Using information to develop a research strategy: challenges and opportunities

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Queen’s University Belfast
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Timeline for this presentation

• New President and Vice-Chancellor – March 2014

• ‘Size and Shape’ Review of the University – 2014 to 2015

• Corporate plan development ‘Vision 2020’ – 2015 to 2016

• ‘Vision 2020’ effective from 2016/17 to 2020/21

• Research Strategy development process throughout 2015

• Research Strategy launched 2016 (through to 2020/21)

Today is about reflecting on part of that process
Strategic context for research
Strategic context

• Govts and funding organisations are focusing on big questions and challenges that affect society and the planet, and look to universities to help identify solutions, and in a timescale Govts need.

• Best fundamental research is driven by curiosity but we have to think what this means to the public at large and to Govts (and funders) – this is very challenging.

• Stronger and more meaningful institutional and Govt research strategies (more ‘top down’ leadership?) - also very challenging.

• Requirement to demonstrate range of outcomes, impacts, uptake, translation such as wealth creation, jobs/ economic and societal benefits/ value for money to society, voters and Govts.

• Communicate more effectively how research contributes to these challenges in a way that is more accessible to policy makers and the public and not seen as self indulgent.
Research coherence

• Single research groups, single institutions, or even single nations, do not have sufficient critical mass, expertise or resources to address these major societal questions, so collaboration is essential and expected; ‘size matters’

• Research projects are more multi-disciplinary, -partner, -institution and – national = added complexity and risk; competition for resources remains fierce

• Big challenge for universities to work coherently and make the whole > sum of the parts

• Must demonstrate how we add to the totality of activities rather than appear as disparate groups of individual research projects – very difficult to achieve

• Need to work in partnership with other universities, (regionally, nationally and internationally) much, much more
And yet…

“Universities have always changed in response to perceived social and economic needs and they always remained the same….”

Prof Sir David Watson
Oxford University
The Queen’s University Corporate Plan: Vision 2020

- Research: £55m to £110m
- International: 8% to 20%
- PG: 23% to 30%
- UG: enhanced quality
Developing a Research Strategy: initial questions...

• What are our research strengths at Queen’s?
• Where do our successes lie in terms of international recognition?
• Where are our successes in engaging with funders?
• Where are our successes in engaging with end users of our research?
• Where is our research having most impact?
• Where are our growth areas in research?
• How are they best supported through prioritised investment?
• How does this align with the global challenges we face?

Do we answer these questions based on evidence or instinct?
Evidence base: a review of the research landscape at Queen’s
Evidence based approach to better understand the research base

Grant rates  RAE 2008
Citations  REF 2014  Global Rankings
Income Contribution  Business Engagement
Category A staff  PhD levels
Impact Data
RG8 Benchmarking  Internal Collaboration
# Review of strengths and collaborative indicators

<table>
<thead>
<tr>
<th>Data Group</th>
<th>Data Set</th>
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<tbody>
<tr>
<td>Funding success</td>
<td>Research grant applications by school for comparative 12-month periods</td>
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<td>Research grants awarded, by School, for comparative 12-month periods</td>
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<td>Rate of grant success</td>
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<td>Average grant size by School</td>
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<td>Movement in research grants awarded by source</td>
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<td>Research income (expenditure) from research grants</td>
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<td>Research income and cost recovery rates</td>
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<td>Collaborative Activity</td>
<td>Internal collaborative seed fund allocations</td>
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<td>Outputs, Impact, Esteem</td>
<td>Competencies analysis – output profiles</td>
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<td>Citations by subject areas &amp; benchmarked</td>
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<td>Impact data 2009-2014 (where available)</td>
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<td>% of citations with international co-author</td>
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<td>Esteem data (where available)</td>
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<td>Postgraduate Research</td>
<td>Research environment Review</td>
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<td>PhD supervision levels and completion rates per School</td>
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<td>Benchmarking</td>
<td>UK and global rankings over time in subject areas.</td>
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<td>Russell Group peer comparison data (where available)</td>
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<td>Research Assessment Exercise 2008 data for Comparison</td>
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<td></td>
<td>Research Excellence Framework 2014 Results 3* / 4* (available later)</td>
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<td></td>
<td>Research Excellence Framework 2014 category A staff returned (available later)</td>
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<td>Bespoke Arts and Humanities related information (qualitative)</td>
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Developing information systems

- Disjointed systems (little integration)
- Siloed data, no holistic picture of research
- No Institutional Repository

- Bespoke systems
- Some ageing infrastructure
- Duplication of systems and data
Developing information systems

