[1]

[2] ...

iv. List of edited proceedings from international scientific conferences and other proceedings

4. Project structure, research grants and other funding resources

• International projects and funding

- List of major projects within the European Research Area – 5th and 6th Framework Programme of the EU, European Science Foundation, NATO, COST, INTAS, CERN, etc. (here and in items below please specify: type of project, title, grant number, duration, funding, responsible person in the Organisation and his/her status in the project, e.g. coordinator, principal investigator, investigator)

• Summary of funding from external resources

External resources	2003	2004	2005	2006	total	average
external resource (millions of SKK)	0,000	0,000	0,000	0,000	0,000	0,000
external resource transferred to cooperating research organisations (millions of SKK)	0,000	0,000	0,000	0,000	0,000	0,000
ratio between external resources and total salary budget	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
overall expenditure (millions of SKK)	0,000	0,000	0,000	0,000	0,000	0,000

5. Organisation of PhD studies, other pedagogical activities

6. Direct output to the society

iv. List of patents issued abroad, incl. revenues

x. Summary of outreach activities

Outreach activities	2003	2004	2005	2006	total
activities for the decision sphere, government and NGOs, international and foreign organisations					0
articles in press media/external popularising results of science, in particular those achieved by the Organisation					0
appearances in mass communication media popularising results of science, in particular those achieved by the Organisation					0
public popularisation lectures					0

7. Background and management. Staffing policy and implementation of findings from previous assessments

Other information relevant to the assessment

Some remarks

3 referees gave also marks of indicators but their distribution was narrow. Of more value were their comments. Final marks were given by Evaluation committee, not always in line with the referees. This was criticized by "victims".

EC members based their marks of particular indicators on

- standards of "medium" level given in advance
- referee reports
- observations made at the visit of organisation
- comparison with similar visited institutes

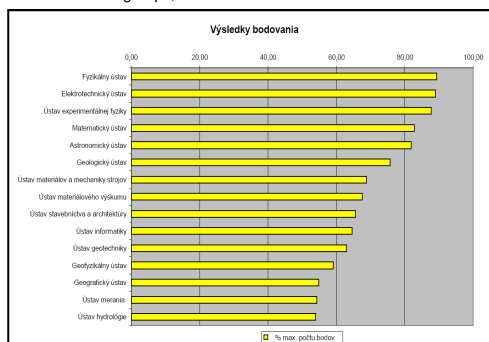
Final marking of particular indicators and overall assessment of the institutes were done at once after all evaluation meetings. If a difference in marks of some indicator was bigger than 2 there was a panel discussion and agreement organized.

Some statistics and results

	Attendance of committee members	Attendance of referees	From Slovakia	From Visegrad countries	From old EU15+	A* (number of organisations)	A (number of organisations)	B (number of organisations)
Evaluation Committee Section I	78 %	93 %	28.9 %	37.8 %	33.3 %	5 (33,3%)	6 (40 %)	4 (26,7%)
Evaluation Committee Section II	86 %	78 %	25,4 %	36,5 %	38.1 %	6 (28,6 %)	12 (57,2%)	3 (14,2%)
Evaluation Committee Section III	63 %	80 %	33,3 %	55 %	11,7 %	4 (20 %)	14 (70 %)	2 (10 %)
Together	76 %	84 %	29.2 %	43,1 %	27,7 %	15 (27 %)	32 (57 %)	9 (16 %)

Distribution of organisations in Section I

A* for > 80%, A for > 60%, B for > 40 % of maximum
3 natural groups, but 2 institutes in between



by Dr. S. Olejnik, chairman of EC I

Ranking of organisations in Section I in partial indicators

	1	2	3	4	5	6	7	
	Vedecke vyskumy	Chlba vedecckych vyskupov	Vedecke postavenie v medzinarodnej vedeckej komunit	Projektov a inovacnych vykupov	Organizacia doktorandov, študijn	Prehľad vedeckej popularizacie	Spolupracovnia s medzinarodnou	Infrastruktura a manažment
Organizácia I. OV SAV								
Astronomický ústav	5	8	10	5	1	2	5	
Elektrotechnický ústav	3	3	1	11	7	9	1	2
Fyzikálny ústav	1	1	1	2	4	2	3	1
Geofyzikálny ústav	14	11	12	10	9	3	15	12
Geologický ústav	10	12	11	15	15	4	10	13
Geofyzikálny ústav	6	3	6	8	5	6	6	6
Matematický ústav	3	3	4	13	1	4	5	4
Ústav experimentálnej fyziky	1	1	1	5	3	6	3	3
Ústav geotechniky	9	8	14	6	5	15	12	11
Ústav hydrologie	12	14	13	10	13	14	13	15
Ústav informatiky	12	14	7	2	11	11	8	10
Ústav materiálov a mechaniky strojov	10	9	8	2	12	6	6	7
Ústav materiálového výskumu	6	5	8	7	6	12	8	8
Ústav merania	14	12	14	13	10	12	14	14
Ústav stavebníctva a architektúry	7	7	10	8	14	10	11	9

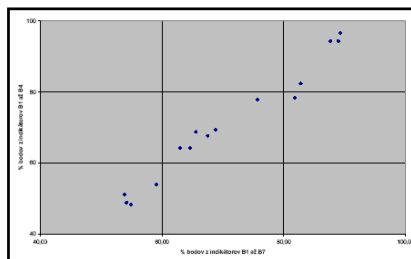
by Dr. S. Olejnik, chairman of EC I

	1. člen AKOVI	2. člen AKOVI	3. člen AKOVI	4. člen AKOVI	5. člen AKOVI	6. člen AKOVI	7. člen AKOVI	8. člen AKOVI	9. člen AKOVI	10. člen AKOVI	11. člen AKOVI	12. člen AKOVI	členové
Organizácia I. OV SAV													
Astronomický ústav	3	5	4	2	5	3	4	2	5	4	2	5	4
Elektrotechnický ústav	7	2	7	2	2	1	5	5	2	2	1	5	5
Fyzikálny ústav	1	4	1	2	1	1	1	2	1	1	1	2	1
Geofyzikálny ústav	10	14	12	10	8	11	12	14	7	14	14	12	12
Geografický ústav	14	11	14	15	11	11	12	14	11	7	7	14	13
Geologický ústav	4	6	6	5	6	8	6	8	5	6	2	6	3
Geometrický ústav	10	5	10	5	3	3	3	3	3	3	3	3	3
Ústav experimentálnej fyziky	4	1	3	1	3	3	3	2	2	2	2	2	2
Ústav geodetický	12	9	12	8	7	9	10	8	13	11	13	12	11
Ústav hydrologie	15	12	15	12	13	14	12	12	11	13	13	13	15
Ústav informatiky	10	12	6	8	8	11	10	11	8	9	9	10	9
Ústav materiálu a mechaniky strojov	7	6	6	5	8	8	6	11	10	8	9	7	7
Ústav materiového výskumu	10	10	10	10	10	10	10	10	10	10	10	10	10
Ústav meteo	12	14	11	13	12	15	12	13	14	14	14	14	14
Ústav stavebníctva a architektúry	7	9	9	12	9	8	6	9	8	9	8	9	9

Weight of partial indicators for overall rating

1. Research output
2. Responses to research output
3. Status within the EU & national context
4. Projects, grants and other resources
5. PhD studies & other educational activities
6. Applications and/or popularisation
7. Background & management

	1	2	3	4	5	6	7
Vedecké výstupy							
Ovlivň. vedec. dn. výstupov							
Vedecké postavenie v medzinárl. a domácom kontexte							
Projektová činnosť, výskum na granty a iné zdroje financí							
Organizácia doktrín, školení, med. partnerov, aktivít							
Spoločenské výstupy, politické, popularizačné							
Infraštruktúra a mažeovanie							
Koeficient korelácie	0,775	0,819	0,795	0,858	0,765	0,897	0,907



by Dr. S. Olejnik, chairman of EC I

Conclusions

Although 3 EC worked independently they were quite determined by the system: Standards/requirements in 3 evaluation committees were similar. Averaged assessments were: ECI – 70.5%, ECII – 73.9% and ECII – 72.8%.

