



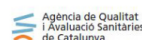
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# RIA Foundations

Jonathan Grant

## Founding organisations



## 2016 Partners



**The International School  
on Research Impact Assessment**  
MELBOURNE | 19–23 SEPTEMBER 2016





**Jonathan Grant** @jonathancgrant · 14h

Reviving the @ResImpactSchool tradition ...#ISRIA16. Sadly only two small fish this time but great fun as ever.



4



**Daniel Glaser**

@bnqlaser



Following

@jonathancgrant Perhaps you need a broader set of outcome measures?

9:47 PM - 18 Sep 2016

# Learning outcomes

- Be able to describe the rationale and value of research impact assessment (RIA)
- Describe the discipline of RIA
- Understand the various RIA frameworks



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# Many drivers for RIA

- ✓ Culture of accountability & transparency
- ✓ Need to improve & optimise impacts
- ✓ Competitiveness for scarce resources



# Value of RIA

- ✓ Showcase research impacts
- ✓ Understand the path to impacts
- ✓ Shows portfolio of research impacts
- ✓ Informs research strategy development & management decisions

in published papers — the Nature journals are at present considering urgently necessary ones.

## Unknown quantities

It is in researchers' interests to help funding agencies quantify the economic benefits of their work.

When research agencies are pressed by politicians to quantify the economic value of scientific research, it is only natural that they reach for whatever numbers they can find and then repeat them as well-established fact. Natural, but wrong. The reality is that few of those numbers — typically, assertions that each unit of research investment will yield a certain amount of additional

research plays a substantial role in fostering innovation — by which they mean new technologies, services and business methods. They also have good evidence that innovation is essential for strong economic growth, especially when society faces constraints on key inputs such as labour, capital and materials.

Beyond that, they can't predict which disciplines of scientific research will lead to future innovation — that would require a time machine. Not, thus far, can they trace how additional research investment will influence a society's ability to innovate.

The problem is that innovation is not a simple, linear system in which basic research begets technology, and technology begets innovation — although that has always been the easiest model for





# RIA as a (anti) discipline

Draws upon many fields

- Emergence of the science of science (and innovation) policy
  - Scientifically rigorous quantitative basis for science policy
- Growing body of evidence on ways to monitor, measure & evaluate impacts
- Group of evaluators, researchers, policy makers, funders & consultants engaged in improving our understanding of research impact



# But interest in the impact of research is not new



Francis Bacon  
Novum Organum, 1620

*"There is another powerful and great cause of the little advancement of the sciences, which is this: it is impossible to advance properly in the course when the goal is not properly fixed. **But the real and legitimate goal of the sciences is the endowment of human life with new inventions and riches.**"*



Vannevar Bush  
Science the Endless  
Frontier, 1945

*"As long as [universities] are vigorous and healthy and their scientists are free to pursue the truth wherever it may lead, **there will be a flow of new scientific knowledge to those who can apply it to practical problems in Government, in industry, or elsewhere.**"*



Chancellor of the  
Duchy of Lancaster  
Realising our potential  
White Paper, 1993

*"The understanding and application of science are fundamental to the fortunes of modern nations. **Science, technology and engineering are intimately linked with progress across the whole range of human endeavour: educational, intellectual, medical, environmental, social, economic and cultural.**"*





