HEA HIGHER EDUCATION AUTHORITY
AN tÚDARÁS um ARD-OIDEACHAS

3rd HEA Forward-Look Forum

International Trends in Research: What Does Ireland Need to Succeed?

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Discussion paper

Overview of developments in Ireland

Since the late 1950s, policy has focused on strengthening Ireland's role within the international economy, initially via capital-intensive and now knowledge-intensive enterprise. By definition, the "knowledge economy" is global; to be part of this world requires a national strategy drawing upon well-educated graduates and advanced research capacity and capability.

Considerable resources have been invested in the research capacity of Irish higher education over the last decades. The HEA's *Programme for Research in Third Level Institutions* (PRTLI), 1998–2015, along with the funding schemes of the two research councils—the Irish Research Council for the Humanities and Social Sciences (IRCHSS) and the Irish Research Council for Science, Engineering and Technology (IRCSET), merged in 2012 to form the Irish Research Council (IRC)—have provided human and physical infrastructure at a level not previously seen. Science Foundation Ireland (SFI), established in 2000, initially targeted basic funding in ICT, biotechnology and energy, but more recently has extended its remit across STEM subjects, placing a strong emphasis on commercialisation and job creation.[1] The *Strategy for Science, Technology and Innovation 2006–2013* aimed to set Ireland on the map of global science. Together these actions have ensured that Ireland has the broad and deep base necessary to underpin a pipeline of human knowledge and world-class technological expertise.[2]

The *National Strategy for Higher Education to 2030* (2011) identified research as one of the core functions of higher education. High-quality research is vital for the teaching mission of higher education, and for the enhancement of the student-experience. It underpins the quality of the learning environment, informs the curriculum of

undergraduate students and provides the necessary learning platform for postgraduate students who "participate in the advancement of knowledge".

> Investment in research creates a range of benefits—improving the quality of education for all students, developing a cadre of highly trained Ph.D. students, producing new knowledge to address national and international problems, enhancing international competitiveness, and informing public opinion.[3]

With the onset of the economic crisis, a more targeted approach has been adopted to research-investment with greater attention being paid to the value and type of research being undertaken and to the benefit for the public. In the intervening years, policy has focused on the direction of public funds into areas with most potential for economic recovery; on the consolidation of resources for scale and excellence; on increased collaboration between the academy and industry, within the academy, and internationally; and on knowledge and technology transfer.

The *Research Prioritisation Exercise* marked the end of a strategy to build a broad base of expertise in favour of a "more top-down, targeted approach" (Forfás 2012, 8).[4] It identified 14 priority areas aligned with industrial sectors to account for *c*. 80% national competitive funding. Research relevance has become paramount, with the emphasis on science and technology, and impact and benefit for the Irish economy.

Today, despite national research funding being consistently below the EU average, Irish higher education institutions are ranked in the top 1% of research institutions in the world in 18 fields, spanning natural sciences, social sciences and the humanities, and as a country Ireland is currently ranked 18th across all fields, having risen from 36th in 2003.[5] *Nature Publishing Index* declared Ireland a "rising star" and one of five "countries to watch" based on its "rapidly increasing […] research output, […] speed of their climb in the NPI rankings, and for their regional scientific leadership".[6]

Ireland is now moving into an economic recovery phase, with growth forecasts for GNP of 4.9 and 5.2 percent for 2014 and 2015, respectively.[7] A new *Strategy for Science, Technology and Innovation, 2015–2020*, is currently being developed. Higher education has been identified as one of the key differentiators for Ireland's future.[8] These circumstances provide a valuable opportunity to review the role of research in higher education, and the role of higher education in the Irish innovation eco-system.

Changes in our understanding of knowledge production

Traditionally, research activity has been divided according to functions. The influence of the Humboldtian model of higher education increasingly linked teaching with research. In the post-WW2 era, the US federal government increased research funding as scientific and technological progress became connected to, and the basis for, national security and economic growth. Since 1963, the *OECD Frascati Manual*—version 7.0 is currently underway—(OECD, 2002) has provided the basic definition of research, distinguishing between basic, applied and experimental production.