New systems precision and/or error bars allowed to distribute assessed organisations into 3 quality levels.

By ECs there are no anymore really weak research organizations in SAS.

There are correlation between size and rating => some too small organisations exist.

Differences among research groups inside an institute can be bigger than among different institutes. **We need to focus more on that in the next assessment.**

Selection of strong and demanding referees is crucial.

More externality in RAE is desirable.

Unique/unified RAE of SAS and Slovak universities is desirable.

Jiří Zlatuška

Cul-de-sac of Czech Research Evaluation Policy



Jiří Zlatuška is dean of the Faculty of Informatics Masaryk University Brno since 2004, professor of computer science, Information society, general impact of Informatics, Scientific activities: Computer Science and mathematical logic, lambda-calculus-based systems, information systems, logic programming and specification-based programming methods, electronic typesetting. 2002 - 2008: Senator of the Czech Parliament, Committee for Education, Science, Culture, Human Rights and Petitions, 2004-6 Vice-Chairman, 2006- Vice-Chairman of the Committee for Legal and Constitutional Affairs. 2006 - : member of the Brno City Council, head of the Council Committee for Information Technology. 1998 - 2004: Rector of Masaryk University Brno.

Cul-de-sac of Czech Research Evaluation Policy

The talk will focus on principal problems of the methodology for research evaluation and research finance allocation introduced recently in the Czech Republic. Problems from bibliometric and systemic point of view will be shown, and some comparisons with international experience as well as indications from pilot exercises will be made. Based on the wealth of accessible international expertise on both bibliometrics and research evaluation, conclusions concerning quality and professional ethics entering major public policy decisions in the area of research policy will be drawn.

Slepá ulička českého hodnocení vědy

Cul-De-Sac of Czech Research Evaluation Policy

Jiří Zlatuška

Pardubice
10. prosince 2009

- Obecná východiska užití citační analýzy
- Problémy konstrukce IF
- Nerovnoměrné oborové pokrytí
- Různá média publikací v různých disciplínách
- Internacionalizace časopisů a její podíl podle disciplín
- Citační index vs. archivní knihovní služby
- Druhy literatury v humanitních disciplínách
- Reforma na český způsob (a efekty „amatérské bibliometrie“)

Pro výsledky uplatněné do roku 2007 včetně:

(Převzato z Metodiky 2008)

$$\text{Faktor} = (1 + N) / (1 + (N / 0.14)), \text{ kde } N = (P - 1) / (P_{\max} - 1)$$

Druh výsledku		I – obory NRRE ⁶⁾	II – ostatní obory
J_{imp}	článek v impaktovaném časopise	5 + 140 × Faktor ¹⁾	
J_{semp}	článek v recenzovaném časopise		
	světově uznávané databáze ²⁾	12	8
	seznam recenzovaných periodik ²⁾	10	4
B	odborná kniha	40	světový jazyk ³⁾ 40
			ostatní jazyky 20
D	článek ve sborníku ⁴⁾	8	
P	patent	evropský nebo mezinárodní patent (EPO, USPTO), patent USA a Japonska 500	
		český nebo národní patent s výjimkou patentu USA a Japonska, který je využíván na základě platné licenční smlouvy 200	
		ostatní patenty ⁵⁾ 40	
		poloprovoz, ověřená technologie, odrůda, plemeno 100 ⁶⁾	
Z (T)	prototyp, uplatněná metodika, funkční vzorek, software, užitný a průmyslový vzor, specializované mapy, poskytovatelem realizované výsledky	40 ⁶⁾	
S, F, G, H, L, N, R	výzkumná zpráva, která je výsledkem obsahujícím utajované informace	50 ⁷⁾	

Pro výsledky uplatněné od roku 2008 včetně:

$$\text{Faktor} = (1 + N) / (1 + (N / 0.057)), \text{ kde } N \text{ je normované pořadí časopisu, } N = (P - 1) / (P_{\max} - 1)$$

Druh výsledku		I – obory NRRE ⁶⁾	II – ostatní obory
J_{imp}	článek v impaktovaném časopise ¹⁾	10 až 305 ²⁾	
	článek v prestižním impaktovaném časopise (Nature, Science, Proc. Natl. Acad. Sci. USA) ³⁾	500	
J_{semp}	článek v recenzovaném časopise	12	světově uznávané databáze ⁴⁾ 8
			seznam recenzovaných periodik ⁴⁾ 4
B	odborná kniha	40	světový jazyk ⁵⁾ 40
			ostatní jazyky 20
D	článek ve sborníku ⁶⁾	8	
P	patent	evropský nebo mezinárodní patent (EPO, USPTO), patent USA a Japonska 500	
		český nebo národní patent s výjimkou patentu USA a Japonska, který je využíván na základě platné licenční smlouvy 200	
	ostatní patenty ⁷⁾	40	
Z	poloprovoz, ověřená technologie, odrůda, plemeno	100	
F	užitný vzor	40	
G	průmyslový vzor	40	
H	prototyp, funkční vzorek	40	
N, L	poskytovatelem realizované výsledky	40	
R	certifikované metodiky a postupy, specializované mapy s odborným obsahem	40	
	software	40	
V	výzkumná zpráva, která je výsledkem obsahujícím utajované informace	50	

Pochybný postup konstrukce

- Neexistují důvodové zprávy pro jednotlivé parametry hodnocení, nelze tedy ani kompetentně připomínkovat
- Kdo odborně recenzoval uplatňovanou metodiku z hlediska bibliometrického či scientometrického?
- Jak byli tiito recenzenti vybráni, aby byla zaručena jejich nezávislost?
- Autory jakých bibliometrických nebo scientometrických prací byli tiito opONENTI a jaké je jejich mezinárodní renomé ve scientometrické odborné komunitě? (Odborné počiny ve scientometrii u autorů metodiky samých raději nehledejme.)
- Kdy proběhla veřejná opONENTURA, kdo dával jaké připomínky a jaký byl výsledek této opONENTURY?

➤ Neverifikovatelná datová základna, evidentní rozpory mezi implementací a specifikací z metodiky

Potřebná expertíza?