# Current practices in implementing an RIA framework



## **Canadian Academy of Health Science (CAHS)**

Aims to provide consistency and comparability while remaining flexibility



## **CSIRO Impact Framework**

Aligned with organisational planning, performance and investment frameworks



## **Research Excellence Framework (REF)**

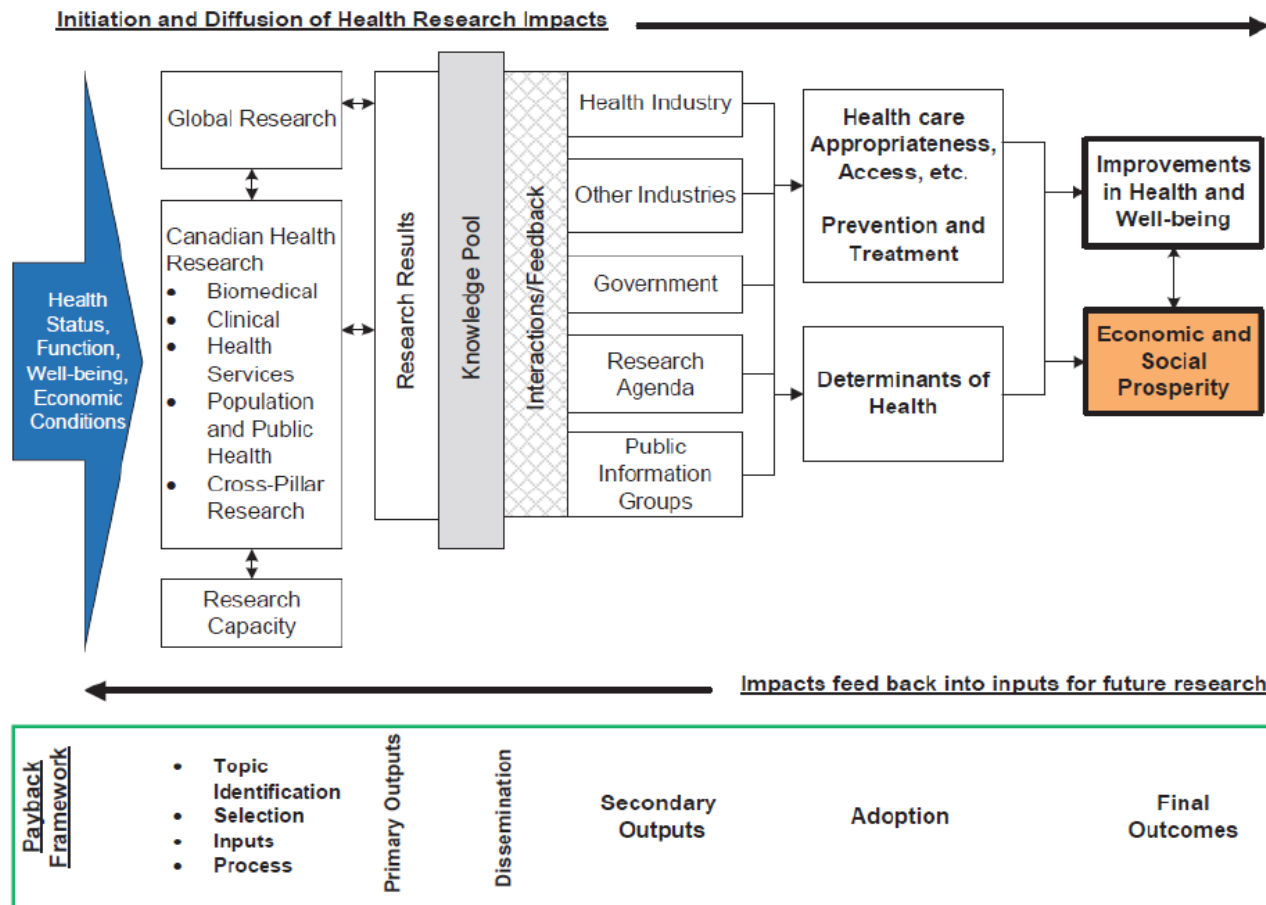
Assesses performance of UK universities to determine funding allocation







# Canadian Academy of Health Science (CAHS) Framework



# CAHS Impact categories

ACADEMIC IMPACT	<b>Advancing Knowledge</b>	Traditionally more academic focused, can provide useful starting point & mechanisms to trace impact forward ➤ <i>Indicators: citation impacts, shared publications</i>
	<b>Capacity Building</b>	Elements which build future research capacity, aids absorption of knowledge by the system ➤ <i>Indicators: research resources, leveraged funding</i>
WIDER IMPACT	<b>Informing Decision Making</b>	Looks at impact in policy, practice processes, products & services, across five stakeholder groups. Policies & practice might change at multiple levels ➤ <i>Indicators: use of research guidelines</i>
	<b>Health Impacts</b>	Breaks down health into health status & determinants of health which are further broken down into 14 categories ➤ <i>Indicators: health gains</i>
	<b>Broad Economic &amp; Social Impacts</b>	Benefits from economic activities & commercialisation, benefits from a healthier or more enriched society ➤ <i>Indicators: gains in socio-economic status, increased well-being</i>





