

# Science - Evaluation and Financing

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INVESTMENTS IN EDUCATION DEVELOPMENT

# Part I

## Journal evaluation

- defined for *journals*
- the ratio of the number of citations to the previous 2 years of the journal divided by the number of articles in those years
- essentially the average number of recent citations per article
- only for journals indexed in *Journal Citation Reports*
- accessed from the *Web of Science*

## The formula

- 1  $A$  = total cites in 2012
- 2  $B$  = 2012 cites to articles published in 2010-11 ( $B \subseteq A$ )
- 3  $C$  = number of articles published in 2010-11
- 4  $D = B/C = 2012$  *impact factor*

- computed by *private company* (Thomson Reuters)
- items not in JCR do not count
- strongly influenced by editorial policies

*European Association of Science Editors (EASE)* (November 2007)

*... journal impact factors are used only – and cautiously – for measuring and comparing the influence of entire journals, but not for the assessment of single papers, and certainly not for the assessment of researchers or research programmes*

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## *International Council for Science (ICSU)* (July 2008)

Suggests considering a limit number of publications per year to be taken into consideration for each scientist, or even penalising scientists for an excessive number of publications per year.(e.g. more than 20).

## *Deutsche Forschungsgemeinschaft* (February 2010)

Guidelines to evaluate only articles and no bibliometric information on candidates to be evaluated in all decisions concerning “...performance-based funding allocations, postdoctoral qualifications, appointments, or reviewing funding proposals, [where] increasing importance has been given to numerical indicators such as the h-index and the impact factor”.

## *National Science Foundation* (US)

## *Research Assessment Exercise* (UK)

- *5-year impact factor*
- *journal immediacy index* – the number of citations that year to articles published the same year
- *journal citing half life* – the median age of the articles that were cited by the articles published in the journal that year
- *journal cited half life* – the median age of the articles in the journal that were cited by other journals during the year

## Part II

# Institutional evaluation



## Main characteristic

- point-based system (bobříci, kafemlejnek)
- on organizational level
- faculties evaluated separately, however money awarded to university
- way of splitting money within the university is not defined

## Results for 2012

<http://www.vyzkum.cz/FrontClanek.aspx?idsekce=650812>

Tabulka č. 5

<http://www.vyzkum.cz/FrontClanek.aspx?idsekce=650022>

Metodika, page 33

$$Jimp = 10 + 295 \times Faktor$$

where

- $Faktor = (1 - N)/(1 + (N/0,057))$
- $N$  je normované pořadí časopisu,  $N = (P - 1)/(Pmax - 1)$
- $P$  = pořadí časopisu v daném oboru podle Journal Citation Report v řadě seřazené sestupně podle IF
- $Pmax$  = celkový počet časopisů v daném oboru dle Journal Citation Report
- Je používána hodnota IF platná v roce uplatnění výsledku, není používána hodnota IF-5.

- point value of different results keeps changing
- leads to short-term optimization - skewed results
- this needs to be corrected in the next term
- various constants, which are subject to change
- rules keep changing (e.g. software)
- *tends to be used to evaluate individuals and their research*

# UK: Research Assessment Exercise (RAE)

- approximately every 5 years
- to *evaluate the quality of research undertaken by British higher education institutions*
- grouped by subject (Computer Science, Chemistry, ...)
- evaluated by *subject specialist peer-review panel*
- assessment focuses on evaluating:
  - quality of research outputs (journal and conference papers)
  - research environment
  - indicators of esteem
- for RAE 2008, each full-time staff member could submit at most four publications from 2001-2007
- full-time researchers not included

# UK: Research Assessment Exercise (RAE) – results

## The scale

4*	Quality that is world-leading in terms of originality, significance and rigour
3*	Quality that is internationally excellent in terms of originality, significance and rigour but which nonetheless falls short of the highest standards of excellence
2*	Quality that is recognized internationally in terms of originality, significance and rigour
1*	Quality that is recognized nationally in terms of originality, significance and rigour
Unclassified	Quality that falls below the standard of nationally recognized work. Or work which does not meet the published definition of research for the purposes of this assessment.

## Results

University	Average	% 4*	% 3* plus	staff 2008	staff 2001	% staff 2001	subjects
Cambridge	2.975	32.0	71.2	2040.39	1826.1	96.49%	48
Oxford	2.959	31.8	70.3	2245.83	2023.83	94.89%	48
LSE	2.957	34.9	68.4	490.36	431.57	97.19%	14

## Part III

# Personal evaluation

- named after *Jorge E. Hirsch* (physicist, UCSD)
- for an *individual* scientist
- measures *productivity* and *impact* of the published work

## The formula

- $N_p$  – the number of papers published by a scientist
- $h$  - the number of papers that have at least  $h$  citations each
- $N_p - h$  – the number of papers with less than  $h$  citations each



- useful only for comparing in the same field
- grows with *academic age*
- demonstrated to have high predictive value for National Academy membership or the Nobel Prize

**Original Hirsch's suggestion:** (for physics!)

12 advancement to tenure (associate professor)

18 full professor

15-20 membership in the US National Academy of Sciences

## Where to take the data from?

- Web of Science (WoS)/Web of Knowledge
- Scopus
- Google Scholar
- DBLP

## Problems

- completely different numbers
- errors in data
- spelling of Czech/Slovak names
- multiple people with the same name

# Part IV

## Funding bodies

## ČR - primary sources

- Grantová agentura České republiky (GAČR)  
*basic research*
- Technologická agentura České republiky (TAČR)  
*applied research*
- Ministerstvo školství, mládeže a tělovýchovy (MŠMT)

## EU

- EU Framework Programme for Research and Technological Development
- FP7: 2007–2013, FP8/Horizon: 2014–2020
- European Research Council (ERC) grants (part of FP7)
  - Starting grants (2-7 years after PhD)
  - Advanced grants

## Project types

- Standard (2-3 years)
- Postdoc (2-3 years, within 4 years of obtaining Ph.D.)
- International/bilateral (2-3 years, Germany, Korea, Taiwan)
- Centres of Excellence (7 years)

## Evaluation

- expert panel
- university/AV ČR researchers
- possibility of reducing the budget

Příjemci: výzkumné organizace a *podniky*

## Programy

- centra kompetence
- Program ALFA  
Aplikovaný výzkum a experimentální vývoj. Oblasti:
  - 1 Progresivní technologie, materiály a systémy
  - 2 Energetické zdroje a ochrana a tvorba životního prostředí
  - 3 Udržitelný rozvoj dopravy
- Program BETA  
Výzkum, experimentální vývoj a inovace pro potřeby *státní správy*.
- Program OMEGA  
Aplikovaný výzkum a experimentální vývoj, jejichž výsledky mají vysoký potenciál pro uplatnění v řadě oblastí celospolečenského života obyvatel České republiky.

## Typy projektů

- Operační programy
  - prostředky ze strukturálních fondů EU
  - OP VK – Vzdělávání pro Konkurenceschopnost (2007-2013) (IDS)
  - OP VaVpl – Věda a Výzkum pro Inovace (2007-2013) (CERIT)
- Fond rozvoje vysokých škol (FRVŠ)
  - A Inovace a rozvoj laboratoří, ateliérů a pracovišť pro praktickou výuku a informačních technologií ve vysokoškolském vzdělávání
  - B Podpora pedagogické práce akademických pracovníků do 35 let
  - G Tvůrčí práce studentů směřující k inovaci vzdělávací činnosti
- KONTAKT - mezinárodní spolupráce ve výzkumu a vývoji
- EUREKA - evropská spolupráce v aplikovaném výzkumu
- ...