Excellence attracts excellence – and what about the Rest? Reflections on excellence and inclusion

Helga Nowotny

EMBO-EMBL Anniversary Science and Policy Meeting

Heidelberg, 2-3 July 2014

I. How do we know what excellence is?

II. The Matthew effect of excellence

III. Excellence – and what about the Rest?

How do we know what excellence is?

- No absolute measurement of excellence, only by comparison
- Science is a hi performance system
- Reliance on competition to minimize risk of failure >>> peer-review
- Balance of collaboration and competition, but rewards go mostly to individuals (signaling effect)

Competition in science through peer-review

- Fair, transparent rules, open for all
- Stratified access: in which league do you play?
- Norm of universalism in science
- Scientific elite believes that best will win
- Standard setting through elite and peer-review

Peer review under stress

19 Oct 2013

17 Oct 2013

Internal pressure

- System is overloaded: evaluation everywhere; ex-ante, ex-post
- John Ioannidis “Why Most Published Research Findings Are False.” PLoS Medicine 30th August 2005
- Slow science movement (I. Stenghers, 2011, Another science is possible)

External pressure

- Scientific excellence welcome, but not sufficient; additional criteria include:
- NSF: broader impacts criterion
- REA; REF: impact statement
- Translational research
- Relevance for many different stakeholders

Possible solutions/outcome

- Metrics; further automatization
- Alt-metrics
- Individual PI without conventional peer-review (Wellcome Trust)
- Radical shift: e.g. shared data analysis and validation; shared publication with multiple authors?
- Towards a culture of sharing? In line with peer-to-peer economy?

Scientific excellence only – the ERC experience

- 2007: radical policy shift fundamental research at EU level
- Independent Scientific Council sets scientific strategy (‚run by scientists for scientists')
- Crucial: set up evaluation mechanisms and appoint panel members (‚excellence to recognize excellence')
- Background factors: competitiveness of European universities; fundamental research indispensable for radical innovation

We think we know what excellence is, BUT

- Does present system allow for necessary diversity also in scientific approaches?
- Does it encourage risk-taking when system (KPIs) is designed to minimize risk?
- Are there sufficient generalist reviewers with broad overview in system?
- Where is the (rightful) place of excellent science in larger systems? H2020?

I. How do we know what excellence is?

II. The Matthew effect of excellence

III. Excellence – and what about the Rest?

Excellence attracts excellence: the concentration effect

- The 80/20 rule (Pareto principle) holds also for scientific publications
- Skewed distribution of resources and rewards in US universities continues
- 50% of ERC grants go to 50 institutions; differential impact on 550 others
- Strong path-dependency: past excellence is best predictor for future excellence
- Unequal preconditions: institutional, national, e.g. austerity policies in Southern Europe

The Matthew effect (Robert K. Merton, 1968)

- Eminent scientists get disproportionately great credit for their contribution
- The 41st chair phenomenon; stratified distribution of chances, differential access to resources and equipment
- Nobel laureates see it as unintended double injustice, basic inequity that affects careers of individual scientists
- But has focalizing function: heightens visibility and faster distribution

The Matthew effect (Robert K. Merton, 1988)

- Competition among successful institutions attracts additional resources
- Accumulation of advantages and disadvantages: self-augmenting processes
- Institutionalized bias in favour of precocity, affects life course; PI predictor
- Countervailing processes: no infinite growth
- How much density of talent can individual department or research area support?

Reinforcement through KPIs and rankings

- Ranking methodology flawed, but allows for selective perception and uptake
- Performativity and *eigendynamik* of indicators
- Gaming at individual level
- Beyond Bibliometrics: Harnessing Multidimensional Indicators of Scholarly Impact
  Edited by Blaise Cronin and Cassidy R. Sugimoto (2014)

Only time will tell

- Geo-political shifts in past and present
- Globalization of science and innovation base
- Excellence reinforces and is reinforced by interaction with innovation eco-system
- US funding for fundamental research: great continuity in broad alignment with industrial and military interests (D. Sarewitz, 2013)

I. How do we know what excellence is?

II. The Matthew effect of excellence

III. Excellence – and what about the Rest?

Robustness of system vs. vulnerability of the individual

- Career prospects of younger researchers
- Increase of post-doc´s and other forms of non-tenure track employment
- How many Ph.D.s are needed, when and where?
- Leaking pipeline and women leaving science
- Other imbalances

Increasing competition at global level

- Global expansion of science base
- GRC: setting global standards, putting scientific excellence on the map
- Heightened global mobility; hunting for talent
- Science is international; research and innovation policies remain tied to national interests

The scientific elite and the Rest

Two prevailing attitudes, not incompatible

- Training ground for talent, best will make it, the larger the pool the better
- Nurturing and caring for talent: mentoring, outreach

- Promises and reality: hope and disappointment

The case for inclusion: whose responsibility?

- Women in science: looking for unconscious bias (funding agencies); cascade models and other measures (universities and PROs)
- Unconventional career paths
- Room for mavericks, maladjusted and other talented individuals (‚Feynman is becoming a real pain')
- H2020: stairways to excellence; twinning programmes, structural funds

Why we need scientific excellence

- Despite inflation of ‚excellence': fundamental research remains indispensable for innovation-driven societies
- Excellence is multi-dimensional; highest standards
- Excellence thrives at the cusp of uncertainty
- Coping with unexpected problems needs diversity of approaches
- Responsibility of the scientific elite: upholding excellence AND openness for inclusion