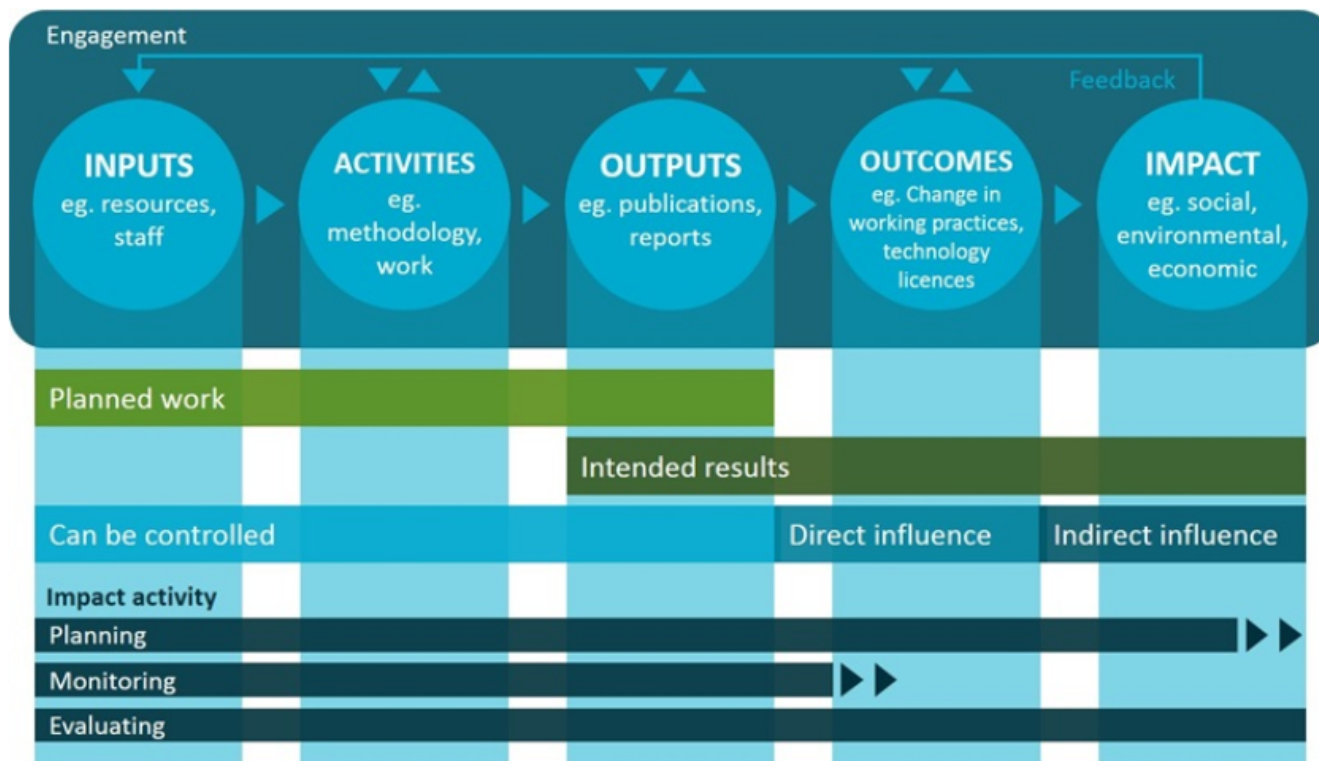
# Alberta Innovates – Health Solutions Impact Framework

## AIHS Mission & Vision



Modified from the Canadian Academy of Health Sciences





# CSIRO Impact Framework

***The CSIRO definition of impact:** 'An effect on, change or benefit to the economy, society and environment, beyond those contributions to academic knowledge'.*





