

Assessing University-based Research: Advocating Best Practice for Social and Public Accountability

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Grand challenges require “sustainable solutions [to problems] in areas such as global warming, tightening supplies of energy, water and food, ageing societies, public health, pandemics and security” (Lund Declaration,2009).

“Researchers who benefit from opportunities in cities should ask what they can give back. More than half of the world's people live in cities, and that number is growing rapidly. So if scientists want to help the majority of the population, they need to turn their attention to urban areas” (*Nature*, 2010).

“‘Valorisation’ is the process of *disseminating and exploiting* project outcomes to meet user needs, with the ultimate aim of integrating and using them...at local, regional, national and European level.” (EU Leonardo da Vinci programme)

Themes

- Changes in the Role of Higher Education
- Changes in our Understanding of Knowledge Production
- Assessing the Contribution of Higher Education and University-based Research
- Challenges for Science and Policy Implications

1. Changes in the Role of Higher Education



Trends

- Higher education landscape rapidly transformed world-wide over last decades;
- Participation moving beyond traditional definitions of “mass” and “universal” systems to being *high participation societies* in which vast majority of population are educated to advanced levels;
- Higher education increasingly internationalised;
 - HE operates an increasingly more competitive and hierarchical environment in which competition for positions within elite institutions is escalating;
 - Success tied closely to that of nation state and vice versa – raising competitive stakes, and placing HE at the fulcrum of national (economic) policy;
- Globalisation’s biggest effect has been to transform HE from a local issue into one of geo-political significance.

Drivers of Change

- Transition to knowledge economies,
- Demographic pressures and global battle for talent,
- Student choice and “new traditional student”,
- Measuring quality, performance and value.