- Much improved data management
- One set of reference data (can be reused)
- More connected systems
- More holistic picture of research
- Institutional Repository launched
Identifying research strengths, collaborations and areas for improvement
% of total value of awards 2009/10-2012/13 from each UK Research Council

Queen’s

- Respiratory medicine: 64%
- Food safety/security: 12%
- Other fields: 3%

Peer group average

- Respiratory medicine: 45%
- Food safety/security: 15%
- Other fields: 20%

Field Breakdown:

- AHRC
- BBSRC
- NERC
- ESRC
- MRC
- EPSRC
- STFC
2012/2013 UK Research Council applications and awards

Application levels low, success high – peace building, conflict resolution, social justice
Identifying leaders and opportunities to enhance capacity

Award values (£m) by PI, 2011/12-2013/14

Leadership capacity key (esp. in a highly devolved environment)
Could/ should growth in staff be more/ less evenly distributed? I.e. Where should we invest?
Understanding collaborative strengths
**Medicine, Health and Life Sciences - collaborations**

**Public health/ Nutrition/ Social work/ Social policy**  
Issues relating to children, adolescents

**Internal collaboration in numbers**

- No. of projects Inside of Faculty: 382
- No. Project Outside of Faculty: 97
- No. of participants in internal projects: 529
- No of Participants in External projects: 290

**Collaboration with other Faculties**

<table>
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<tr>
<th>EPS (62 – 12.9%)</th>
<th>AHSS (35 – 7.3%)</th>
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<tr>
<td>EEEC 10</td>
<td>SSS 19</td>
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<tr>
<td>MPY 12</td>
<td>HiA 4</td>
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<tr>
<td>PSY 6</td>
<td>MOL 1</td>
</tr>
<tr>
<td>CHEM 15</td>
<td>MAN 5</td>
</tr>
<tr>
<td>MAE 7</td>
<td>EDU 5</td>
</tr>
<tr>
<td>PAC 8</td>
<td>LAW 1</td>
</tr>
<tr>
<td>GAP 4</td>
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**Cancer**
Mapping the evidence base to interdisciplinary themes

Interdisciplinary projects (funding)
- Health / age improving lives
- Advanced, applied health technology
- Peace, justice and conflict

Co-citation competencies (SciVal)
- Respiratory distress
- Parasitology
- Peace process
- Voltage control

RAE 2008/2014 (UoA rankings)
- Health professions
- Law
- Pharmacy
- Medicine
- Politics

Field-Weighted Citation Impact strengths (SciVal)
- Agri-food
- Translational medicine
- Arts and Humanities
- Biochemistry
- Computer Science

Eight Great Technologies
- Big data
- Satellites
- Robotics
- Genomics
- Agri-science
- Nano-technology
- Energy
- Regenerative medicine

Improving Health

Advancing Technology

Supporting a Secure Society

RCUK interdisciplinary priorities
- Connected communities
- Lifelong health and well-being
- New dynamics of ageing

Horizon 2020
- Energy
- Biotechnology
- Agriculture Bio-based industries
- ICT research
- Society
- Health

EU Innovation challenges
- Ageing population
- Food and fuel
- Global warming
- Smart and green transport
A consultative process
A consultative process for strategy creation

**Workstreams**

- Research mission, values and motivators
- Research themes and selective investment
- Collaboration and connectivity
- Research talent
- Transparency and empowerment
- Innovation, impact and public engagement
Key themes arising

- Inclusivity
- Intellectual Community
- Supporting Excellence
- Research Intensive
- Innovation
- Respect for diversity
- Leadership Capacity
Identifying strategic themes and frameworks
Research Strategy 2016-21

Research Strategy Priorities

- Priority 1: Culture of Research Ambition
- Priority 2: Connecting to Tackle Global Challenges
- Priority 3: Vibrant Postgraduate and Postdoctoral Community

Research Strategy Cross-Cutting Themes

- Internationalisation
- Impact
- Environment
A challenge-oriented research organisation

Research at Queen's takes place in Core Disciplines, Pioneer Research Programmes and Global Research Institutes.

- Excellent research conducted by researchers working in a range of core disciplines is the foundation for our research success, as demonstrated through the results of REF 2014.

- Our Global Research Institutes bring researchers from different disciplines together on a scale that enables them to address major societal challenges.