## Introduction to CSIRO's Impact Framework

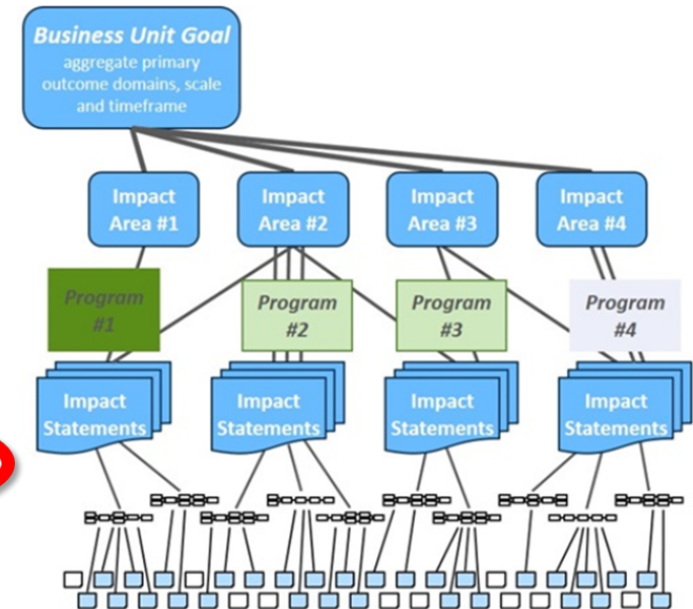
# CSIRO Strategy 2020: Customer First Pillar



### Customer first

To create deeper innovation relationships with our customers and prioritise the highest value investments, we will:

- Continually develop and improve the end to end customer experience and our capacity to deliver innovative solutions to customers.
- Embed a rigorous impact and investment planning, monitoring and evaluation framework into our business and employ it to continually optimise our portfolio.
- Deliver and act upon market and technology roadmaps to support national challenges and industry innovation.





# Agriculture

## IMPACT STRATEGY ON A PAGE

### GOAL

By 2030, CSIRO Agriculture's technologies, management and knowledge systems will generate a sustainable gain in profitability of >\$2 billion per annum with multiple indirect benefits to the environment and society of Australia, and will be integral to the global response to food and fibre security for the world's growing population.

### IMPACT AREAS

Transforming yield

Closing yield gaps

Transforming value

Harnessing digital agriculture

Sustaining the base

Informing policy

### IMPACT STATEMENTS

**Transforming yield – farming systems innovation:** Through the adoption by producers of novel genotype x management packages in grains and cotton, forages in livestock & dairy production, and feeds in aquaculture, increase aggregate (production intensity & scale) production by 20% by 2030.

**Transforming yield – genetic solutions in plants:** Through genetics and plant breeding including step-change genetic technologies, double the rate of genetic gain in grains and sugarcane, and reduce the overall impact of abiotic and biotic stresses by 20% in grains, cotton and grapevines by 2030.

**Transforming yield – genetic solutions in animals:** Through genetics and animal breeding including step-change genetic technologies, improve the rate of feed conversion in ruminants and aquaculture species by a factor of two, and reduce the overall impact of abiotic and biotic stresses by 20% by 2030.

**Closing yield gaps – identification and diagnosis:** Through definition and addressing of yield gaps in crops and livestock, increase unit production by producers 20% by 2030, with a focus on grains, sugarcane and cotton in Australia, and livestock and aquaculture in Australia and the developing world.

**Closing yield gaps – accelerate adoption:** Through increased use of current decision support tools and information delivery, agribusiness accelerate adoption by farmers of technologies that reduce yield gaps 20% by 2030, with a focus in grains and cotton in Australia, and livestock and aquaculture in Australia and the developing world.

**Transforming value – food products:** Functional grains products for health and wellbeing, create a new market value of \$500M and enhanced grain quality characteristics create improved market access worth \$100M by 2030.

**Transforming value – value chains:** Increased whole-of-chain value by 20% in selected industries (red meat, grains, cotton, winegrapes) through logistic efficiencies and market access based on food labelling.

**Transforming value – industrial products:** Farm income from new industrial products increased by 20% by 2030.

**Harnessing digital agriculture – precision agriculture:** Producers double their adoption of precision management technologies that reduce input costs (chemicals, labour, machinery) by 20%, and double the adoption rate of digital technologies in breeding programs which reduce costs by 30% and shorten time to delivery by 30% by 2030.