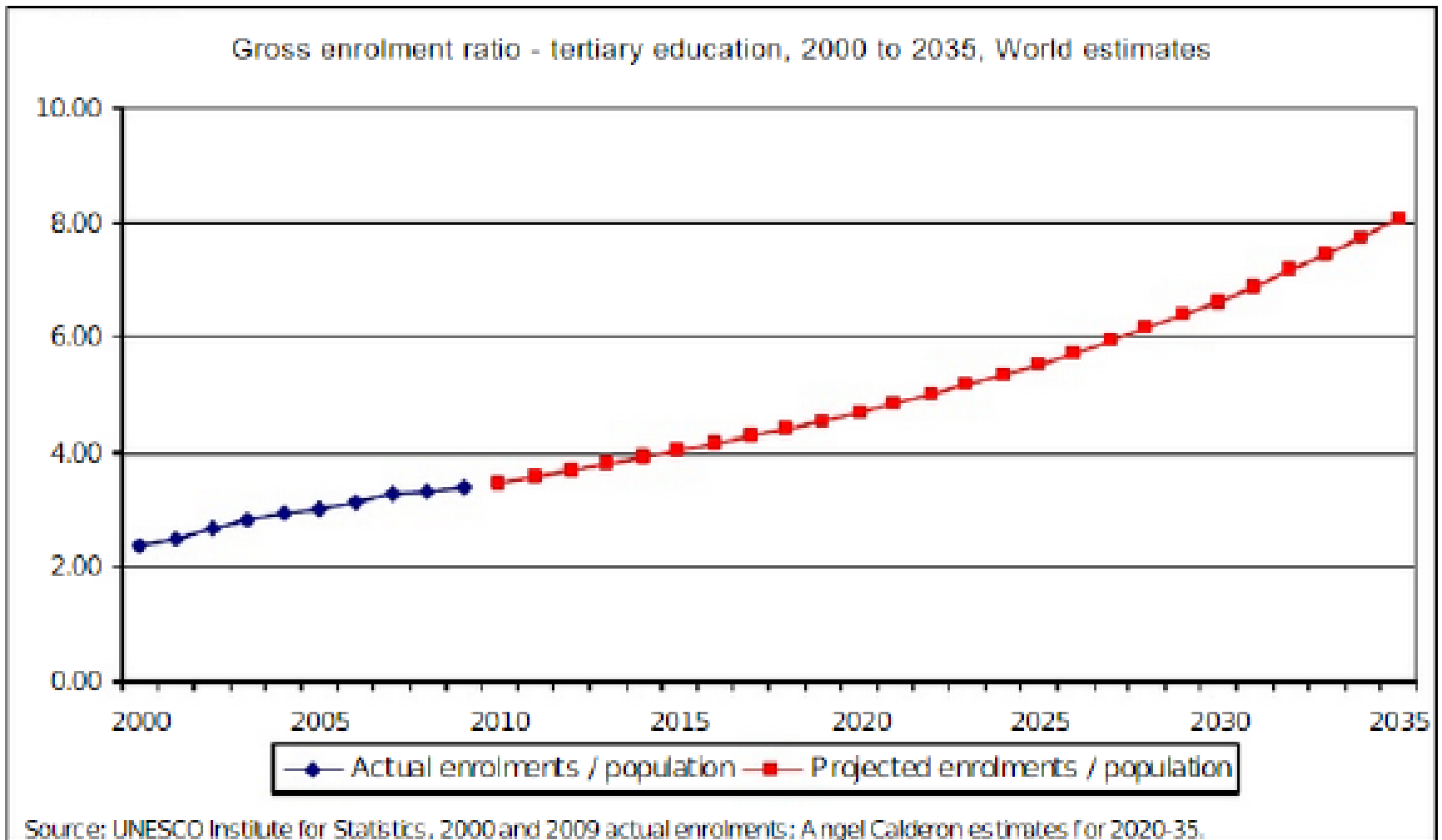
Changing Idea of the University

- **Classical University:** mission and role of higher education and academic research distinct from commercial activity;
- **Land Grant University:** teaching agriculture, science, and engineering as a response to industrial revolution, and changing social class rather;
- **American Graduate School:** mission to train the next generation of scholar-researchers;
- **Polytechnics and New Generation Universities:** catering for wider range of socio-economic groups, learner groups and educational requirements;
- **New Providers and HE Models:** public and for-profit, distance and open-learning/MOOCs; franchising, over-seas campuses – with joint and dual awards;
- **Multi-polar rather than bi-polar world:** global competitiveness accelerating changing the world order; alliances/global networks.

New Model of HEI

- Over last century, role of universities changing dramatically:
 - Transformation from institutions attended by a small elite to one where attendance is more or less obligatory;
 - Traditional boundaries between basic and applied knowledge have blurred, labour markets matured and professional/academic disciplines moved up the value chain;
- Today, this process is accelerating:
 - Increasing focus on institutional mission – what institutions do rather than what they are;
 - Research intensity becoming less significant than excellence within a field of specialisation.
- Idea of the university as single norm or a stand-alone “ivory tower” has faded.

Gross tertiary enrolment ratio, 2000-2035, world estimates



Higher Education: Part of the Eco-system

Wider understanding of knowledge creation and innovation has influenced our understanding of how higher education contributes to society and the economy:

- Emblem of nation-building, the engine of the economy and source of human capital, and innovation and entrepreneurship;
- Medical schools, museums, theatres, galleries, sports facilities and cafes – all of which play a significant role in their community, city and nation;
- Meets needs of demographically, ethnically and culturally diverse populations, and responds to complex and challenging political-economic environments;
- Actively engages with a diverse range of stakeholders, and acts as magnet for mobile talent and investment, underpinning the global competitiveness of nations and regions.