- Ze zprávy Mezinárodní unie matematiků k užití citační analýzy:
„If one consults with doctors when practicing medicine, surely one ought to consult with statisticians when practicing statistics.“
- Problémy mezioborových srovnání i podstatné rozdíly mezi publikacemi v přírodních vědách jsou v odborné literatuře dokumentované a známé
- Český přístup: RVV a vládě stačí většinové rozhodování politiky jmenované rady, námitky statistiků nebo odborníků na bibliometrii jsou v této perspektivě irelevantní

KHV a parametry hodnocení ve stylu kulinářské delikatesy pejska a kočičky

- 23-5-B Přípomínkové řízení : „Ověřitelnost výsledků vykazovaných v RIV“
- Přípomínka 18
Autor: Ing. Miroslav **Janeček**, CSc.
Přípomínka: „*Tabulka, kategorie J (a asi i D) Navrhuji zvýšit minimální počet stránek na 3*“
Odůvodnění: „*Abstrakta jsou často na dvou stránkách, takže vymezení 2 stránkami textu může skrývat takovéto případy.*“
Vypořádání: „*A - návrh na úpravu dvou definic druhu výsledku.*“
- Návrh, o kterém se opravdu **hlasovalo**:
DOPLNIT do def. Upřesnění pro účely hodnocení:
„J – článek v odborném periodiku má **minimální rozsah 3 normostran** textu. **ZMĚNA DEFINICE HLASOVÁNÍ č. 1** následně je nutno v metodice definovat „normostranu““

Co může být v české vědě nežádoucí

- **Title:** C-60 – Buckminsterfullerene
Authors: Kroto, HW; Heath, JR; Obrien, SC; Curl, RF; Smalley, RE
Source: Nature 318 (6042):**162-163**, 1985
Times Cited: 6606
- **Kroto, Curl a Smalley za to dostali v roce 1996 Nobelovu cenu**
- *M. Janeček ovšem někde viděl článek s dlouhým abstraktem, takže ...* ☹
(Možná by v KHV měli přednostně sedět frekventanti pomocných škol...)

Hodnocení kvality výzkumu

- Kvantifikace výzkumu (počty publikací) s vazbou na kvalitu (citační ohlas) jen **jedním z podkladů** hodnocení
- Podstatná je **normalizace výsledků s ohledem na oborové rozdíly**
- Známa je **nerovnoměrnost pokrytí vědních disciplín** ve WoS
- Citační analýza vychází z **publikačních zvyklostí přírodních věd** – staví primárně na člancích, nikoli knihách [Britská Akademie v roce 2007: Pro humanitní a společenské disciplíny neexistuje metrika, která by adekvátně měřila výkonnost]
- **Český přístup:** Kvantifikace publikací je **jediným kritériem**, tato kvantifikace lineárně odpovídá množství přidělených financí

Chybné použití IF k hodnocení článků i autorů

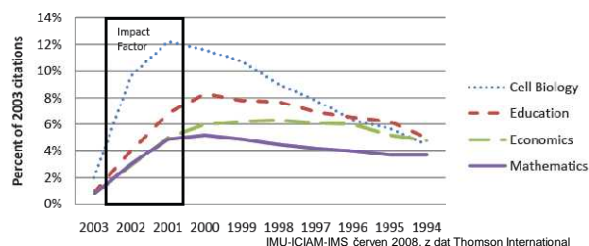
- IF časopisů **nebyl navržen** nebo zamýšlen k užití jako měřítko nebo indikace kvality **jednotlivých článků nebo autorů**
- Výrazně asymetrické rozložení citací způsobuje, že ve většině případů **IF nadhodnocuje impakt** jednotlivých článků nebo autorů, kteří v časopise publikují
- IF je **ovlivněn rozdíly mezi obory**, mezioborová srovnání jsou zkreslená
- **Sumace nebo kombinace IF** tyto chyby ještě **zvýrazňuje**.

Thomson Reuters, 2009

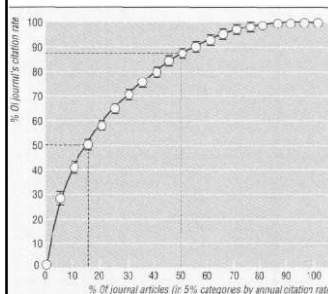
Impaktní faktor nezohledňuje odchylky v charakteru citací

- IF je počítán z dvouletého okna, charakteristiky citací se však výrazně liší mezi jednotlivými disciplínami
- Hodnocení významu rozdílu citační frekvence je proto závislé na uvažované disciplíně

Citation Curves



Nerovnoměrná distribuce citací článků vzhledem k citačnímu indexu časopisu



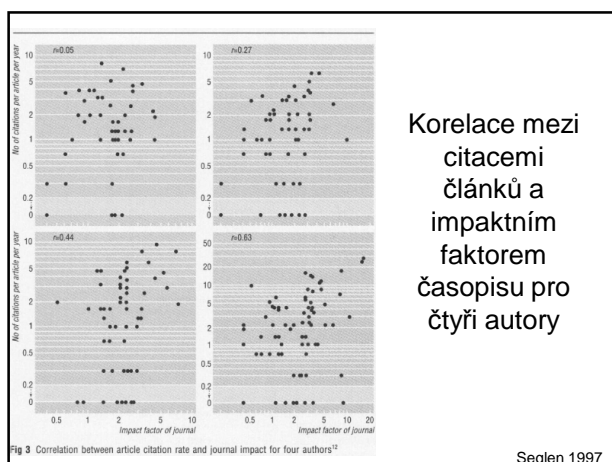
15 % článků generuje 50 % citací.

Nejcitovanějších 50 % článků generuje 90 % citací.

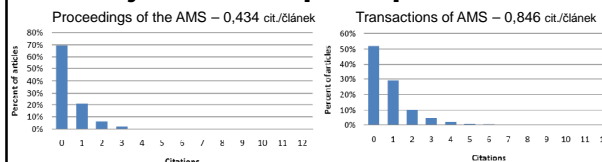
→ Články v nejcitovanější polovině jsou v průměru desetkrát citovanější, než články v nejméně citované polovině.

→ Přiřadí-li všem článkům z časopisu IF časopisu, je **zploštění na této škále rozdílů pravým opakem toho, co má analýza kvality přinést.**

Seglen 1997



Výrazná šikmost citačních statistik problematizuje i řazení časopisů v jedné disciplíně podle IF



Transactions mají **dvakrát větší** IF než Proceedings

Náhodně zvolený článek z Proceedings má **v 62 % případů větší množství citací**, než náhodně zvolený článek z Transactions

Zdroj: IMU-ICIAM-IMS červen 2008

Eugen Garfield k chybnému užívání IF, citát z roku 2005:

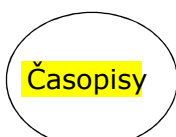
- Používání citačních indexů časopisů namísto **skutečných citačních indexů článků** pro hodnocení jednotlivých autorů je **vysoce spornou záležitostí**.
- Grantové agentury a jiné instituce zodpovědné za vědní politiku si často přejí **vyhnout se práci, kterou představuje získání skutečných počtů citací** pro jednotlivé články a autory.
- Typicky to vypadá tak, že se při posuzování bibliografie posuzovaného autora nahrazují skutečné počty citací jeho prací impaktními faktory časopisů, ve kterých byly publikovány. Impaktní faktor se tak používá k odhadu očekávaného dopadu jednotlivých článků, což je **dost pochybné, uvážíme-li známé zkrácení pozorované u většiny časopisů**.

Celkové pokrytí hlavních oborů v ISI

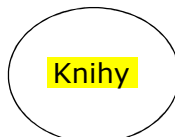
EXCELLENT (> 80%)	VERY GOOD (60-80%)	GOOD(40-60%)
Biochem & Mol Biol	Appl Phys & Chem	Mathematics
Biol Sci – Humans	Biol Sci – Anim & Plants	Economics
Chemistry	Psychol & Psychiat	Engineering
Clin Medicine	Geosciences	MODERATE (<40 %)
Phys & Astron	Soc Sci – Medicine	Other Soc Sci
		Humanities & Arts
		(Computing)

H. Moed et. al., 2007

Dva různé světy vědy ?