This simple demarcation or hierarchy of disciplines was initially challenged by Boyer (1990), President of the Carnegie Foundation for the Advancement of Teaching, who promoted a broader view. In *Scholarship Reconsidered: Priorities of the Professoriate* (1990), he highlighted four different "scholarships": discovery, integration, application and teaching.[9] Later, Boyer (1996), drawing on Lynton (1987), argued that knowledge is no longer produced in isolation, but is increasingly the result of collaboration between academics and individuals outside higher education.

Gibbons et al. (1994) went further, arguing that as knowledge becomes more complex, it gives rise to new disciplines, methodologies and ways of thinking. Unlike traditional 'Mode 1' research, which is disciplinary or "curiosity-oriented", conducted by individuals in a secluded/semi-secluded environment and achieving accountability through peer-review, 'Mode 2' knowledge is "socially robust", collaborative and interdisciplinary. It is focused on useful application, with external partners including the wider community, and achieves accountability and quality control via social accountability and reflexivity.

These developments have encouraged the re-conceptualisation of research questions as "grand challenges", such as climate change, human health and healthy living, food and water security or sustainable cities. Owing to their scale and complexity, major social and economic problems transcend borders and disciplines, necessitating new methodological and organizational frameworks. They require collaborative solutions and interlocking innovation systems, underpinned by interdisciplinary research teams working inter-institutionally and globally. This is the basis of H2020, but other countries have also taken-up this approach.

Box 1 Evolution in our understanding of knowledge production[10]

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.

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): 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.

Conceptions of knowledge production have evolved over time, and in so doing changed the way in which research is conducted while also highlighting the important contribution that all disciplines make to solving societal challenges.[11] As the interconnectedness between higher education and society deepens, research is required to achieve social and public accountability. This challenges not only the role of HEIs and the organisation of university-based research but also concepts of academic excellence and peer review—and the way they are measured and promulgated. Thus, how excellence, impact and relevance are defined, and over what timeline, remains an issue of huge debate in Ireland and elsewhere.

The significance of research-based education

International research continually shows that the inter-relation between higher education and social and economic growth relies upon two key "connectors" which form a reinforcing eco-system:

- Human capital: Higher education produces skilled graduates who are capable of independent, autonomous operation. This raises the overall productive capacity because smart, creative individuals, with the proper skills, have a much higher impact on society and the economy; and
- Knowledge production: Higher education produces a cohort of skilled knowledge workers that can catalyse the adoption of research, carry out further research, and are proficient in the use of technology.

There has often been a tendency to over-rely on narrowly-defined technology-driven innovation. However its speed and direction are shaped by well-educated and trained people. Most critically, the "primary source of productivity growth is technological readiness and innovation, which requires a well-educated and skilled workforce."[12] For Ireland, a small open economy, the absorption of knowledge (or absorptive capacity) is an important factor for economic growth. Graduates, including both undergraduates and Ph.D. graduates, facilitate the absorption of world-knowledge and contribute to a shared pool of knowledge in society.[13]

Studies show that investment in research-based education is most likely to pay off. This is particularly true for regions/countries which specialize in innovation and are considered to be technological leaders (such as Ireland and other northern European countries). Innovation studies further show that investment in high-quality secondary, and research-based vocational and bachelor-level, education are extremely important factors in explaining the innovativeness of high-cost countries, such as Denmark.[14]

Educational quality is a significant contributor to economic innovation. This is a complex term but broadly refers to the quality of the learning environment, which includes the quality of teaching and teachers. The latter refers to academic credentials and the maintenance of high-level subject-specific expertise.[15] Other measures include how well HEIs or the system as a whole is managed, and the degree of equality of opportunity.

Countries, such as Denmark, Sweden, and Norway, which spend more GDP per capita on education than most other countries according to the OECD, also tend to the most willing to expand equality of opportunity. The U.K. could also be included in this list because of its extensive loan scheme and universal means-tested grant. This is important as there is often a suggestion that supporting equity is at the expense of excellence. In fact, evidence shows the opposite.[16]

Policy responses and choices

Higher education systems are under growing stress as the costs of mass higher education, and of competing in world-class scientific research, escalate. Some governments are able to invest heavily in higher education and research while others are more restrained. The gap appears to be widening,[17] opening up considerable policy discussion about the best balance between requirements for human-capital development through provision of mass/universal post-secondary education and the ability of a nation to compete in world-class science (in its broadest sense).