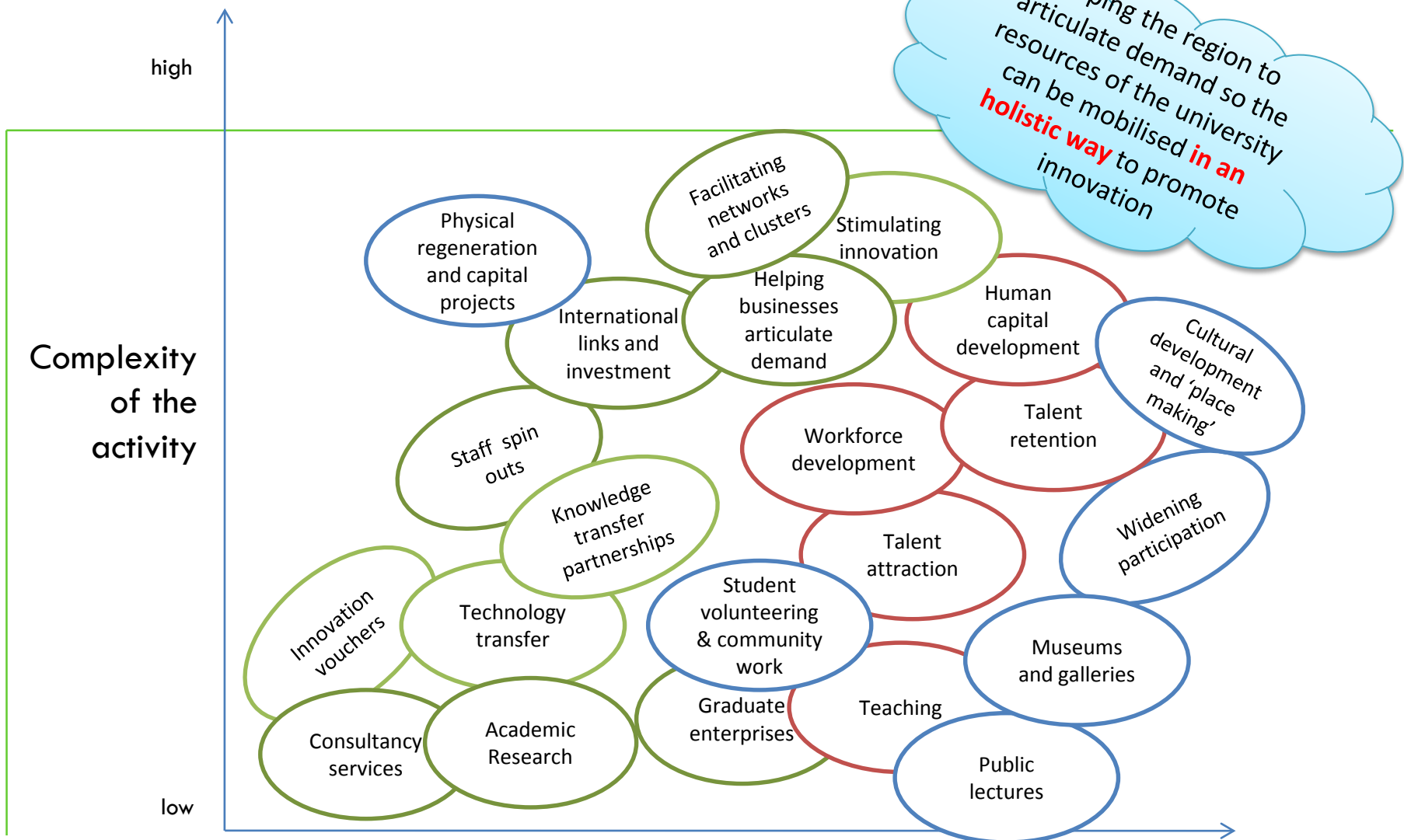
Global Regions and Higher Education

- Globalization demands regions are dynamic in their approach to social and economic development to enhance their comparative advantage;
- Sustainable prosperity is based in knowledge and innovation-intensive regions, which requires greater diversity of educational and research opportunities and perspectives – and people to work in jobs we don't yet know about (Porter, 2002; IHEP, 2010);
 - “Regions of knowledge” strengthen European regions via “research-driven clusters”, associating universities, research centres, enterprises and regional authorities (EU, 2011);
 - “Specialized clusters of higher education and research institutes that interact with creative enterprise, exchanging ideas and personnel” (OECD, 2006);
 - “Systemness”: coordination by a collective of multiple institutions (SUNY, 2012)
- Maximising capacity beyond individual capability.