- Through Pioneer Research Programmes, we stimulate novel interdisciplinary research collaborations to tackle challenges emerging on the global horizon.
Global Research Institutes

- The Institute for Health Sciences
- The Institute of Electronics, Communications and Information Technology
- The Institute for Global Food Security
- The Senator George J. Mitchell Institute for Global Peace, Security and Justice
Global Research Institutes

The Institute for Health Sciences
- Cancer
- Respiratory conditions
- Eye disease
- Diabetic Vascular Complications

The Institute of Electronics, Communications and Information Technology
- Securing our Digital Tomorrow
- Addressing the Information Explosion
- Communications for a Smarter World

The Institute for Global Food Security
- Integrity of the Global Food Supply
- Health and Nutrition
- Farms of the Future

The Senator George J. Mitchell Institute for Global Peace, Security and Justice
- Legacy Issues
- Justice and Rights
- Security
- Ideology and Beliefs
Pioneer Research Programmes

- Centre for Evidence and Social Innovation
- Sustainable Energy Research Centre
- Intelligent Autonomous Manufacturing Systems
- Risk and Inequality
- Centre for Advanced and Interdisciplinary Radiation Research
- Materials and Advanced Technologies for Healthcare
Pioneer Research Programmes (1/2)

Intelligent Autonomous Manufacturing Systems
- Virtual Sensing, Prognostics and Virtual Factory Simulations
- Flexible Automation
- Autonomous and Intelligent Decision Making

Sustainable Energy Research Centre
- Renewable Energy Conversion Storage
- Transportation
- Sustainable Chemical Manufacturing

Centre for Evidence and Social Innovation
- Families
- Schools
- Communities
Pioneer Research Programmes (2/2)

- Finance: systemic risk
- Environment: sustainability
- Public Health: Inequalities

- Cancer modelling, nanomedicine
- Radiation sources
- Cancer Biology, radiobiology
- Atomistic simulation

- Drug delivery
- Biomaterials
- Nanomedicine
- Materials Science
- Tissue Engineering

Centre for Advanced and Interdisciplinary Radiation Research

Risk and Inequality

Materials & Advanced Technologies for Healthcare
Key messages and take-aways...

• Research Information can:
  - Look at research organisation differently – i.e. cross-cutting themes
  - Help identify – and quantify - interdisciplinary collaboration
  - Confirm strengths, weaknesses – and some emerging areas
  - Support the business case for investment in priorities
  - Help establish performance targets/ monitor performance

• Research information cannot:
  - Replace engagement, consultation, organisational politics at play
  - Substitute for genuine research leadership in an area
  - Be ‘sold’ as 100% reliable – it is a guide/ data will be flawed in places
  - Give the benchmarking information required

Will someone make this process far easier and more meaningful for us?
Monitoring progress against strategy
Improving the grant portfolio

<table>
<thead>
<tr>
<th>No of research awards at set thresholds (%)</th>
<th>Value of research awards at set thresholds (%)</th>
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<tbody>
<tr>
<td>2012/13</td>
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<tr>
<td>&lt; £100k</td>
<td>&lt; £100k</td>
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<tr>
<td>£100k - £500k</td>
<td>£100k - £500k</td>
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<td>£500k - £1m</td>
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<td>£1m</td>
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Graph showing the distribution of research awards and their values over the years 2012/13 to 2016/17.
Benchmarking with peer institutions

- Queen's
  - 2013-14: £100
  - 2014-15: £100
  - 2015-16: £100
  - 2016-17 (6mth): £43
  - 2016-17 (12mth): £43

- Changes:
  - 2013-14 to 2014-15: -1%
  - 2014-15 to 2015-16: +43%
  - 2015-16 to 2016-17 (6mth): -1%
  - 2016-17 (6mth) to 2016-17 (12mth): +43%
Benchmarking award funder profiles

<table>
<thead>
<tr>
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<th>Queen’s 2013-14 – 2016/17 (Q2)</th>
<th>Peer institution 2013-14 – 2016/17 (Q2)</th>
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<tbody>
<tr>
<td>UK central gov</td>
<td>25</td>
<td>18</td>
</tr>
<tr>
<td>UK-based charities</td>
<td>18</td>
<td>17</td>
</tr>
<tr>
<td>EU government bodies</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>UK industry</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Non-EU industry</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Others</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Research Councils</td>
<td>6</td>
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Legend:
- UK central gov
- UK-based charities
- Research Councils
- EU government bodies
- UK industry
- Non-EU industry
- Others
- UK-based charities
- EU government bodies
- UK central government
- UK industry
- Non-EU Other

UK-based charities
EU government bodies
UK central government
UK industry
Non-EU Other
Promoting international collaboration

Top ten QUB collaborative institutions by no of co-author publications, 2013-2016

- UCL: 7.9
- Ulster: 7.9
- Oxford: 6.6
- Cambridge: 6.6
- TCD: 6.6
- UCD: 6.6
- Imperial: 6.6
- Edinburgh: 6.6
- Harvard: 6.6
- CNRS: 6.6
Thank you.

www.elsevier.com/research-intelligence