At the same time, higher education is being asked to respond more directly to societal needs. There is growing emphasis on the need for research which can solve the societal grand challenges of climate change, human health and healthy living, food and water security or sustainable cities; this is the basis of *Horizon 2020*.[18] Due to their scale and complexity, these major social and economic problems transcend borders and disciplines, and necessitate new ways of thinking, and methodological and organizational frameworks. This requires research undertaken by interdisciplinary teams, connecting different skills and knowledge across institutional and national boundaries as well as working with the community and the wider world.[19]

> If you want science to deliver for society, through commerce, government or philanthropy, you need to support a capacity to understand that society that is as deep as your capacity to understand the science. And your policy statements need to show that you believe in that necessity.[20]

This has implications beyond technology; it includes social and business innovation brought about by well-educated and trained staff.[21]

In response, many governments are reviewing the structure of their public higher education and research systems. Issues under consideration include, *inter alia*: institutional mission diversity and distinctiveness, balancing comprehensiveness and specialisation across fields of study, harmonising teaching and research, ensuring academic quality and career opportunities, graduate competences and researcher training, and the role of research assessment and links to resource allocation.

Some countries have adopted a strategy of “selection and concentration” to drive a clearer division between teaching and research at the institutional and individual academic level. Because of the costs involved and in order to encourage greater competition, these “excellence” initiatives have favoured a steeper institutional hierarchy through investment in a limited number of research-intensive universities.[22] Alliances and mergers between HEIs, and between HEIs’ independent research

institutes, have been encouraged in order to build critical mass, enhance capacity and capability, improve research training, and extend global reach. Sometimes these actions have been pursued by the institutions themselves (e.g. University of Manchester) while, in the case of France, mergers have formed a key component of the national strategy.[23] Other countries have emphasized the importance of mission distinctiveness, with diverse institutions specializing in research according to regional relevance and competences; this is the concept behind smart specialisation.[24]

Depending upon policy choices made, there are implications for the organisation and management of research at the national and institutional level, what kind of research is funded, how it is measured and by whom.

Assessing the contribution of higher education research

Quality and excellence are now key drivers impacting on and affecting higher education, nationally and globally. Today, there is increasing emphasis on research performance and productivity which is measurable, and supported by competitively earned funding. These developments are part of the overall push for greater accountability, but they are also related to a further shift from measuring inputs and outputs to evaluating outcomes, impact and benefit—and relevance—with implications for research practice, organisation, funding and management. Concerns have been raised about graduate aptitude and employability, as well as in relation to the integrity of the academic profession and academic contracts.

Discussion about the role of publicly funded research has highlighted tensions around the “public good” role of higher education, and the balance between meeting societal demands (usually seen as economic demands) and institutional autonomy and intellectual/academic values. Different terms are often used to categorise research according to: basic vs. applied, applied vs not-yet-applied, and curiosity-inspired vs. use-inspired research—sometimes suggesting a hierarchy.[25] Likewise different terms are used to describe the value, impact or relevance of research. The European Union has, through Horizon 2020, identified “Grand Challenges” as the means to bring together different disciplines to solve problems that cross societal and geographical boundaries, whereas the Research Prioritisation Exercise identifies industrial fields.

The civic or publicly engaged scholar is another way to describe the transformative process that has brought the end-user into the research process as an active participant helping shape the research agenda, and an assessor of its value, impact and benefit. Calhoun and Brewer, respectively, argue that “public support for universities is based on the effort to educate citizens in general, to share knowledge,

to distribute it as widely as possible in accord with publically articulated purposes",[26] and that "public social science has both a research and teaching agenda and involves a commitment to promote the public good through civic engagement."[27]

Many countries undertake regular assessments of research performance and productivity. For example, both the U.K. and Australia conduct national research assessment exercises on a regular, usually five-yearly basis, and in recent years, the assessment criteria have been expanded to include impact and benefit, e.g. the REF and the ERA.[28] In Nordic countries, evaluations are conducted regularly (at least once each decade) in specific fields, which can be rather narrow (e.g. political science, philosophy) or very broad (all of life science, all of engineering). The Dutch have developed an innovative model of assessing the arts, humanities and social science research which includes both research excellence and societal impact with a focus on assessment rather than resource allocation. University rankings have become also popular around the world.[29]