**Harnessing digital agriculture – data analytics:** Better decision making through use of next-gen tools creates 20% extra value by 2030, with a focus on risk management in grains, cotton, livestock, and aquaculture.

**Sustaining the base – on site:** Natural resource trends for ground cover, soil organic matter and soil acidity are stable or improving, saving \$30M in lost production due to decline in productive capacity of land.

**Sustaining the base – off site:** Pesticide and nutrient losses to the environment is reduced by 20% by 2030, with a focus on pesticides in cotton and grains, fertiliser in sugarcane and cotton, with savings of \$50M in input costs and \$500M in environmental damage.

**Informing policy – welfare:** Through enhanced animal welfare policies in the non-government and government organisations and new on-farm practices for pain mitigation, improve welfare outcomes for ruminants and aquaculture species by 20%, and enhanced market access to due elimination of welfare concerns, by 2030.

**Informing policy – GHG:** Farm income from GHG sequestration interventions increased by 20% by 2030, and land sector reduces Australia's GHG footprint (emissions per unit production) by 30% by 2030.

**Informing policy – innovation:** Through analysis of investment and delivery provide policy advice to government, business and NGOs that increases the economic effectiveness (outcomes per \$) of research expenditure by 20% by 2030.

### INTERNAL PROGRAMS

### ROLES

### OTHER BUSINESS UNITS

### ROLE KEY

○ = Lead ○ = Support

### PROGRAMS

● Breakthrough Genetic Technologies for Crop Improvement

● Crop Improvement for Novel Plant Products

● Integrated Agricultural Systems

● Sustaining Agricultural Soil and Landscapes

● Breeding Higher Value Food Crops

● Productive and Adaptive Livestock Systems

● Integrated Sustainable Aquaculture Production

● Agriculture and Global Change

### OTHER BUSINESS UNITS

● Data61

● Land and Water

● Food and Nutrition

● Manufacturing

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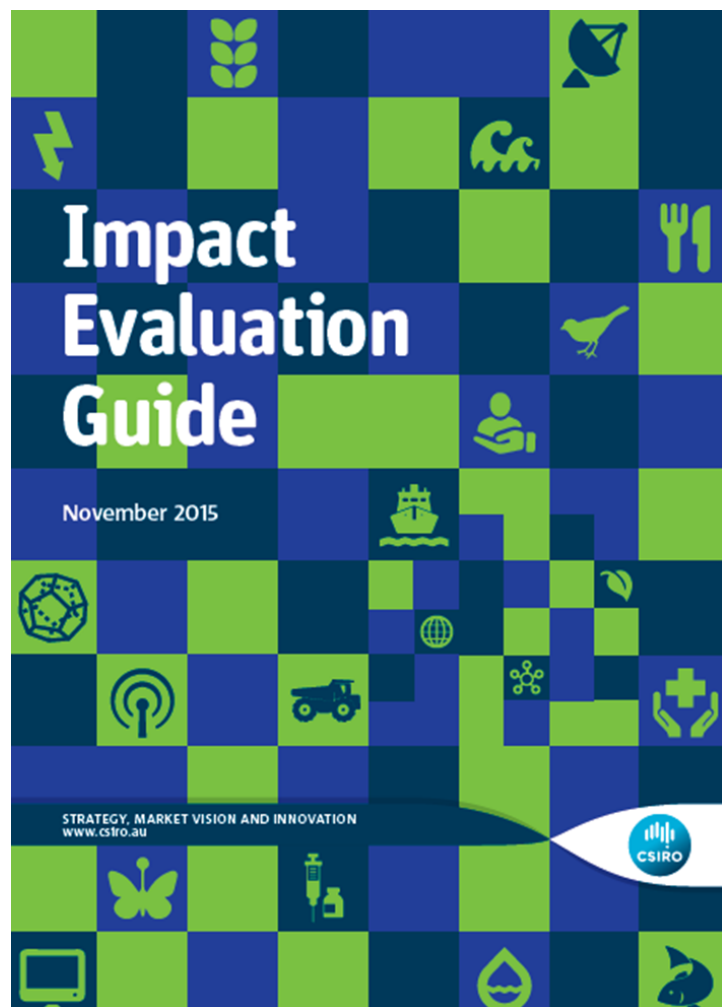
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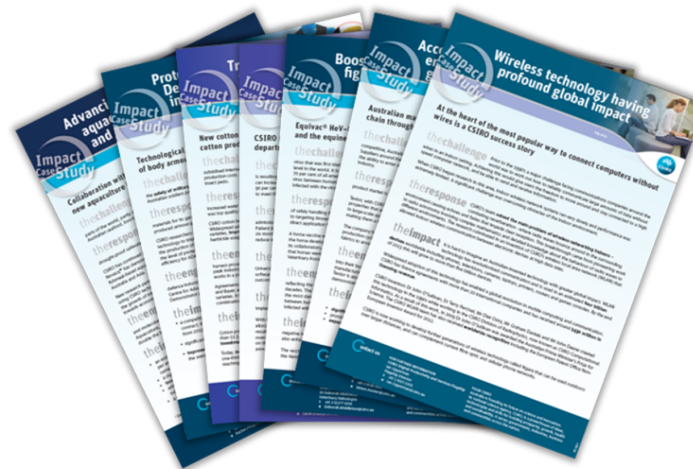
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Environmental Impact Categories	Social Impact Categories	Economic Impact Categories
1. Air quality	1. Health and wellbeing	1. National economic performance
2. Ecosystem health and integrity	2. Access to resources and opportunities	2. Trade and competitiveness
3. Climate	3. Quality of life (material security and livelihoods)	3. Productivity and efficiency
4. Natural hazards mitigation	4. Safety	4. Management of risk and uncertainty
5. Energy generation and consumption	5. Security (e.g. cyber, biological, civil and military)	5. Policies and programs
6. Land quality	6. Resilience	6. New services, products, experiences and market
7. Aquatic environments	7. Indigenous culture and heritage	7. Securing and protecting existing markets
8. Built environments	8. Innovation and human capital (creativity and invention)	
	9. Social cohesion	