Medicína
Přírodní vědy



Humanitní a
společenské obory

Ulf Sandström, 2007

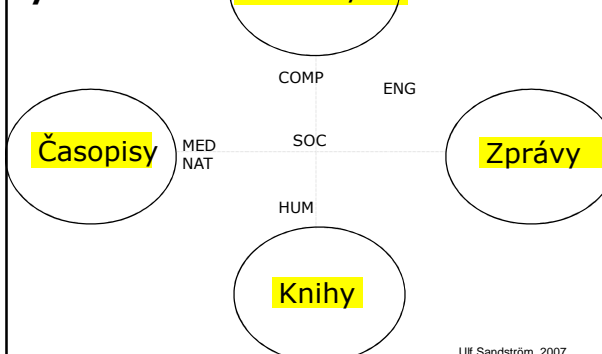
Rozdíl mezi přírodními a humanitními disciplínami

- Derek de Solla Price (1970) identifikoval jedné ze zakladatelských prací bibliometrie **fundamentální rozdíly mezi přírodními a humanitními disciplínami** jako rozdíly mezi dvěma oblastmi vědění s podstatně různým obsahem.
- Rozdílný „sociální aparát pro sdílení informací a jejich výměnu“:
- V **přírodních vědách** důraz na „kvantitativní, vysoce uspořádané a velmi určité poznatky“, znalost je „pozitivní“ a „krátkodobá“, výzkumné problémy se rychle vyvíjejí;
- V **humanitních oborech** vědci zkoumají otázky trvalého významu a produkují o nich „novou moudrost“

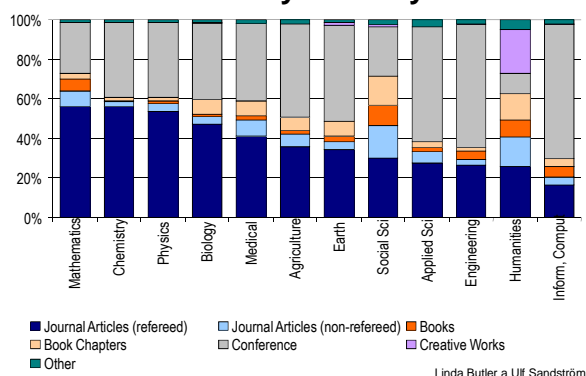
Rozdíl mezi přírodními a humanitními disciplinami 2

- Vědec v oblasti **humanitních disciplin** pracuje vysoce individuálně
- Výzkum v **přírodních vědách** je sociálně organizován do skupin, interakce se ohedrávají přes konference a časopisy a utváří se „mezinárodní výzkumná fronta“
- **Solla Price**: citace přicházejí v **přírodních vědách** mnohem rychleji, než v **humanitních disciplínách**

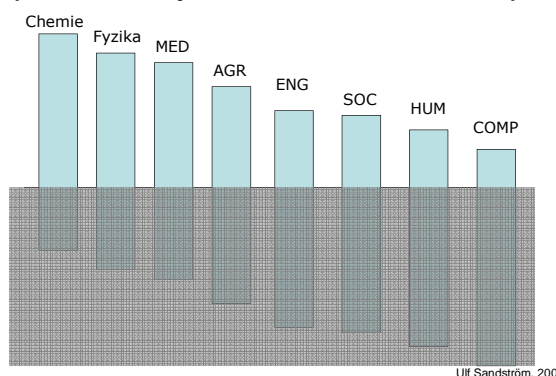
Čtyři světy akademického výzkumu



Rozdílná struktura typů publikací mezi různými obory



Metafora ledovce (viditelnost výsledků v citační databázi)



Discipliny se liší i mezinárodností publikací

Table 7.6. National orientation of journals by discipline

Discipline	No. Journals	Median INO	% Journals with INO > 90%
Chemistry	440	33	12
Applied physics & chemistry	723	35	10
Mathematics	390	37	2
Physics & astronomy	260	37	10
Engineering	1,061	41	9
Molecular biology & biotechnology	530	41	4
Biol sci related to humans	856	43	5
Geosciences	437	44	14
Biol sci related to animals and plants	879	48	16
Clinical medicine	1,459	50	12
Economics	294	62	15
Psychology & psychiatry	337	63	18
Social sci related to medicine	449	69	22
Humanities & arts	1,110	71	24
Other social sciences	874	72	22

INO: Indicator of a journal's national orientation, defined as the share of the papers from the country most frequently publishing in a journal, relative to the total number of papers published in the journal. A purely national journal would have an INO value of 100 per cent. Disciplines are ranked by median INO.

Moed, 2005

Rozdílná mezinárodní orientace

- **Humanitní publikace** jsou objektivně více orientovány národně
- Silná národní orientace existuje v sociálních a humanitních disciplínách, antropologii a v pedagogice
- Klasifikace „národní“ x „mezinárodní“ neodpovídá rozdílu „zahrnuta – nezahrnuta v citační databázi“ (**řešením proto nemůže být „národní registr“**) – typické jsou právní časopisy amerických univerzit, které jsou čistě národní (Moed 2005)
- Citační indexy jsou zde proto **principiálně hůř použitelné**, než v přírodních vědách

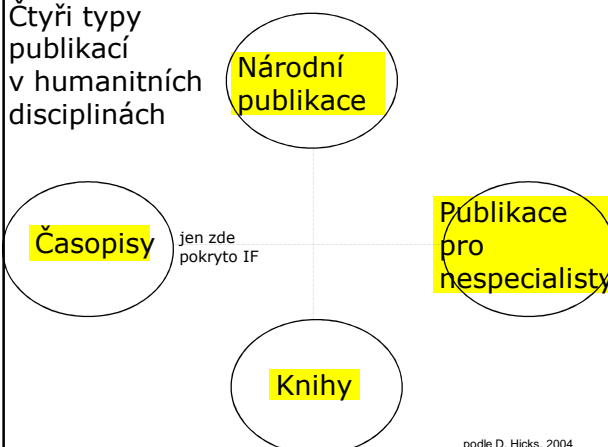
Podstatně různé citační kultury

- Solla Price (1970): Různý typ informací o publikačních výstupech
- Humanitní disciplíny: **standardní archivní služba** typu knihovny
- Přírodní vědy: **citační indexy** (Priceův index: většina citací během pěti let)
- Citace v humanitních disciplínách: *Homér mezi autory citovanými dva roky po publikaci své práce zcela jistě není*

V odborné literatuře jsou **dokumentovány** způsoby umělého zvyšování IF časopisů

- Editor (nikoli recenzent) požádá autora citovat články z daného časopisu
- *Časopis vychází na začátku roku, v těchto číslech přednostně publikuje články, které budou citovány, inzeruje je předem např. na webu (IF je dán fixním 2letým oknem)*
- Publikování materiálů, které sice nejsou považovány za citovatelné, ale budou (krátkodobě) generovat velké množství citací
- *Nepublikovat mnoho článků, které jsou sice výborné, ale vybočují ze současného trendu*
- Zařazujte editoriály, nejlépe na konci roku, citující všechny hodné články z předchozího období