Depending upon the approach taken, e.g. alignment with resource allocation, qualitative and/or quantitative methodologies or terminology used (i.e. valorisation, impact or relevance), there can be implications for research practice and organisation—and the wider innovation eco-system. Over-concentration or focus on some disciplines or fields of science at the expense of others may produce incentives with unintended knock-on effects for the other disciplines and institutions or regions, and hence the intellectual base and attractiveness of society as a whole.

3rd HEA Forward-Look Forum

The 3rd HEA Forward-Look Forum aims to discuss the role of research in higher education, and for society and the economy. It will look at what is happening across Europe and elsewhere, why it is important and what Ireland needs to succeed. Finally, it will advance discussions from previous events by focusing attention on how we can better measure and demonstrate the full value and impact of higher education research for/on social, cultural and economic development.

Session 1: What is the role of research in higher education?

In Ireland as elsewhere, there is considerable discussion about the value and contribution of higher education, and especially the role of research as a driver of economic recovery and growth. This session will focus on the role that research plays in higher education institutions—in terms of underpinning teaching and learning, and strengthening human capital and talent. How important is this role in terms of undergraduate and/or postgraduate education? What are the implications of different

models—e.g. in higher education, schools or HE research centres/institutes or independent research organisations—for the organisation, management, outcomes and impact of research at the national and institutional level? Are there implications for the kind of research that is undertaken and/or is funded? What can be learned from developments elsewhere? What are the implications for Ireland's long-term success?

Session 2: Redefining research relevance: for whom and for what?

As public attention and the basis for resource-allocation shifts from inputs to outputs, there is increasing focus being given to the impact and benefit of publicly-funded research. This session will discuss the concept of research relevance, and how it is or should be defined. Given the different outcomes identified, such as pushing forward the frontiers of knowledge, exposing students to cutting-edge knowledge and developing their creativity, and given the differing time-spans within which direct impact is produced, how best can these outcomes be achieved and evaluated? How do we take account of different emphases, such as that of interdisciplinary research or research which addresses societal challenges, as well as of the appropriate time-lines within which research will have impact? What are the implications and unintended consequences of different choices for human capital development and the research pipeline, and for the sustainability and global competitiveness of the Irish economy?

Session 3: How can higher education best demonstrate impact and value?

Following on from previous discussions, this session will consider the growing pressure on higher education and researchers to showcase the results, impact and benefit of research in a way that is meaningful to society as well as to the global research community. What is the best way that this can be achieved? Should Ireland develop a formal process to assess performance, demonstrate impact and value, improve research quality, and productivity and/or allocate research funding? If so, what processes should be introduced? What can be learned from developments elsewhere? What are the pitfalls to be avoided?

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[1] Industrial Development (Science Foundation Ireland) (Amendment) Act 2013, http://www.irishstatutebook.ie/pdf/2013/en.act.2013.0036.pdf

[2] "Press Release: Technology Foresight Report Stresses the need for Ireland to become an Attractive Location for Worldclass Research and Development."
http://Www.Forfas.Ie/Media/Icsti990430_Technology_Foresight_Press_Release.Pdf

[3] DES, *National Strategy for Higher Education*, 2011, p12

[4] Forfás (2011) *Report of the Research Prioritisation Steering Group*, Dublin, http://www.djei.ie/publications/science/2012/research_prioritisation.pdf; Forfás and the Department of Jobs, Enterprise and Innovation (2014) *National Research Prioritisation Exercise: First Progress Report*, http://www.djei.ie/publications/science/2014/NRPE_First_Progress_Report.pdf

[5] HEA (2014) *Higher Education System Performance 2014-2016*, Dublin, p17

[6] D. Swinbanks (2013) "Five Countries to Watch," *Nature Publishing Index* 2012, pp1, 24–26.
http://www.natureasia.com/en/publishing-index/pdf/NPI2012_Global.pdf