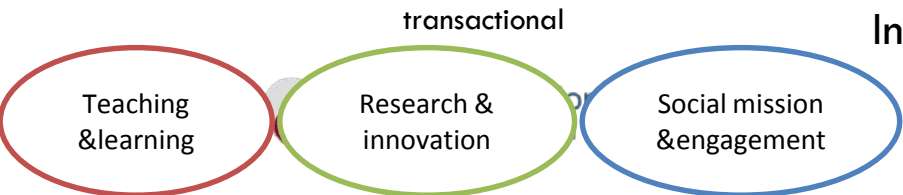
Emerging Civil Society Agenda

- *Carnegie Foundation for Advancement of Teaching: Community Engagement* (2006, 2008) – collaboration between HEIs and larger community for the "mutually beneficial exchange of knowledge and resources in a context of partnership and reciprocity"
- *Calhoun* (2006) refers to the "four senses of public" in the context of the contribution, obligations and responsibilities of higher education to civil society and public knowledge;
- *Goddard* defines the Civic University (2009) as one which engages as a whole not piecemeal with its surroundings, in such a way that location forms part of its identity.

MECHANISMS FOR UNIVERSITIES TO PARTICIPATE IN THE INNOVATION/SMART SPECIALISATION “PROCESS”



Helping the region to articulate demand so the resources of the university can be mobilised **in an holistic way** to promote innovation



Intervention type

Making an Impact

- “Civic University” is not only characterised by what it does, but also how it does things.
 - Focus on the “how” ensures that activities are not just determined by individuals or small groups, but take place within an *holistic framework* and an *enabling environment* that encourages and promotes *active institutional citizenship*.
- Sources of support generally fall into four categories:
 - Instrumental in providing or enhancing local human capital at either the undergraduate, master’s, doctoral, mid-career, or executive level.
 - Increased capacity for problem solving. This can include everything from contract research, faculty consulting, and technology licensing to setting up incubators and providing specialized equipment or instruments.
 - Providing public space and hosting meetings and forums that can bring investors, companies, and academics together.
 - Source of codified knowledge, providing comprehensive references on technical standards, patents, and other criteria.

2. Changes in our Understanding of Knowledge Production



Changes in Knowledge Production

- Traditionally, knowledge production was divided simplistically and hierarchically between basic/fundamental research and applied research;
- Progression from simple to complex knowledge has led to:
 - Emergence of new disciplines, methodologies and ways of thinking;
 - Transformation in way knowledge is created, by whom/where and how used.
- Today, boundaries blurring, and knowledge production is increasingly conducted in the context of application, both within and outside universities:
 - Translation of findings into new/improved products, services and social-cultural practices is integral part of the research process – which is seen as a continuum;
 - Knowledge democratized in sense that more people are aware of the issues, involved in the process, and social actors in its application.

Evolution of Knowledge Production, 1

- *Research for Social and Economic Progress* (Vannevar Bush, *Science The Endless Frontier*, 1945), focused on fundamental scientific research, excluding the humanities and social sciences.
- *Basic, Applied and Experimental Production* (OECD, Frascati Manual, 1963, 1st ed.; 2002, 6th ed., p28): “comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications”.
- *Engaged Scholarship* (Ernest Lynton, 1987; Ernest Boyer, 1990, 1996): “Knowledge generation is a process of co-creation, breaking down the distinctions between knowledge producers and knowledge consumers”, defining the research problem, choosing theoretical and methodological approaches, conducting the research, developing the final products, and participating in peer evaluation.

Evolution of Knowledge Production, 2

- *New Production of Knowledge* (Michael Gibbons et al., 1994): Mode 2 is “socially robust” and interdisciplinary knowledge, created within the context of being useful for the resolution of specific problems, in contrast to traditional knowledge production (Mode 1) which is disciplinary or “curiosity-oriented”, usually conducted by individuals in secluded/semi-secluded environments.
- *Societal Grand Challenges* (Graham, US Office of Science and Technology, 1987; National Academy of Sciences, 2004; Lund Declaration, 2009): problems of economic and social importance which are demonstrably hard to solve, thereby requiring improvements of several orders of magnitude, collaborative solutions and interlocking knowledge and innovation systems.