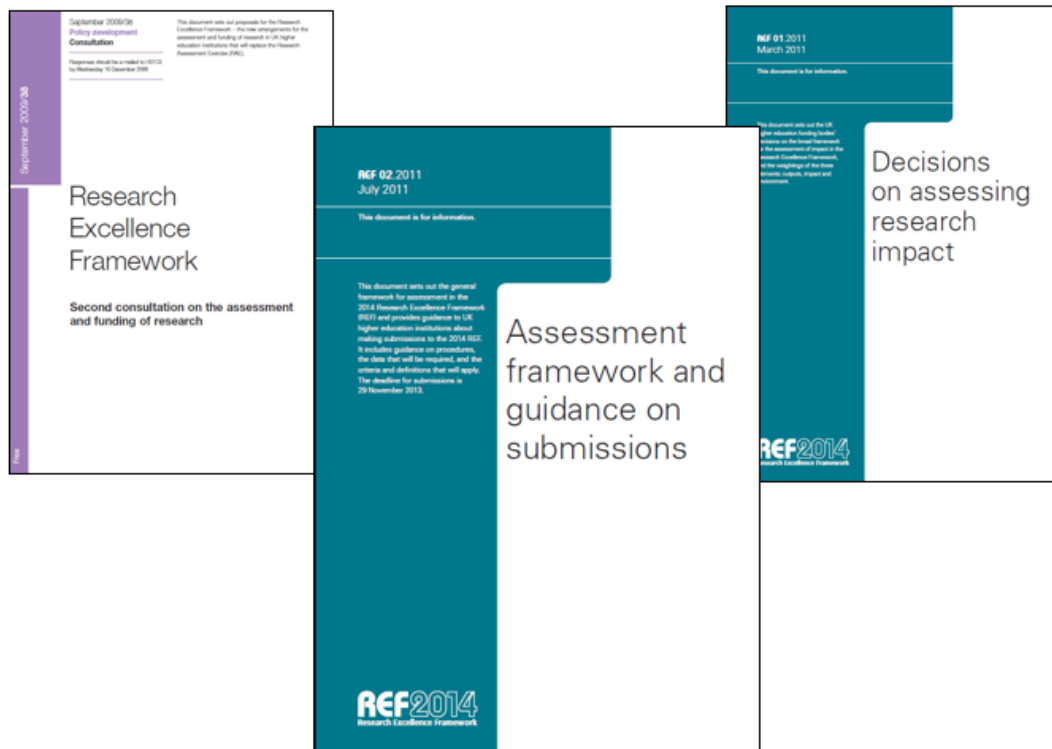


**\$5B**

The annual value delivered by CSIRO to Australian economy is estimated to be at least

