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RESEARCH IMPACT

UNDERSTANDING IMPACT AND DEVELOPING
WORLD-CLASS IMPACT CASES

(A UK PERSPECTIVE)

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About me



2016-2021, Associate Director
for Research Impact and
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Supervised the submission of ten
impact cases for REF2021

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AMBS strengthens its position as a leading
business school for research

Thursday, May 12, 2022 [Research School](#)

Alliance Manchester Business School is placed third in the UK for research power(1) – which measures the quality and scale of research impact – in the UK government's Research Excellence Framework (REF) 2021.

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AMBS REF 2021 results:

- 1st in UK for impact research power (GPA × number of cases)
- 5th in UK by impact GPA of 3.7 (up from 35th in 2014)
- 75% of impact rated world leading (4*) and 95% rated world leading or internationally excellent (4* or 3*)

UK REF 2021 Results: Business & Management Rankings by Proportion of 4* Impact Cases

Rank	Institution name	FTE of submitted staff	% of eligible staff submitted	4*	3*	2*	1*
1	Middlesex University	85.75	55	78.6	21.4	0	0
2	The University of Manchester	163.10	100	75	20	5	0
3	School of Oriental and African Studies	19.50	100	75	25	0	0
4	The University of Westminster	47.35	25	75	25	0	0
5	University of Exeter	79.10	100	71.4	28.6	0	0
6	University of Cambridge	61.20	100	70	20	10	0
7	City, University of London	124.55	85	66.7	27.7	5.6	0
8	University of Oxford	84.20	100	64.3	35.7	0	0
9	University of Southampton	93.83	100	64.3	28.6	7.1	0
10	Cranfield University	40.10	100	62.5	37.5	0	0

WHAT IS IMPACT?

“For the purpose of RAE 2026, impact is defined as the demonstrable contributions, beneficial effects, valuable changes or advantages that research qualitatively brings to the economy, society, culture, public policy or services, health, the environment or quality of life whether locally, regionally or internationally; and that are beyond academia.



Impact in this context includes, but is not limited to -
 (a) positive effects on, constructive changes or benefits to the activity, attitude, awareness, behaviour, capacity, opportunity, performance, policy, practice, process or understanding, of an audience, beneficiary, community, constituency, organisation or individuals; or

(b) the reduction or prevention of harm, risk, cost or other negative effects.”

https://www.ugc.edu.hk/eng/ugc/activity/research/rae/2026/guidance_notes.html

Weighting of RAE elements		
	2020	2026
Outputs	70	65
Impact	15	20
Environment	15	15

Impact

≠

Dissemination

Knowledge exchange

Academic influence

Change

Artefacts or activities

e.g., products, devices, events

Impact = Benefit

“demonstrable and/or perceptible **benefits** to individuals, groups, organisations and society (including human and non-human entities in the present and future) that are causally linked (necessarily or sufficiently) to research”

Reed, M. S., Ferré, M., Martin-Ortega, J., Blanche, R., Lawford-Rolfe, R., Dallimer, M., & Holden, J. (2021). Evaluating impact from research: A methodological framework. *Research Policy*, 50(4), 104147, <https://doi.org/10.1016/j.respol.2020.104147>