(co)Production of Knowledge

Knowledge is created increasingly through/with bi-lateral, inter-regional and global networks, with inter-locking innovation systems because complex problems require collaborative solutions.

- Research-informed teaching and teaching-informed research;
- Teaching which uses real-life problems and issues;
- Research agenda derived/developed in tandem with end-users;
- Social, business and technological innovation;
- Knowledge exchange rather than knowledge transfer;
- "Industrial partners" which includes public and NGO sectors.

Embedding Engagement & Innovation

- Universities can make a multifaceted contribution to the economy, as a source of knowledge and skilled employees, and as the centre for regional economic clusters (NESTA, 2009);
- Leverage attributes of mission and place to differentiate (J Goddard, 2010)
 - City and region as a resource;
 - Balance public (social) and private (the university) good;
 - Identify major societal challenges that can focus academic community.
- Sustained, embedded and reciprocal engagement: Learning beyond the campus walls, discovery which is useful beyond the academic community and service that directly benefits the public.

The Evolving Civic Society Agenda

	ELITE	MASS	UNIVERSAL
ATTITUDES TO ACCESS	Privilege of birth or talent or both	Right for those from middle and upper classes	Obligation for majority of society, and for certain qualifications and employment
FUNCTIONS OF HIGHER EDUCATION	Shaping mind and character of ruling class; preparation for elite roles	Transmission of skills; preparation for broader range of elite technical and professional roles	Adaptation of "whole population" for rapid social, labour market and technological change
INSTITUTIONAL CHARACTERISTICS	Homogeneous with high and common standards. Clear and impermeable boundaries between campus and society.	Comprehensive with more diverse standards. Boundaries between campus and society fuzzy and permeable.	Greater institutional diversity with no common model; large aggregates of people enrolled but not always on campus. Boundaries between campus and society weak or non-existent.
CURRICULUM	Highly structured in terms of academic conceptions of knowledge with strong focus on classical subjects such as: literature, philosophy, language (Greek and Latin), and theology	Modular, flexible and semi-structured sequence of courses in medicine, science, engineering, nursing/public health, social work, media, etc. geared towards the professions	Boundaries and sequences break-down with more flexible educational programming and services. Distinctions between learning and life break down, with changes from traditional time-served to competency-based education, and adoption of just-in-time concepts.
RESEARCH AND KNOWLEDGE TRANSFER	<p>Pursuit of understanding of fundamental principles focused around "pure disciplines" and arising from curiosity, with no commercial benefits. Conducted by limited number of research actors in secluded/semi-secluded environment.</p> <p>Achieves accountability via peer-review process. Mode 1.</p>	<p>Pursuit of understanding of principles in order to solve practical problems of the modern world, rather than to acquire knowledge for knowledge's sake. Broad range of research actors across breadth of disciplines/fields of inquiry.</p> <p>Achieves accountability via mix of peer review and social accountability. Mode 2.</p>	<p>Research focused on solving complex problems via bi-lateral, inter-regional and global networks, not bound by borders or discipline. Knowledge production democratised by extending/involving research actors (e.g. civil society) "beyond the academy".</p> <p>Achieves accountability via social and public accountability. Mode 3.</p>

3. Assessing the Contribution of Higher Education and University-based Research



Changing practices

Once research is seen to have value and impact beyond the academy, there are implications for what is funded, research organisations/management, and how it measured and by who;

- Balance between
 - Human capital development vs. economic/industrial strategy;
 - National priorities vs. Researcher curiosity;
 - Selectivity (funding excellence wherever it exists) vs. Concentration (targeted funding to strengthen capability/build scale);
 - New and emerging fields/HEIs vs. Existing strengths;

Challenges of Demonstrating Value

- Peer-review is backbone of academic culture, but it can also be a gate-keeper;
- Valuing the contribution of all disciplines – avoiding the narrowness of “techno-science” view of innovation:
 - Arts, humanities and social sciences find it difficult to explain/demonstrate value when compared with “scientific” discoveries – immediate impact is not always obvious.
- What is impact and how is it evaluated and over what timeline?
 - Results not easily codified into intellectual property or translated into new products and services;
 - Research creates value by causing “ripples” that are played out throughout society (Benneworth, 2012).
- Policymakers and HEIs need to revise how academic activity is valued and rewarded.