[7] ESRI (2014) Quarterly Economic Commentary – Autumn 2014, p4,
http://www.esri.ie/UserFiles/publications/QEC2014AUT_SA_Cronin_McQuinn/QEC2014AUT_ES.pdf

[8] DJEI (2014) *Policy Statement on Foreign Direct Investment in Ireland*, Ireland, p3.
http://www.djei.ie/publications/enterprise/2014/Policy_Statement_FDI_Ireland_July_2014.pdf

[9] Boyer defines the 4 scholarships of: Scholarship of discovery: investigation which contributes to stock of human knowledge; Scholarship of integration: giving meaning to isolated facts and putting them into perspective through synthesis; Scholarship of application: applying knowledge through problem solving; Scholarship of teaching: not just transmitting but transforming and extending knowledge. E. L. Boyer (1990) *Scholarship Reconsidered. Priorities of the Professoriate* (Princeton, NJ: Carnegie Foundation for the Advancement of Teaching).

[10] Bush V. (1945) *Science, the Endless Frontier. A Report to the President by Vannevar Bush*, Director of the Office of Scientific Research and Development. Nature (Vol. 188). (Washington D.C.: United States Government Printing Office); OECD (2002) Frascati Manual 2002. *Proposed Standard Practice for Surveys on Research and Experimental Development*, 6th edition (Paris: Organisation of Economic Co-operation and Development); Lynton E. A (1987) *New Priorities for the University: Meeting Society's Needs for Applied Knowledge and Competent Individuals* (San Francisco: Jossey-Bass Higher Education Series, Proquest Info & Learning); Boyer E. L. (1990) *Scholarship Reconsidered. Priorities of the Professoriate* (Princeton, NJ: Carnegie Foundation for the Advancement of Teaching); Boyer E. (1996) "The Scholarship of Engagement", *The Journal of Public Service and Community Outreach*, 1(1), 11 – 20; Gibbons M., Limoges C., Nowotny H., Schwartzman S., Scott P., Trow M. (1994) *The New Production of Knowledge* (London: Sage); Graham W. R. (1987) "A Research and Development Strategy for High Performance Computing", Washington, D.C.: Office of Science and Technology Policy; National Academy of Sciences (2004) *Facilitating Interdisciplinary Research*, National Academy of Sciences, National Academy of Engineering, and Institute of Medicine of the National Academies. Washington, D.C.: The National Academies Press.

[11] See Expert Group on Future Funding for Higher Education (2015) "The Role, Value and Scale of Higher Education in Ireland", Consultation Paper #1, Dublin: Department of Education and Skills, 3-6.

[12] BIAC (2008), "Comments on the OECD Project on Trade, Innovation and Growth", Paris.
http://biac.org/members/trade/docs/08-01_Innovation.pdf

[13] See: B. Bye, T. Fæhn and T.R. Heggedal (2009). "Welfare and growth impacts of innovation policies in a small, open economy: An applied general equilibrium analysis", *Economic Modelling*, 26, 1075–1088; D. C. Mowery and J. E. Oxley (1995). "Inward technology transfer and competitiveness: The role of national innovation systems", *Cambridge Journal of Economics*, 19, 67-93; W. Keller (1996). "Absorptive capacity: on the creation and acquisition of technology in development", *Journal of Development*, 49, 199-227; S. Dowrick (2003). "A Review of the Evidence on Science, R&D and

Productivity", Australia National University. Paper prepared for the Department of Education, Science and Training, Australian Government; B. R. Martin and P. Tang (2007). "The benefits from publicly funded research", Science and Technology Policy Research Working Paper 161, University of Sussex; A. J. Salter and B. R. Martin (2000) "The economic benefits of publicly funded basic research: a critical review", *Research Policy* 30 Ž2001, 509–532. Available at: http://in3.dem.ist.utl.pt/master/stpolicy03/temas/tema6_1a.pdf

[14] See B-A Lundvall (2002) *Growth, Innovation and Social Cohesion: the Danish Model*. London: Edward Elgar Publishing.

