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Evidence informed policy

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Evidence informed policy

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Evidence informed policy

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Impact of Science

5-7 June 2019, Berlin

Evidence informed policy

Vera Hazelwood

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AESIS

How to create evidence informed policy and avoid policy informed evidence

Dr Vera Hazelwood
Dr Bev Sherbon
Research Fish
6th June 2019, AESIS conference, Berlin

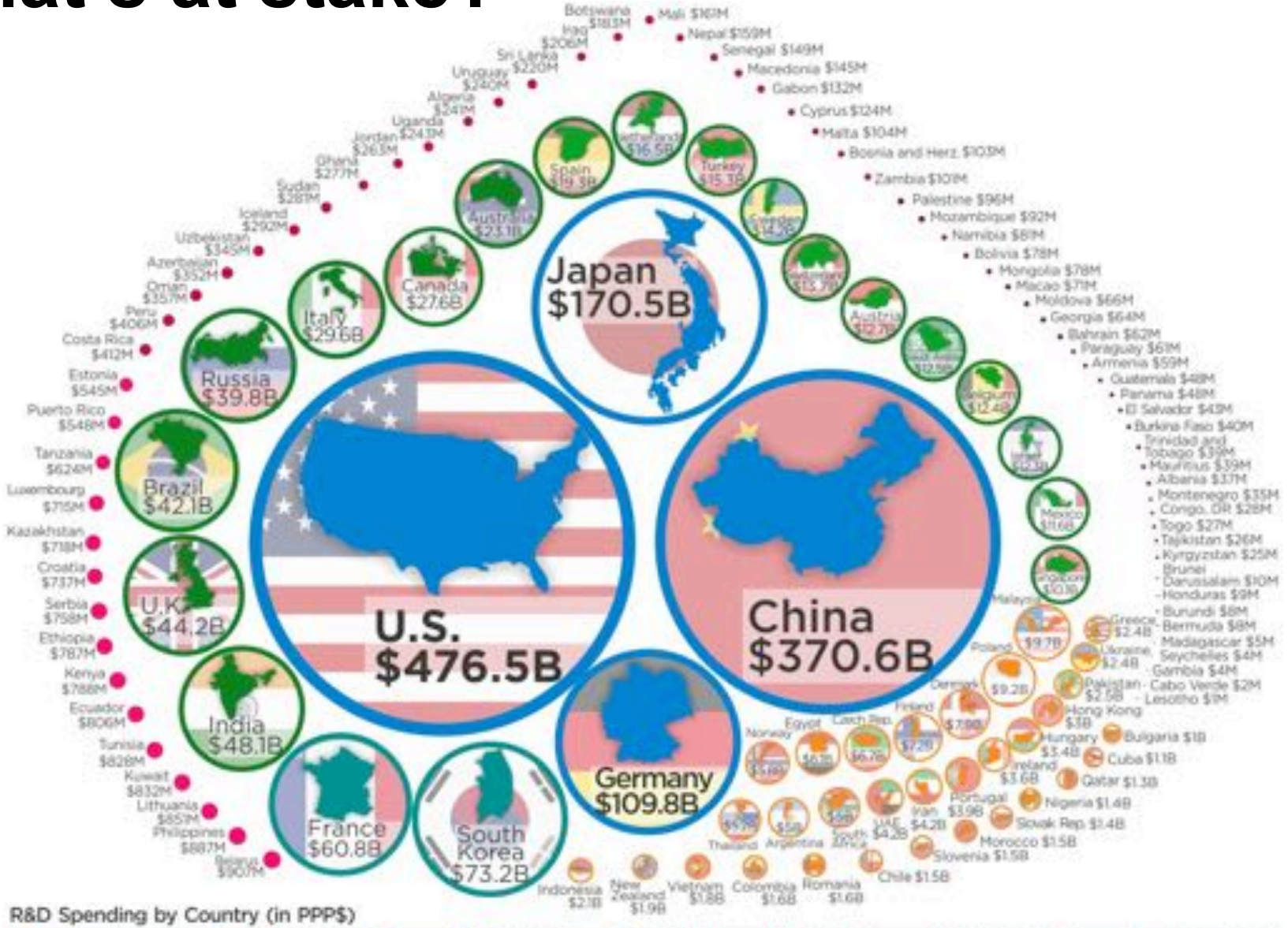
William Edwards Deming

MRC | Medical Research Council

Iceberg of Impact

MRC | Medical Research Council

What's at stake?