Democratizing knowledge

- Wider dissemination and adoption of research by society requires new tools:
 - Open source;
 - Digital repositories
 - Web-based tools, e.g. Google Scholar
- Democratizes knowledge production through greater public accessibility and transparency of scientific communication.
 - Peer-review can no longer be the sole or primary method by which research is assessed;
 - End-user or stakeholder esteem becomes a vital component ;
 - Broader range of indicators and methodologies required.

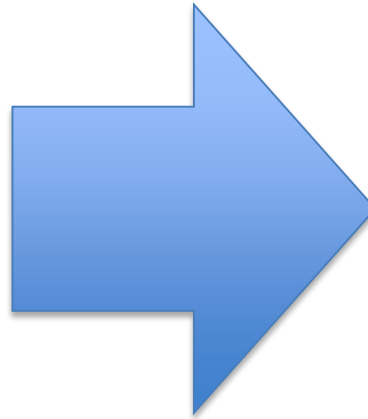
Social & Economic Impact

- **Economic Benefits**, e.g. improved productivity; adding to economic growth and wealth creation; enhancing the skills base; increased employment; as well as unquantifiable returns resulting from social/policy adjustments.
- **Social Benefits**, e.g. improving people's health and quality of life; stimulating new approaches to social issues; changes in community attitudes; influence upon developments or questions in society at large; informed public debate and improved policy-making;
- **Environmental Benefits**, e.g. improvements in environment and lifestyle; reduced waste and pollution; improved management of natural resources; reduced consumption of fossil fuels; and adaptation to climate change;
- **Cultural Benefits**, e.g. supporting greater understanding of where we have come from, and who and what we are as a nation and society; contributing to cultural preservation and enrichment; and bringing new ideas and new modes of experience to the nation.

Research Outputs/Impact

- Journal articles

- Book chapters
- Computer software and databases
- Conference publications
- Editing of major works
- Legal cases, maps
- Major art works
- Major works in production or exhibition and/or award-winning design
- Patents or plant breeding rights
- Policy documents or brief
- Research or technical reports
- Technical drawings, designs or working models
- Translations
- Visual recordings



- Peer Esteem

- Impact on Teaching
- Improved Productivity, Reduced Costs
- Improvements on environment and lifestyle
- Improving people's health and quality of life
- Increased employment
- Informed public debate
- New approaches to social issues
- New curriculum
- Patents, Licenses
- Policy change
- Social innovation
- Stakeholder esteem
- Stimulating creativity

Are We Measuring What's Meaningful?

Indicator	Metric	Pro	Con
Research Publications and Outputs	e.g. Total number of peer publications	Measures & Improves Activity	Basis not always clear
Quality and Scholarly Impact	e.g. Citations; High Impact Publications	Measures & Improves Quality	Which journals? Most effective in English-language
Human Capital	e.g. PhD completions; output/FTE or active researcher	Measures Timeliness of completion & productivity	Differences between disciplines; can manipulate "faculty" denominator
Investment	e.g. Income & donations; competitive funding	Predictor of performance	Difficult to get valid comparable data; favours capital-intensive sciences disciplines
Economic and Social Benefit	e.g. Commercialised IP & employability	Link between RDI	Time-lag and context: different disciplines/HEIs have different impacts and timelines
End-User Esteem	e.g. Appointments to high level organisations	Measures reputation	Time-lag and difficult to verify
Research Infrastructure	e.g. Library & research space	Measures capability	Difficult to get valid comparators

5. Conclusion: Implications for Policy and the Academy



Challenging Science

- Science has always operated in competitive environment, but global rankings have been a game changer;
 - Met a need for an international and comparative framework – popularized due to simplicity;
 - Emphasis on narrow, traditional “research” and “elites” – leading to perception that some knowledge is more important.
- Rankings have become *de facto* research assessment exercise, and indicator of global competitiveness with “world-science”;
 - Differing reactions and approaches as to whether developed or developing country;
 - Developments informing/influencing policy-making, academic behaviour, stakeholder opinions – and understanding of science.