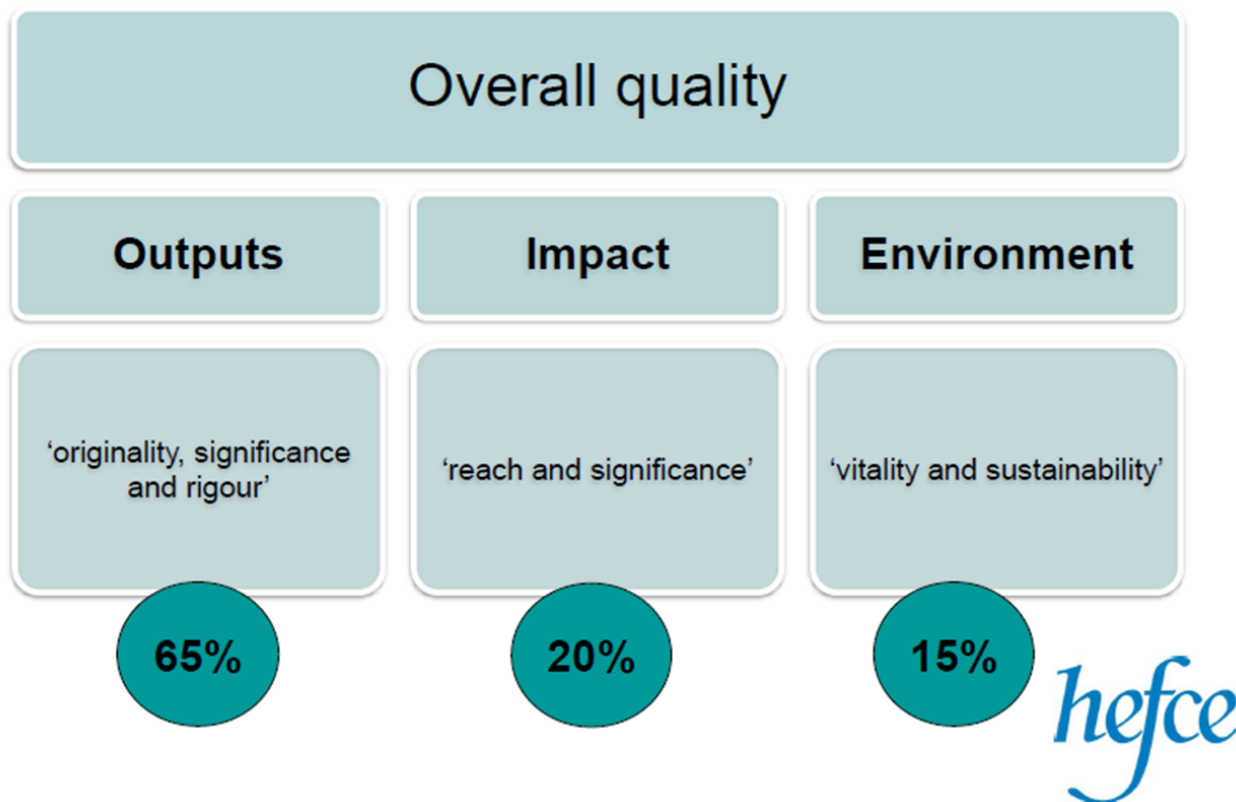


# Research Excellence Framework (REF)



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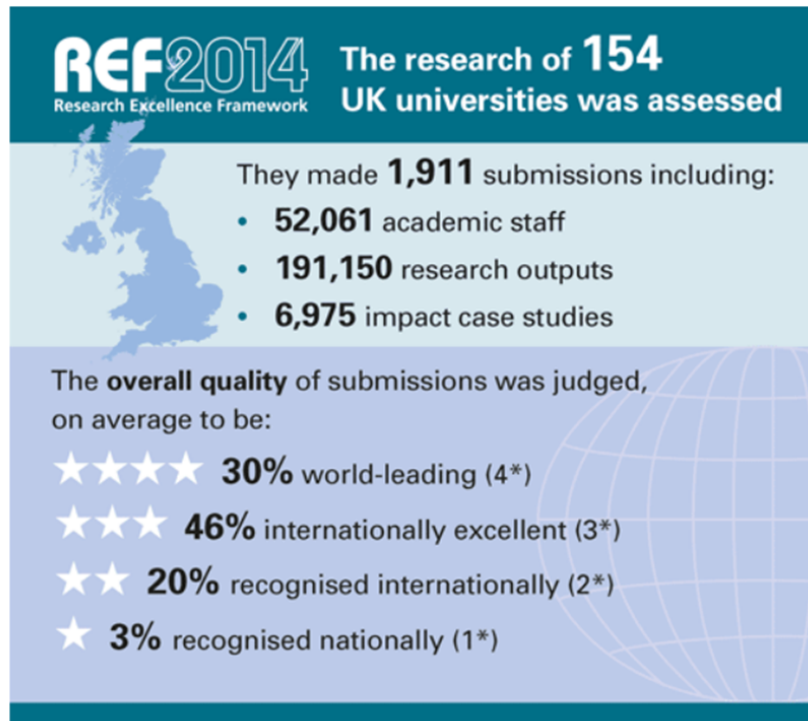


### UK REF Case Study Components:

1. Summary of the impact  
*(indicative maximum 100 words)*
2. Underpinning research  
*(indicative maximum 500 words)*
3. References to the research  
*(indicative maximum of six references)*
4. Details of the impact  
*(indicative maximum 750 words)*
5. Sources to corroborate the impact  
*(indicative maximum of 10 references)*

**Impact is defined as** 'any effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia'





Each submission was rated on a 4 star scale, using two criteria:

1. **Reach** - 'the spread or breadth of influence or effect on the relevant constituencies'
2. **Significance** – 'the intensity of the influence or effect'

- ✓ Over 250 research users judged the impacts, jointly with academic panel members
- ✓ 44% of impacts were judged outstanding (4\*)
- ✓ A further 40% were judged very considerable (3\*)





## What did we learn from both evaluations?

- ✓ You can assess research impact on a national scale
- ✓ Assessing research impact drive behaviours
- ✓ Research impact is multidisciplinary, multi-impactful, and multinational
- ✓ Differentiating impact is difficult (84% of case studies 3\*/4\*)
- ✓ It is expensive but worthwhile (absolute costs high, proportionate costs low)



### Preparing impact submissions for REF 2014: An evaluation

Findings and observations

Catrina Marville, Mully Morgan Jones, Michael Pearson, Sophie Castle-Clarke, Marie-Louise Henham, Sali Gunasekaran and Jonathan Grant



## Looking to the future

- Impact assessment is here to stay
- System will be similar in 2020, but with incremental changes
- Re-submission of case studies likely
- Use of impact metrics very unlikely
- Increase in impact 'weight', possibly by getting rid of impact template



# The need for RIA practitioners & tools

- Impact assessment debate too academic & not practitioner-focused
- Perceived 'competition' between methods, models & approaches
- Emerging but diffused community of practice
- Need to build international capacity, share practices & develop standards





# Questions??



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# Key messages

- ✓ Impact is here to stay
- ✓ RIA as a discipline is growing
  - Progress has been made in measuring impact – metrics alone are not sufficient
  - More work is needed to measure many more areas of impact
- ✓ Need 'science of science' to understand what works & what doesn't
- ✓ Need a practical evidence base for policy & investment decision making



# THANK YOU

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