Our experience with collecting evidence

Number of Researchers using Research Fish worldwide: 100,000+

Number of Funding organisations members: 140+

Total research funding £50B +

Number of Awards tracked: 140,000+

Number of Outputs Reported: 3 Million+

Number of Countries Users Logged in from: 153+

What information is collected?

Common Outcomes	
Publications	Intellectual Property & Licensing
Collaborations	Medical Products, Interventions and Clinical Trials
Further Funding	Artistic & Creative Products
Next Destination	Software & Technical Products
Engagement Activities	Spin Outs
Influence on Policy	Awards and Recognition
Research Tools & Methods	Other Outputs & Knowledge
Research Databases & Models	Use of Facilities & Resources

How evidence is collected?

Webscrapping

Metadata enrichment, e.g. Altmetrics

Deduplication and disambiguation

Integration with over 17,000 independent data sources

Validation and further enrichment by researchers

Evidence-based vs Evidence-informed

Visualisation

Framing

Language

Story telling through different lenses

Terms that have different meanings for scientists and the public		
Scientific term	**Public meaning**	**Better choice**
enhance	improve	intensify, increase
aerosol	spray can	tiny atmospheric particle
positive trend	good trend	upward trend
positive feedback	good response, praise	vicious cycle, self-reinforcing cycle
theory	hunch, speculation	scientific understanding
uncertainty	ignorance	range
error	mistake, wrong, incorrect	difference from exact true number
bias	distortion, political motive	offset from an observation
sign	indication, astrological sign	plus or minus sign
values	ethics, monetary value	numbers, quantity
manipulation	illicit tampering	scientific data processing
scheme	devious plot	systematic plan
anomaly	abnormal occurrence	change from long-term average

www.climatecommunication.org/wp-content/uploads/2011/10/Somerville-Hassol-Physics-Today-2011.pdf

Policy informed evidence

"Kenyan school authorities were rewarded financially for increasing school enrollment, but the result was that data on school enrollment became corrupted by over-reporting." *World bank blog, 2014*

Words of cautions

"Kenyan school authorities were rewarded financially for increasing school enrollment, but the result was that data on school enrollment became corrupted by over-reporting." *World bank blog*

"The REF games are even more brutal this time around" *Headline from Times Higher Education supplement, January 2019*

Words of cautionn

"Kenyan school authorities were rewarded financially for increasing school enrollment, but the result was that data on school enrollment became corrupted by over-reporting." *World bank blog, 2014*

"The REF games are even more brutal this time around" *Headline from Times Higher Education supplement, January 2019*

"While doing the research, keep in mind there are only two types of facts: those that support my position and inconclusive." *Anonymous decision maker*