Čtyři typy publikací v humanitních disciplínách



Čtyři typy literatury v humanitních oborech

- **Časopisecké články**
v některých humanitních disciplínách (ekonomie, psychologie) po normalizaci použitelné podobně jako v přírodních vědách
- **Knihy**
významná oblast publikací s vysokým dopadem
- **Národní literatura**
znalost rozvíjená v místním kontextu – prokazatelně existuje a její vyloučení z citačních databází není věcně konzistentní
- **Publikace určené širší veřejnosti**
významný zdroj aplikací, přenos poznatků/znalostí do jiných oblastí

D. Hicks, 2004

Koncept reformy VaVal nadřazuje rychlost kvalitě

- Bez adekvátní analýzy dat o publikacích a citacích jsou metriky příliš rozdílné mezi obory
- **Vládní reforma VaVal zcela ignoruje potřebu adekvátní kalibrace** datovýchází i rozdíl mezi skupinami oborů
- *Ve Velké Británii je přechod na metriky rozfázován do roku 2014, počítá se s pilotními běhy a původní představa o dominantním užití metrik přechází do peer review beroucí metriky jako jeden ze vstupů („peer review informed by metrics“)*
- Britská HEFCE zadala analýzu databází WoS a SCOPUS z hlediska využitelnosti pro REF, česká RVV takovou analýzu **udělat odmítla jako nepotřebnou**
- Koncept Reformy VaVal předpokládá pouze bibliometrickou metriku založenou na WoS, žádný expertní vhled, realizace proběhla v řádu měsíců
- *(Databáze výsledků výzkumu RIV je pro tento účel fakticky nepoužitelná z koncepčních důvodů, data navíc zpracovává chybně.)*

Problémy konstrukce bibliometrických evaluací

(J. Gläsel, G. Laudel, 2007)

- Citační impakt měří „důležitý aspekt kvality“, nikoli kvalitu per se; **bibliometristé neměří kvalitu, ale poskytují data, která musí být posouzena experty**
- Citační analýza je práce statistická, která přináší relevantní výsledky pouze na velkých souborech podkladových dat – prakticky to znamená, že se **měří jen dimenze mezinárodního dopadu**
- Úplnost citačních dat je podstatná – **jedna chybějící dobře citovaná publikace může způsobit podstatné chyby**; metoda ztrácá relevanci, pokud se zmenšuje hodnocená jednotka (**MŠMT „měří“ i jednotlivce!**)
- Jako minimální citační „okno“ jsou v přírodních vědách pokládány 3 roky; **nutným důsledkem dřívější dostupnosti bibliometrických dat je jejich nižší spolehlivost**
- Citace v různých oblastech **nelze porovnávat nebo agregovat bez normalizace** postupy, které závisí na konkrétních oblastech; **vymezení vědních oblastí také ovlivňuje bibliometrické výsledky**

Podkladová citační data nejsou korektní pro bibliometrii

- Citační analýza dat Thomson Scientific ukazuje **malou spolehlivost dat, chyby přetvárají dlouhé roky**
- Kritika dat bibliometristy **nevede ke zlepšení**
- Mnoho bibliometristů se **obává kritizovat vlastníka dat** (i když konkrétní protiakce dokumentovány nejsou)
- Data **znevýhodňují humanitní, společenskovědní i technické disciplíny**

Bibliometrie zneužitá podle politických požadavků

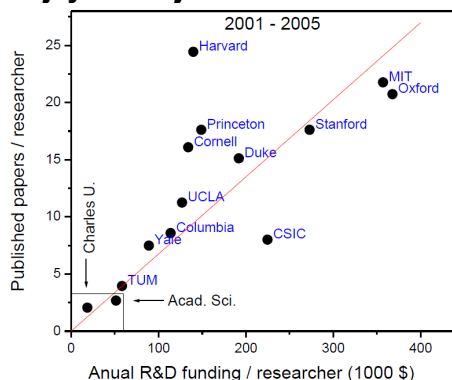
- Politické požadavky jednoduchého hodnocení jedním číslem
- Vědecká praxe zdánlivě legitimizuje užití IF
- Zdánlivost „objektivit“ čísel dělá věc lákavou pro politiky
- **Pro „odborníky“, kteří se podíleli na KHV, je to etická diskreditace**

Problémy amatérské bibliometrie

- Užívání bibliometrie **na úrovni jednotlivců v institucích**
- Grantové agentury vynucují uvádět bibliometrické parametry a **nutí uchazeče do amatérské bibliometrie**
- Přes konstrukce žebříčků se produkty amatérské bibliometrie šíří dál
- Amatérská bibliometrie zvyšuje poptávku po hodnocení; **evaluace pochybné kvality jsou artiklem marketingu**; úspěšní vědci jsou zainteresováni „objektivně“ ukazovat, že jsou lepší, než jejich kolegové
- Amatérská bibliometrie **snižuje standardy bibliometrie obecně**
- **Peer review může pozbyť charakter alternativního hodnocení kvality**, pokud se posuzovatelé coby amatérští bibliometristé budou pouze „věřit číslům“

Gläser, Laudel, 2007

Výsledek? Redukce AV ČR destruuje nejvýkonnější instituci české vědy



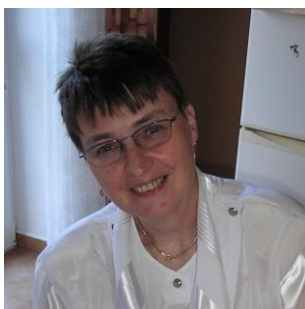
Zdroj: J. Málek
(člen RVV),
prezentace ČKR
na semináři OECD,
Praha 16.10.2009

Odkazy

- Henk F. Moed: Citation Analysis in Research Evaluation, Springer 2005, 346pp.
- J. Gläser, G. Laudel: The Social Construction of Bibliometric Evaluations, in: R. Whitley and J. Gläser (eds.), The Changing Governance of the Sciences, Springer Science+Business Media D.V., 2007, pp. 101-127.
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- Per O Seglen: Why the impact factor of journals should not be used for evaluating research, British Medical Journal, Vol. 314, Feb. 15, 1997, pp. 498-502
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- Ulf Sandström: A Metric for Academic Performance applied to Australian universities, 2001-2004, WCU-2, Shanghai 2007
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- Linda Butler, Martin S. Visser: Extending citation analysis to non-source items, Scientometrics, Vol. 66, No. 2 (2006) 327/343
- Eugen Garfield: The Agony and the Ecstasy – The History and Meaning of the Journal Impact Factor, International Congress on Peer Review and Biomedical Publication Chicago, September 16, 2005
- http://www.reformy-msmt.cz/reforma-terciarniho-vzdelavani/sites/default/files/conference/CRC_Position_Malek.pdf
- Joint Committee on Quantitative Assessment of Research: Citation Statistics, IMU, July 2008

Jana Musilová

**Problems of Quantitative Evaluation of Research
Activities Results**



Jana Musilová is vice-rector for research and development at Masaryk University since 2004. She is professor of General Physics and Mathematical Physics at the Department of theoretical physics and astrophysics. Her field of research is mathematical physics, geometric analysis focused on the mechanic systems and variation sequences in mechanics and field theories, and physics education.

Since 2006 she is member of the Czech Academy of Sciences Academic Assembly and since 2008 founding member and vice-chairman of Special Group of Czech Physical Society "R&D Organization". Next to her interest in science, she is involved in studies comprehensive of human resources in research and development as well as effectiveness and assessment of research.