[15] F. Hénard and D. Roseveare (2012) *Fostering Quality Teaching in Higher Education: Policies and Practices*. Paris: OECD, p17. http://www.oecd.org/edu/imhe/QT%20policies%20and%20practices.pdf

[16] C. Hoareau, J. Ritzen and G. (2012) *The State of University Policy for Progress in Europe, Policy Report*, UNU-MERIT, University of Maastricht, Netherlands. http://www.merit.unu.edu/publications/uploads/1354635371.pdf; see M. Foster & F. Cigano (2014) "Does income inequality hurt economic growth?", *FOCUS on Inequality and Growth*, December, Paris: OECD, Accessed 18 January 2015, from http://www.oecd.org/els/soc/Focus-Inequality-and-Growth-2014.pdf

[17] See C. Macilwain (2015) "Economic divide taking toll on European science**",** *Nature,* 517:123, 8 January, Accessed 14 January 2015, from http://www.nature.com/polopoly_fs/1.16659!/menu/main/topColumns/topLeftColumn/pdf/517123a.pdf, doi:10.1038/517123a

[18] European Commission (2013) *The Grand Challenge: The design and societal impact of Horizon 2020*, Luxembourg: Office for Official Publications of the European Communities, p15. http://ec.europa.eu/information_society/newsroom/cf/horizon2020/document.cfm?doc_id=3778

[19] The Human Genome Project is a good example. It is the world's largest collaborative biological project, and involved research groups from Europe, Asia and the US, combining computing and statistical skills with biological genetics to identify and map all of the genes of the human genome which has led to finding the genetic roots of disease and then developing treatments.

[20] Editorial (2014) "Time for the social sciences", Nature, 30 December, http://www.nature.com/news/time-for-the-social-sciences-1.16621. See also NESTA – the UK National Endowment for Science, Technology and the Arts, was formed as a result of the National Lottery Act 1998. It has embraced a very broad understanding of innovation across the sciences, technologies and the arts. http://www.nesta.org.uk/

[21] DG Regional and Urban Policy and DG Employment, Social affairs and Inclusion, Brussels. Available at: http://s3platform.jrc.ec.europa.eu/documents/10157/47822/Guide%20to%20Social%20Innovation.pdf

[22] There are around 33 such initiatives, mostly found in Asia, Europe and the Middle East, with less activity in Africa and Latin America (e.g. France, Germany, Russia, Spain, China, South Korea, Taiwan, Malaysia, Finland, India, Japan, Singapore, Sri Lanka and Latvia etc.).

[23] A. Curaj, L. Georghiou, J.C. Harper & E. Egron-Polak (eds), *Mergers and Alliances in Higher Education: International Practice and Emerging Opportunities*, Dordrecht: Springer

[24] J.E. Lane & D. B. Johnstone (eds.) (2013) *Higher Education Systems 3.0. Harnessing Systemness, Delivering Performance,* Albany: SUNY Press. See "Riyadh Statement On World Class University System", Accessed 18 September 2014, from http://siteresources.worldbank.org/EDUCATION/Resources/278200-1099079877269/547664-1099079956815/547670-1128086743752/Riyadh_Statement_On_World_Class_University_System_6.pdf

[25] E.L. Boyer, (1990) *Scholarship Reconsidered. Priorities of the Professoriate*, Princeton: Carnegie

Foundation for the Advancement of Teaching, p15.

[26] C. Calhoun (2006) “The University and the Public Good”, *Theses Eleven*, 87: pp7–43.

[27] J. D. Brewer (2013) *The Public Value of the Social Sciences: An Interpretive Essay*, London: Bloomsbury Academic.

[28] REF: http://www.ref.ac.uk/; ERA: http://www.arc.gov.au/era/

[29] For a comprehensive review of research assessment systems and recommendations for good practice, see: Europa (2010) ***Assessing Europe's University-based Research***, Report of the Expert Group on University-based Research, Brussels. http://ec.europa.eu/research/science-society/document_library/pdf_06/assessing-europe-university-based-research_en.pdf. See also E. Hazelkorn, M. Ryan, A. Gibson and E. Ward (2013) *Recognising the Value of the Arts and Humanities in a Time of Austerity. HERAVALUE Ireland Report,* Funded by the European Science Foundation, Dublin: HEPRU, Dublin Institute of Technology. http://arrow.dit.ie/cserrep/42/