Strategic use of the evidence

1. Communicate and demonstrate the benefits/progress of funding (advocacy/accountability)

2. Strategy/policy development (accountability/allocation)

3. Studies/analysis to better understand research and how it leads to impact (analysis)

How is this done

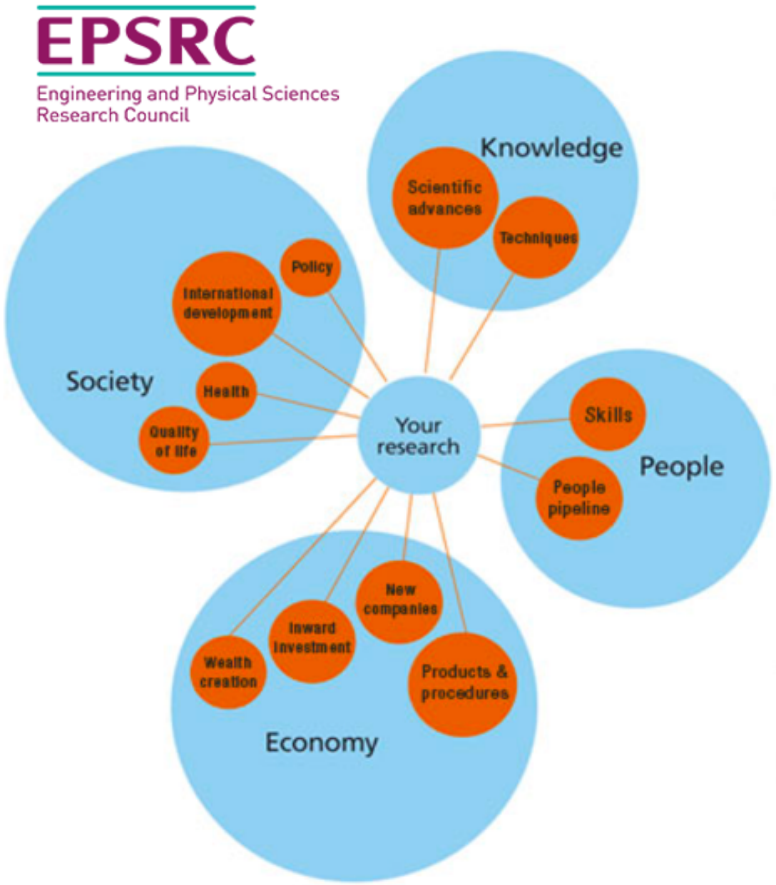
Both quantitative & qualitative (sometimes reporting against pre-defined frameworks)

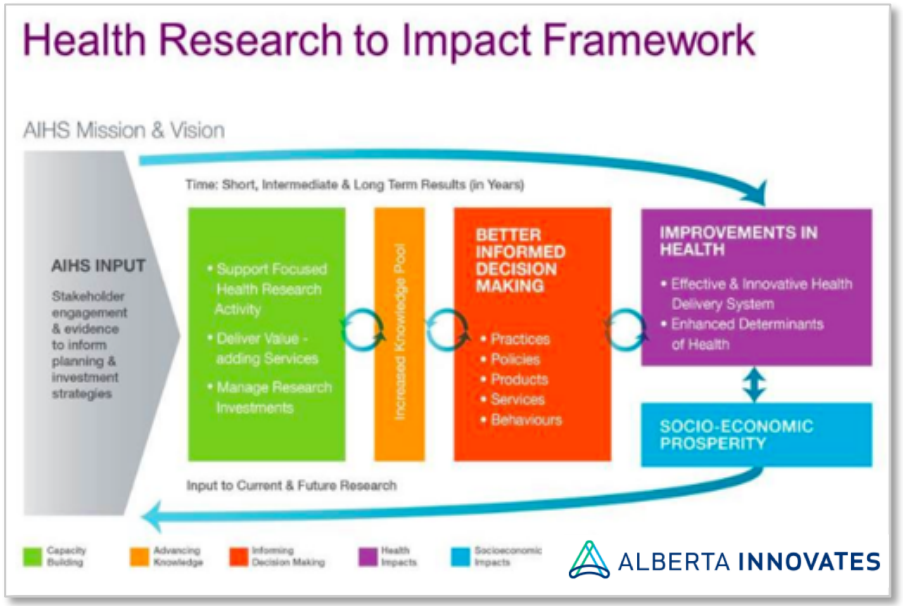
For example:

- Metrics/counts of outcomes
- Case studies
- Brief impacts
- One sentence (factoids/infographics)
- Blog posts
- Timelines