Problems of quantitative evaluation of research activities results

The intention to evaluate research results through the numerical values promises a simple way of sequencing research organisations on the imaginary scale of value of their research activities assumed to be an objective scale which is free from the effects of subjective character. To have such a scale is especially attractive as a part of an effort to minimize problems of institution funding and forming a routine administrative procedure of it. The possibility to succeed in such an approach in the field of research involving in an undifferentiated way all of its fields is however only apparent.

The scale index can serve at the most as a benchmark comparison of large groups of organisations but it cannot express the incommensurable quantitative aspects of the research activities of their units.

The author focuses at the capabilities of such a seemingly correct quantitative evaluation and its limits which are documented on simple and clear examples using publicly available data.

Problems of quantitative evaluation of research results

Jana Musilová

Pardubice, 10. 12. 2009

Motto

- Concept of the methodology of quantitative evaluation of research results in Czech Republic (2004-2009), as well as the concrete treatment of data is not adapted to the explicitly declared purposes of evaluation.

2

Theses – I

- ranking of research organizations on a unique numerical scale quantifying the quality and effectiveness of their research – just the right tool for institutional financing of groups of organizations

Antitheses – I

- no possibility to reasonably quantify results of activities with quality and effectiveness as their most important aspects
- no possibility to measure a multidimensional quantity by only one its component

3

Theses – II

- quantitative evaluation of research outcomes in all fields of research can be reduced to a unique universal scale

Antitheses - II

- quite specific practice in each field of research as for various ways of presentation of results
- extremely different financial needs in various fields of research

4

History

six years of „experiments“ with a unique scale

- 2004-2007: Index SR (rate of weighted number of results and corresponding financial support) as a measure of research effectiveness
- 2008-2009 the weighted number of results as a measure of research quality („Metodika“ 2008,09)

Present

- importance of features specific in various fields of research conceded for the first time
- no analysis of research outcomes data with respect to specific aspects of research fields

5

Assumptions – I

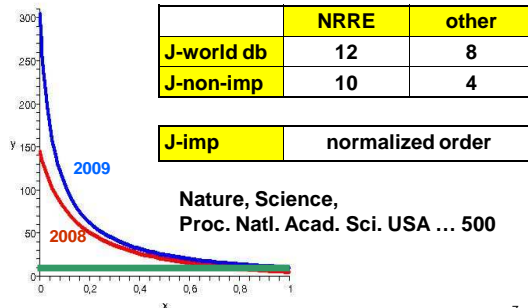
- the weighted number of research results = the right parameter for determining financial support of great groups of organizations

Reality – I

- the „fine“ method of assigning weights to research results = classification of organizations accordingly their size (number of researchers)
- negligible differences between weighing 2008 and 2009

6

Weights of results J (journals)



7

Weights of results B (books)

pages no suppl.		printing		language NRRE		language other		cont- ent
< 100	≥ 100	< 200	≥ 200	world	CZ	world	CZ	?
NO	YES	NO	YES	40	40	40	20	?

1 paper in Science ≈ 12 books
apart from the content

8

Weights and size of institutions

groups of research organizations

group of universities
group of institutes of Czech Acad. Sci.



results	accepted		all
	number/person	points/person	number/person
universities	2,2	43,6	8,3
institutes	3,8	104,3	7,2

9

Weights and size of institutions

groups of research organizations

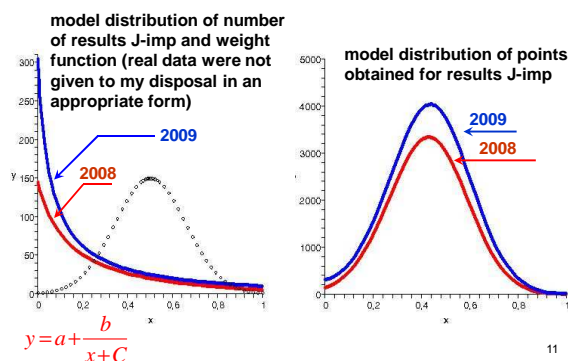
group of universities
research / teaching = 0.5 / 0.5
group of institutes of Czech Acad. Sci.



results	accepted		all
	number/person	points/person	number/person
universities	4,4	87,2	16,6
institutes	3,8	104,3	7,2

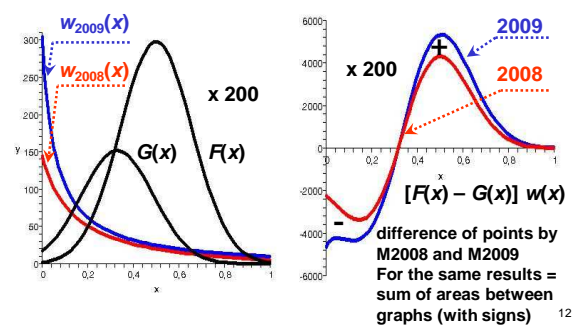
10

Weight function



11

Influence of weight function – I

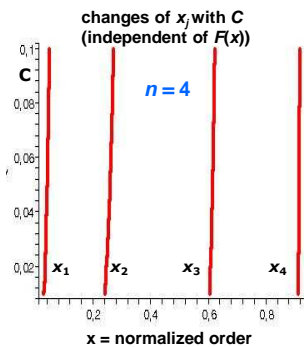
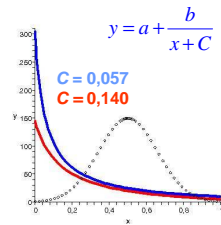


12

Influence of weight function – II

Gauss quadrature

$$\int_a^b F(x) w(x) dx \approx \sum_{j=1}^n \lambda_j F(x_j)$$



13

Why previous estimations?

- problem: complete sets of data – not given to my disposal in the form appropriate for numerical treatment

Requirement

- for institutions – a possibility of preliminary self-evaluation of results based on data analysis

14

Assumptions – II

- usability of the weighted number of research results as the scaling parameter inside the groups of research organizations

Reality – II

- great inner differences between fields of research caused in principle by their specificities

15

„Metodika“ and fields of research

groups of Acad. Sci. institutes
fields of research

- science, mathematics, informatics
- humanities, social sciences, economy



results	accepted		all
	number/person	points/person	number/person
group I	3,1	107,6	5,7
group II	7,3	88,1	14,3

16

Academy and universities

results group I	accepted		all
	number/person	points/person	number/person
UK	4,8	152,0	9,4
MU	5,0	131,6	15,4
Acad. Sci.	3,1	107,6	5,7

results group II	accepted		all
	number/person	points/person	number/person
UK	3,1	45,6	8,8
MU	3,5	45,1	11,6
Acad. Sci.	7,3	88,1	14,3

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Structure of results Acad. Sci.

Institutes of Acad. Sci. – fields of research

- science, mathematics, informatics
- humanities, social sciences, economy

amount of results J (journal) and B (book) on
number / weighted number of all results

	number		points	
	J [%]	B [%]	J [%]	B [%]
group I	81,3	9,1	88,1	1,9
group II	46,4	53,2	42,7	56,2

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Concluding thesis

- evaluation of research quality and effectiveness – an audit primarily based on extra financed external (international) expertises

Concluding antithesis

- 1st step: own analysis of accessible data to disclose specific practice and financial needs in various fields of research
- 2nd step: cooperation of all representations of the academic community in formulating concept of evaluation
- 3rd step: concluding international expertises

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Concluding remark

steps 1 and 2

- the own intellectual potential of research institutions
- during several months
- without additional financial requirements

* * *



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Daniel Münich

**Evaluation and Funding of R&D in the Czech Republic:
Searching for the Right Incentives**



Daniel Münich is a member of CERGE-EI, a joint workplace of the Charles University and the Economics Institute of the Academy of Sciences of the Czech Republic. His research interest includes human capital, economics of education and schooling, employment and labour market related issues, policy impact evaluations, and empirical bibliometric analysis. He is a chair of the Expert commission for Humanities and Social Sciences and member of the Commission for R&D Evaluation - expert and advisory bodies to the Research and Development Council of the government.