Implications for Research

Both qualitative and quantitative methods have limitations.

- Quantitative bibliometrics:
 - Quantification as proxy for quality;
 - Reliance on data that is easily measured;
 - Past performance used as indicator of future performance;
- Qualitative peer review:
 - Traditional basis for academic evaluation but can easily become a “gate-keeper”;
- Influences decisions about what to work to undertake, and where to publish.
 - Importance of elite universities, research reputation, internationalisation, collaborative publications, etc.

Changes in Institutional Decisions and Academic Behaviour

- Over 50% HEIs (2014) had taken strategic, organizational, managerial or academic decisions to improve position in rankings:
 - Revising policy and resource allocation;
 - Prioritising research areas;
 - Changing recruitment and promotional criteria;
 - Creating, closing or merging departments or programmes; and/or merging with another HEI, research institute, etc.
 - Identifying preferential journals in which faculty should seek to be published;
 - Research “stars” rewarded while teaching often seen as a “punishment”.
- Heightened emphasis on research and outputs as performance indicators:
 - Influencing disciplinary practices, such as publishing in English-language and internationally ranked journals.

Source: Hazelkorn (2015) *Rankings and the Reshaping of Higher Education. The Battle for World-class Excellence*. Palgrave MacMillan.

Unintended Consequences

- Frequency of rankings/assessments encourages short-termism and easily/quickly publishable work;
 - Can distort research towards that which is more predictable;
 - Can undermine potential of new and younger teams and institutions;
 - New research fields/ideas which challenge orthodoxy find it difficult to be published;
- Encourage culture of “gaming”:
 - Manipulation of institutional data, e.g. faculty and student entry;
- Controversial ranking of journals, and elevated “power” of a few journals and HiCi/“world class” academics;
- Produces distortionary effect:
 - Global impact can undermine regionally/culturally relevant work;
 - Commercialisation can undermine other impacts and benefits;
 - Tendency to concentrate resources in few HEIs or prioritise research fields.

Because Academic Leadership Matters...

- Recognise the importance of use-inspired and socially-robust knowledge – which is socially and regionally engaged and globally competitive;
- Recognise the value and contribution of all disciplines and fields to innovation;
- Build collaborative knowledge clusters with other institutions and the wider community that occupy the distributed knowledge production system;
- Broaden definition of academic activity to embrace breadth of Knowledge Triangle, including recognition of research "beyond the academy";
- Align policy with assessment and recruitment practices, by developing appropriate incentive and reward systems to support and incentivize the production of socially robust research.

Because Policy Choices Matter...

- Create systems and structures that open higher education up to the region and include stakeholders equally in the research and knowledge production process;
- Actively encourage and support the formation of research and knowledge clusters as part of regional/spatial strategy;
- Recognise the value and contribution of all disciplines and fields to innovation;
- Review criteria for competitive research and assessment criteria.

Good practice

- *Combine indicator-based quantitative data with qualitative information.* Quantitative information tested/validated within the context and purpose of assessment, with appropriate reference to discipline/disciplinary practice.
- *Recognise important differences across research disciplines.* Peer-reviewed journal articles are primary publication channel, but complexity of knowledge has led to a diverse range of output formats and outlets.
- *Include assessment of impact and benefits because research does not exist in isolation.* This differs for different disciplines.
- *Integrate self-evaluation.* Useful way to include research community in assessing own contribution, but also as means of placing research process into context and related to institutional mission;
- *Ensure processes are appropriate and fit-for-purpose.* Minimum frequency of 4-5 years; Only use rankings as part of an overall evaluation process; Care should be taken about linking evaluation with resource allocation.

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Rankings and the Reshaping of Higher Education

The Battle for World-Class Excellence

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