……..lets look at some examples

Some frameworks





Metrics #1

Knowledge generation			2012	2013	2014	2015	2016
6.1.1	Instances of journal articles reported in researchfish®	#	4949	5448	5010	5712	5717
6.1.1a	Number of unique journal articles (NERC only)	#	3330	3579	3304	3817	3858
6.1.1b	Of which % international co-authored – NERC only	%	60	64	62	63	66
6.1.2	Instances of books	#	30	48	28	30	29
6.1.3	Instances of books chapters	#	149	139	131	169	121
Knowledge generation			**2008**	**2009**	**2010**	**2011**	**2012**
6.1.4	Number of awards that gave rise to at least one publication	#	383	345	554	440	502
6.1.4	Proportion of awards that gave rise to at least one publication	%	80	82	79	85	85
Knowledge generation			**2012**	**2013**	**2014**	**2015**	**2016**
6.2.1	Instances of artistic and creative outputs	#	7	15	38	27	33
6.2.2	Instances of research databases and models reported	#	90	106	134	129	135
6.2.3	Instances of software and technical products reported	#	18	23	68	79	72
6.2.4	Instances of research tools and methods reported	#	19	20	30	39	51
6.2.5	Instances of medical products, interventions and clinical trials	#	0	0	2	0	0
6.3	Instances of IP reported	#	5	8	6	8	9
6.3a	Income from IP activity (reported by financial year – NERC only)	£m	2.6	2.9	3.2	3.2	3.9
6.4	Instances of spin-outs/start-ups	#	0	1	2	3	1

✓ Publications

✓ Product sections

✓ IP

✓ Spin Outs

Ref: Natural Environment Research Council (UK) Impact Report 2017

Metrics #2

✓ Publications

✓ Medical Products, Interventions & Clinical Trials

✓ Influence on Policy

✓ Collabs & Partnerships

✓ Further Funding

✓ Next Destination

✓ Spin Outs

✓ Engagement activities

Ref: AMRC Making a difference: Impact report 2019

Impact Case Studies

Antimicrobial resistance

Bacteria-eating viruses

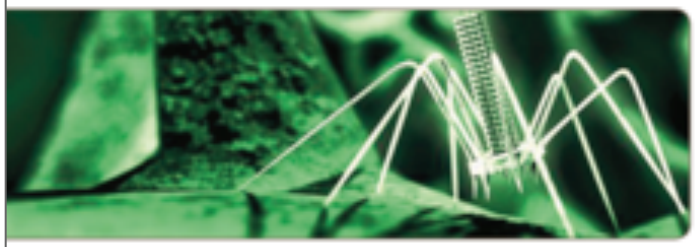


Image: Bacteriophage.
Credit: BlueSci. Cambridge Univer

With the ever-growing threat of antimicrobial resistance, there is a critical need for alternatives to antibiotics. MRC-funded researchers at the University of Leicester are pursuing one such route. A team led by Dr Martha Clokie has isolated bacteriophages — viruses that 'eat' bacteria — targeting the hospital superbug *Clostridium difficile* or *C. difficile*.

Bacteriophages were discovered and used as a therapy for bacterial infections almost 100 years ago, long before the development of antibiotics. Dr Frederick Twort, a British bacteriologist and later recipient of MRC funding, is credited with their initial discovery in 1915. French-Canadian scientist Felix d'Herelle later developed them to treat infections following his independent discovery of them in 1917.

To date however, they are not in widespread use. Although phages did reach commercial production in the 1940s, and have been used to treat several bacterial infections, treatment does not produce consistent results. In the pre-antibiotic area, many aspects of phage biology were not well understood. Doses of phages often did not contain enough viable viruses to be effective, and viruses were used that did not kill the intended bacteria[1]. There were also problems with the production of a stable contaminant-free phage stock. Perhaps the greatest barrier to phage acceptance in the west was the inadequate scientific methods used by researchers, such as the exclusion of placebos in trials[2]. With the advent of the antibiotic dawn, phage research and production were all but shelved, with the exception of Eastern Europe and the former Soviet Union where they continue to be used therapeutically.

Renewed interest

Now the threat of widespread antimicrobial resistance has sparked a renewed interest in phages. Dr Clokie has been studying phages for 14 years. She says, "As their natural enemy, phages specifically target and kill bacteria. They encode a diverse set of gene products that can potentially be exploited as novel antimicrobials. They have the advantage over antibiotics of being much more specific and, as they can self-replicate at the site of an infection, they are able to clear infections that antibiotics can't reach." Over the past few years, Dr Clokie has isolated and characterised 40 different phages that infect *C. difficile* — the largest known set of these phages. Of these, she has developed a specific mixture that has proved to be effective against 90 per cent of the most clinically relevant *C. difficile* strains seen in the UK. The US pharmaceutical company AmpliPhi are funding the further development of these phages, with the aim of testing them in Phase I and Phase II trials. This will involve optimising phage preparations for maximum effectiveness against *C. difficile* infections and establishing production, storage and delivery systems for the phage mixture. Dr Clokie will evaluate the effectiveness of the therapy and dosing regimes in collaboration with Dr Gill Douce at the University of Glasgow.