Evaluation and funding of R&D in the CR: searching for the right incentives

During the last decade, the system of R&D evaluation and institutional funding (E&F) in the Czech Republic was subject to two major changes. The first one, also known as Research Intentions (RI; also called Research Plans), raised high expectations in the middle of the decade but its realisation quickly led to disillusion. The key driving idea of RIs — that one can distinguish between good and bad R&D based on assessing ex-ante plans — turned out to be wrong. Moreover, the attempt to evaluate the performance of the RIs retroactively based on interim reports failed too.

The failure of the RI scheme initiated a second reform attempt—a fundamental overhaul of R&D E&F, also known as Evaluation Methodology (Methodology). Most notably, the reform introduced a most welcomed switch from a forward-looking E&F of R&D to a backward-looking one, reflecting real performance of R&D subjects in the recent past. The development of the Methodology was also driven by well intended efforts to minimise the role of subjective expert evaluations, which had proved to be quite problematic in Czech E&F in the recent past. Unfortunately, good intentions gave way to extreme simplifications and loopholes and the newly introduced scheme appears to be very problematic. There are two key deficiencies of the scheme: (i) it initiates strong perverse incentives in R&D production, and (ii) it leads to funds allocations determined by unclear grounds and objectives. No wonder that the Methodology gave rise to widespread and sometimes furious discontent among the whole academic community.

Good and excellent R&D outcomes can be systematically achieved if proper incentives at all levels are in place. It is the dual scheme of R&D E&F forming such incentives. To work properly, such a scheme has to fulfill several general properties. Unfortunately, both schemes of Research Intentions and the Methodology are lacking such properties.

Evaluation of R&D has to reflect specific publication patterns of dozens of scientific fields. The Methodology does not do so. Evaluations of R&D outcomes within fields have to follow internationally recognised standards of quality and quality of results has to be benchmarked to international standards. The Methodology does not do so. All R&D funds recipients in given field in the Czech Republic have to be evaluated together, compared to each other and international benchmarks. The methodology does not do so, leaving within field evaluations as an optional choice of individual funding providers (ministries and Academy of Sciences) who can, but do not have to, evaluate recipients under their jurisdiction. Evaluation methodology has to differentiate strictly between quality and quantity of R&D outputs and much greater attention should be given to results of above average quality, neglecting other outcomes if there is not enough time and resources for evaluation as in the CR. The Methodology reflects quality in case of few output types only and most output types are simply counted irrespective of their quality. Evaluation criteria have to be revealed before R&D activities start. However, the Methodology sets criteria and parameters at the moment when R&D outcomes are already finished shortly before they are reported. Moreover, the funding formula to allocate funds between providers is not explicitly stated. Allocation of institutional funds between research and experimental innovations, between broad field areas and narrow fields cannot be decided by the same principles and criteria as are used for allocation of funds within scientific fields. However, until very recently the intention was that the Methodology could determine all types of allocations.

It holds as a general principle that R&D subjects at the lower level have strong incentive to take over E&F principles imposed at higher levels. This is because potential deviations have adverse impacts on their future funding. This implies that the superior methodology of evaluation has to be designed properly generating proper incentives. Otherwise, perverse incentives spread quickly at lower levels including individual R&D teams and individuals.

Czech R&D E&F is at a cross-road now. The new system (Methodology) needs substantial revisions to become incentive compatible. Not having a reasonable temporary alternative, there is impending danger that ungrounded R&D funding allocations and perverse incentives will stay in place for many years. The will and consensus to revise the scheme are emerging, but slowly. The need for speedy implementation and avoidance of mistakes calls for adoption and adjustment of successful approaches from abroad. I show that the key principles of the system used in the United Kingdom can be adopted with some adjustments in the Czech environment.

EVALUATION AND FUNDING OF R&D IN THE CZECH REPUBLIC *searching for the right incentives*

Daniel Münich
(MŠMT and CERGE-EI and OK SHV)

České fórum pro výzkum, vývoj a inovace 2009
Pardubice 10. 12. 2009

Presentation outline

- Institutional and project based funding of R&D
 - Evaluation \times funding \rightarrow incentives and allocations
-
- I. Previous R&D evaluation and funding scheme
 - II. New reformed scheme: undesirable incentives
 - III. Further revisions and extensions needed

Grounds for excellence in R&D



Two necessary conditions to achieve desirable R&D outcomes:
appropriate allocation of funds & right incentives

Previous institutional R&D evaluation & funding

- ~ 2004-2005 Research Intentions/Plans
- **Forward looking exercise**
 - verbal promises
 - like general project funding
 - administrative burden
- **Interim evaluation failed**
 - by individual providers
 - absent coherent evaluation framework (world standards)
- **High incidence of claimed "excellent" results**
- **Disappointments initiated new reform effort**

Last reform attempt (Evaluation Methodology)

- Fundamental overhaul of R&D evaluation and institutional funding
- Switch from forward- to backward-looking approach (+)
- Effort to eliminate the role of experts' evaluations (+/-)
- Deficiencies (-):
 - allocations of funds on unclear grounds and objectives
 - perverse incentives (various and strong)

Current R&D evaluation scheme

- Described already?

Characteristics of good evaluation scheme

1. Reflection of field specific characteristics

- Methodology does not reflect this (→ points from various fields are not comparable units)
- different research costs
- different citation and publication practices

Field specific specific dissemination of findings

Table 7.3. ISI coverage indicators per discipline

Discipline	1a Importance of journals (%)	1b ISI coverage of journal literature (%)	1a*1b Overall ISI coverage (%)
Molecular biology & biochemistry	96	97	92
Biological sciences related to humans	95	95	90
Chemistry	90	93	84
Clinical medicine	93	90	84
Physics & astronomy	89	94	83
* Total ISI *	84	90	75
Applied physics & chemistry	83	89	73
Biological sciences - animals and plants	81	84	69
Psychology & psychiatry	75	88	66
Geosciences	77	81	62
Other social sciences - medicine & health	75	80	60
Mathematics	71	74	53
Economics	59	80	47
Engineering	66	77	46
Other social sciences	41	72	29
Humanities & arts	34	50	17

Disciplines are ranked by descending overall ISI coverage (last column).

Definition of the indicators:

Importance of journals as communication media: % References to documents published in journals, relative to total references.

ISI coverage of the journal literature: % References to documents published in ISI source journals, relative to total references to journals.