© Medical Research Council 2014

- ✓ Publications
- ✓ Research Materials
- ✓ Collab & Partnerships
- ✓ Further Funding

Ref: Medical Research Council outputs, outcomes & impacts report, 2015/16

Blog posts

MRC Weatherall Institute of Molecular Medicine | MRC Medical Research Council | University of Oxford

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From the bench to VR

Centre for Computational Biology RDM

11 July 2018

Computational Biologist Stephen Taylor and his team were awarded an Innovation grant to develop a software package that allows researchers to use virtual reality for scientific research and public engagement.

Virtual Reality (VR) is a fantastic tool to interact with complex 3 D objects and data, and an excellent way to showcase research in an intuitive way. Yet the lack of computational 'know how' is a barrier for biomedical scientists interested in exploring the technology. **Stephen Taylor**, from the **MRC WIMM Centre for Computational Biology**, developed a software called BabelVR which aims to overcome this obstacle. BabelVR allows 3D images from a variety of devices (such as CT scanners, microscopes, etc) to be viewed and interacted with in a VR environment. The prototype is already being used at the MRC

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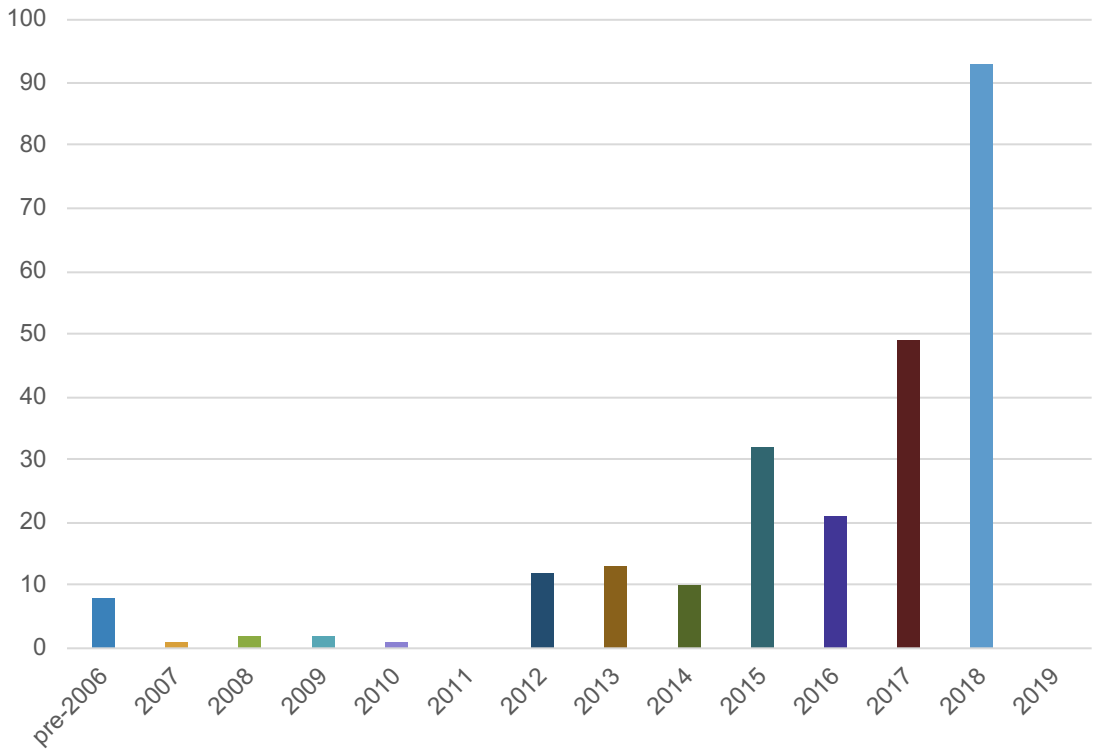
The battle within- new animation on the immune system

7 March 2019

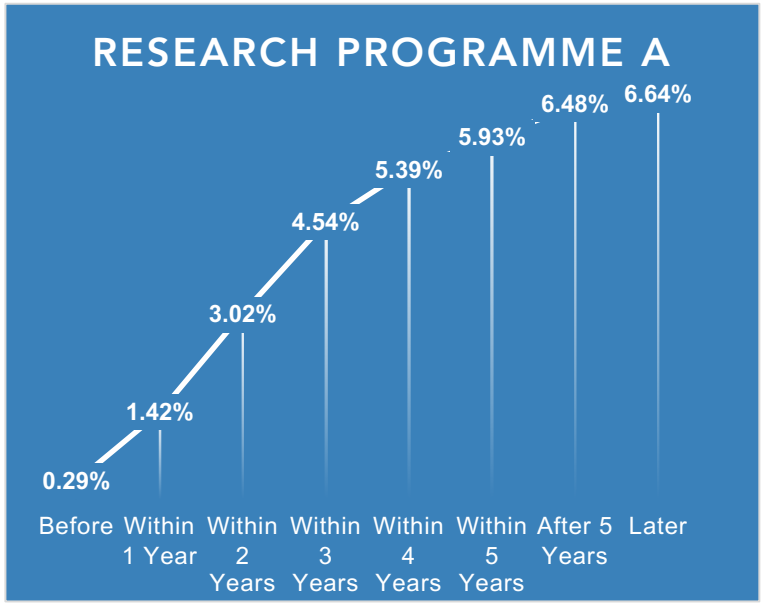
- ✓ Software & Technical Products
- ✓ Further Funding
- ✓ Collabs & Partnerships
- ✓ Engagement activities