Field specific publication intensity

TABLE 3
Journal Publication Rates and Related Information for Eight Disciplines

Discipline	Annual journal publications per faculty (USA)	Acceptance rates in top five journals (%)	Number of authors per article	Equivalent pages per article	Equivalent pages per author per year	Average size of NSF grants	Number of subscribers per top five journals
Economics	0.54 ^a	9	1.6	8.8	2.97	98,885	8,868
Finance	0.26 ^b	11	1.9	11.4	1.56	147,443	11,700
Geology	1.34 ^c	31	2.6	13.3	7.87	90,052	12,108
Psychology	1.88 ^d	22	2.2	10.8	8.67	86,321	3,028
Physics	2.10 ^e	69	4.7	6.6	2.95	508,710	N/A
Physiology	2.11 ^f	72	5.0	8.0	3.38	344,983	1,063
Chemistry	2.86 ^g	55	4.3	7.2	4.79	175,802	5,977
Geophysics	3.80 ^h	69	2.5	8.7	12.70	108,197	9,175

Notes and Sources:

^aOur survey of the top 5 journals in each field except geophysics, where only 3 journals provided information. The top five economics journals we selected were the *American Economic Review*, *Journal of Political Economy*, *Southern Economic Journal*, *Economic Inquiry*, and *Econometrica*. To select the top 5 journals in the other disciplines, we asked department chairs to rank the "best" journals in their respective disciplines. In finance, the journals were *Journal of Finance*, *Journal of Financial Economics*, *Journal of Financial and Quantitative Analysis*, *Review of Financial Studies*, and *Journal of Banking and Finance*. The psychology journals were *Psychometrika*, *Journal of Experimental Psychology*, *Psychological Bulletin*, *Psychological Review*, and *Journal of Applied Psychology*. The physics journals were *Physical Review Letters*, and *The Physical Review* (A, B, C, and D). The geology journals were *Bulletin of the Geological Society of America*, *Geology*, *Bulletin of the American Association of Petroleum Geologists*, *Journal of Geophysical Research*, and *The Journal of Geology*. The physiology journals were *Journal of Geophysical Research* (JGR-Biol Solid Earth), *Geophysica*, *Physiological Reviews*, *Physiological Reports*, and *Physiological Reports*. The chemistry journals were *Journal of the American Chemical Society*, *Journal of Biological Chemistry*, *Biochemistry*, *Journal of Medicinal Chemistry*, and *Journal of Neuroscience*.

^bBased on 1993-95 data for the top 5 journals in each discipline, except for economics, where data on the top 24 journals were used.

^cEquivalent page per article was calculated as average number of words per article divided by average number of words per *American Economic Review* page. Top 5 "other" discipline journals and top 24 economics journals were included in the sample. Estimates were adjusted for number of co-authors (see Table 1).

^dEstimated as annual journal publications per faculty × equivalent pages per article ÷ number of authors per article.

^eTschering (1989).

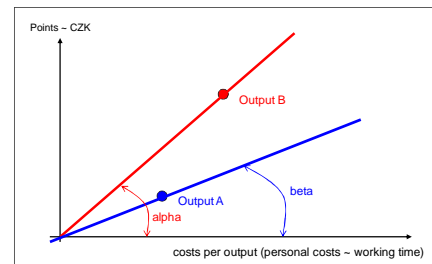
^fGreen and Bertsch (1992), adjusted upward for co-authoring in Table 1 to yield row average.

^gReiss and Stephens (1993).

^hEstimated as 3.5 times economics rate of 0.54 articles per author, based on authors' calculations, Staff (1993), and Table 1.

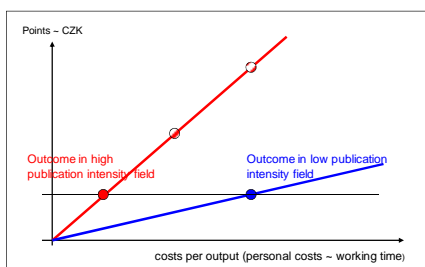
ⁱSource—NSF Grants Database of all NSF grants from 1989 to present. Average for each discipline computed from a random sample of 30 grants from each discipline.

Simple cost – benefit framework



→ Incentives to realize outputs with higher points/costs ratio → output B

Different field specific publication intensity



→ Methodology: Incentives to do research in high publication intensity fields

Characteristics of good evaluation scheme

2. Use of int. standards and criteria in R&D fields

- Methodology does not do so

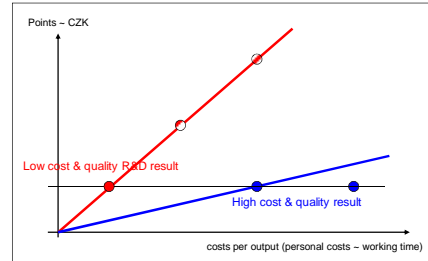
3. Evaluation of all recipients in given field

- providers cannot do it by definition
- Methodology does not do it (not reflecting recipients costs)

Characteristics of good evaluation scheme

4. Greater evaluation attention to high quality outcomes
 - hands on outputs is necessary
 - low quality results are burden in Methodology
5. Distinguishing between quality and quality of outputs
 - Methodology simply counts most output types

Equal valuation of outcomes irrespective of quality



→ Methodology: Incentives to do realize low-cost and low-quality outputs

Characteristics of good evaluation scheme

Evaluation criteria should be set ex-ante

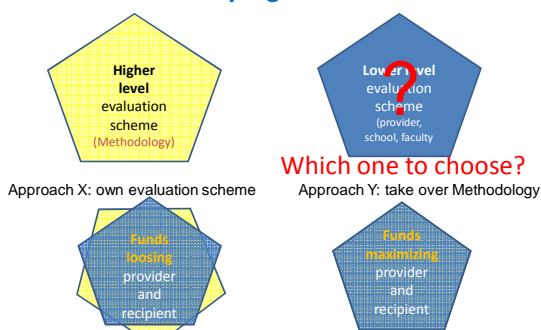


- Methodology sets criteria ex-post (research already done)
- Should Methodology stay fixed, it would fix wrong incentives

Characteristics of good funding scheme

1. Transparent link between evaluation outcomes and funding allocation
 - Allocations to providers
 - Law on R&D vaguely states 3 grounds
 - no explicit rule →
 - ad-hoc decisions, unclear expectations and difficult planning : weak incentives
 - Allocations to recipients (by providers)
 - rule of three sums (trojčlenka, kafemlejnek)
 - or own rules if own evaluation in place (incentives →)

Incentives formed by higher-level evaluation



Different allocations require different principles

Allocation between	Principles & criteria
Basic, Applied research and Experimental Development	<ul style="list-style-type: none"> • country needs, goals and preferences
R&D fields (~70 in the UK)	<ul style="list-style-type: none"> • capacity • comparative advantage • country goals
Recipients within fields of R&D	<ul style="list-style-type: none"> • quality of R&D outputs (within field!) • capacity

Methodology: tried to do all allocations simply by one principle (of 3 sums)



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ
PROJEKT "A REFORMA DO ROZVOJE VZDĚLÁVÁNÍ
A STATISTICKÝ SOUPROUČENÍ ČESKÉ REPUBLIKY"

Revisions and extensions for right incentives

1. Use different evaluation principles for different types of allocations
2. Field specific evaluations
 1. Evaluate all recipients in a field
 2. Use world criteria and benchmarking
 3. Set evaluation criteria ex-ante
 4. Proper field mix of peer reviews, bibliometrics, etc.
 5. Focus on higher quality outputs
 6. Need for one evaluation institution
3. Make explicit link between evaluation and funding



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ
PROJEKT "A REFORMA DO ROZVOJE VZDĚLÁVÁNÍ
A STATISTICKÝ SOUPROUČENÍ ČESKÉ REPUBLIKY"

Thank You



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

PROJEKT JE SPOLUFINANCOVÁN EVROPSKÝM SOCIÁLNÍM FONDEM
A STÁTNÍM ROZPOČTEM ČESKÉ REPUBLIKY

České fórum pro výzkum, vývoj a inovace 2009

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