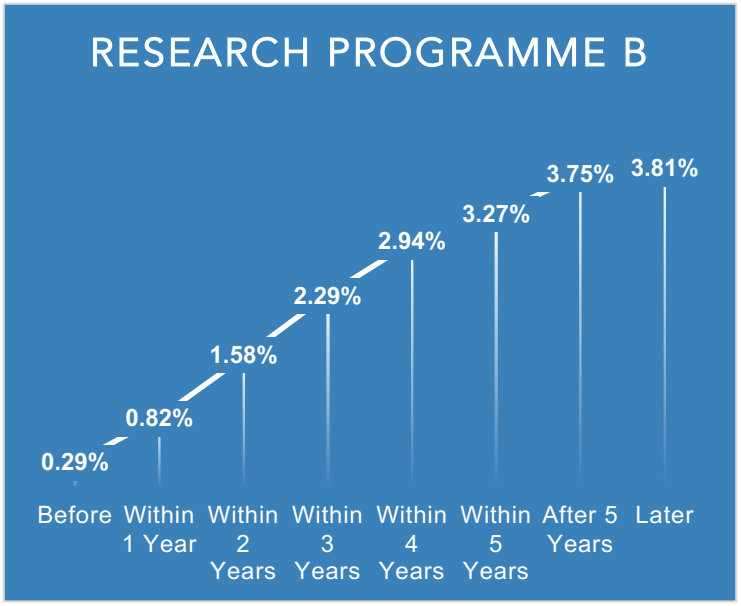
Ref: University of Oxford website 2018

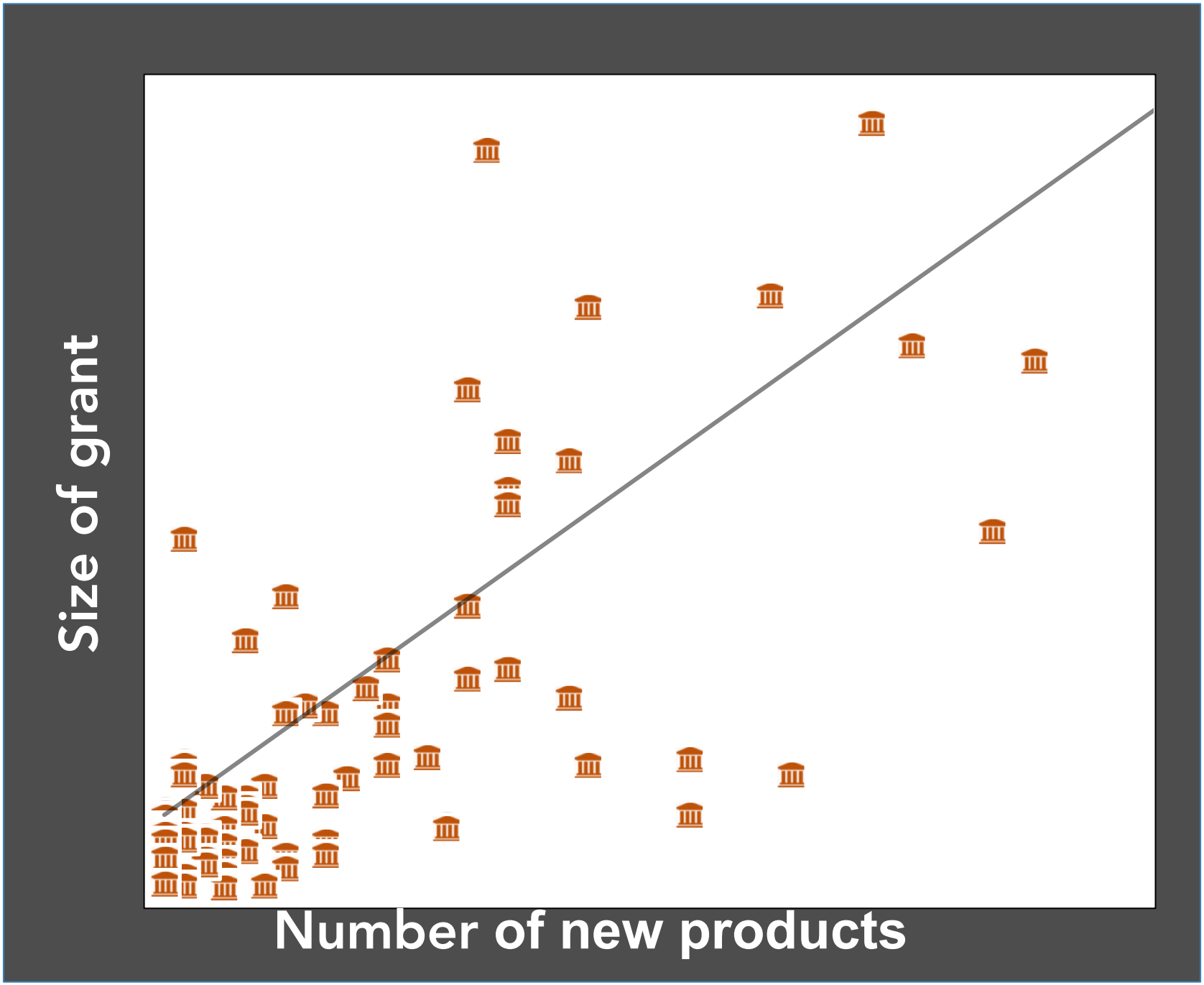
Trend in numbers of collaborations over time



% of awards reporting commercialization activities from the start of award depending on research programme






Size of grant
Number of new products

Summary

Evidence will always be seen through the values of policy-makers

Narratives and metrics are both important

Richness of research outcomes data is beginning to demonstration potential for advanced analytics

What gets measured, … gets improved

Summary

Evidence will always be seen through the values of policy-makers

Narratives and metrics are both important

Richness of research outcomes data is beginning to demonstration potential for advanced analytics

What gets measured, … gets improved

or gets systematically mis-measured?

Questions?

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http://www.researchfish.com/why-report

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Please come to our conference: Strategy of Impact: building a community, 12th November 2019, London