Benefit

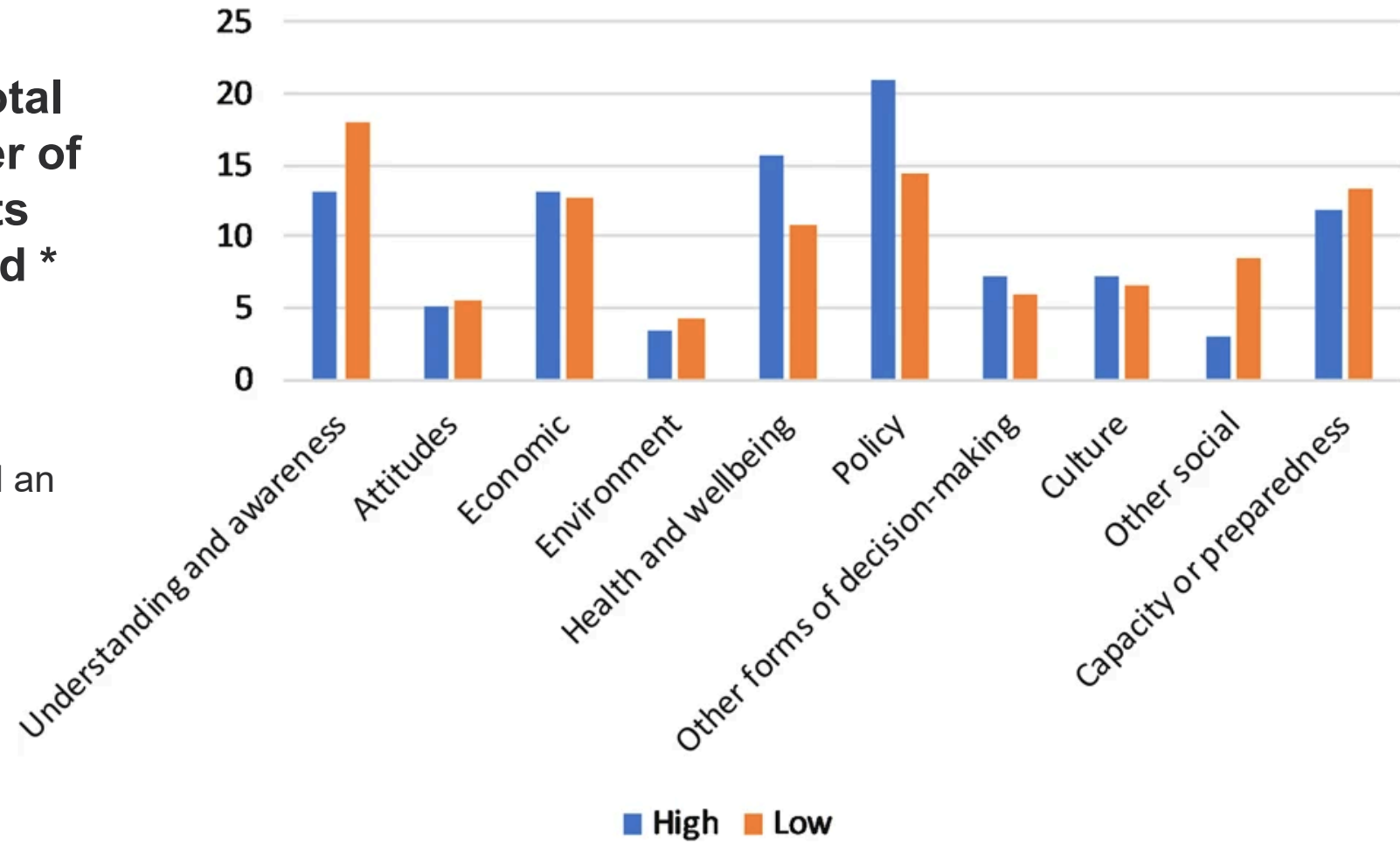
=

Who benefits?
(Reach)

How do they benefit?
(Significance)

IMPACTS CLAIMED IN HIGH AND LOW SCORING CASES BY IMPACT TYPE

% of total number of impacts claimed *



* High-scoring cases claimed an average of 2.8 impacts, low-scoring cases claimed an average of 1.8 impacts.

IMPACT RATINGS

4 star (4*): outstanding impacts in terms of their reach and significance

3 star (3*): considerable impacts in terms of their reach and significance

2 star (2*): some impacts in terms of their reach and significance

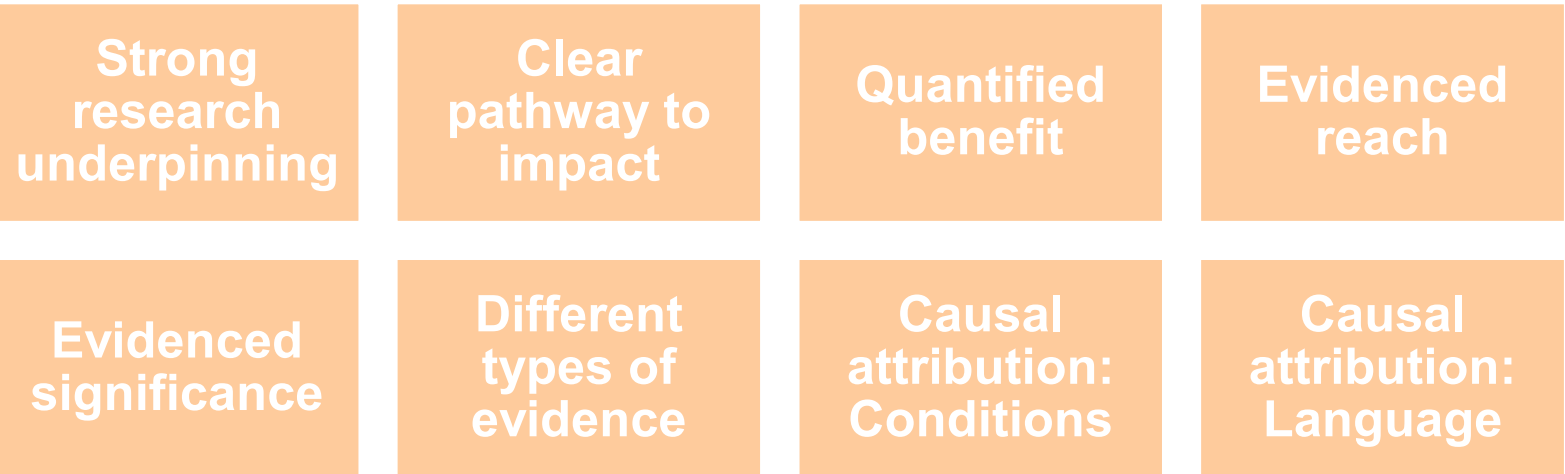
1 star (1*): limited impacts in terms of their reach and significance

Unclassified (u/c): the impact is of either no reach or no significance; or the impact was not eligible; or the impact was not underpinned by research produced by the submitting unit; or nil submission.

https://www.ugc.edu.hk/eng/ugc/activity/research/rae/2026/guidance_notes.html



ELEMENTS OF A 4* IMPACT CASE



RESEARCH UNDERPINNING



Evidence suggests that stronger cases focus on *discoveries, new findings, novel (empirical or theoretical) insights, new perspectives*, ... that in turn lead to impact, not just strong individual pieces of research

[Multi-level perspective on socio-technical transitions](#)

[A new perspective on spontaneous volunteers](#)

[Foundational economy](#)

RESEARCH UNDERPINNING

Case *	Narrative	Underpinning
Multi-level perspective on socio-technical transitions	A new theoretical perspective that reframes how to address climate challenges in terms of facilitating systems-level social and technological shifts, rather than focusing on taxes and incentives.	<ul style="list-style-type: none"> • Six peer-reviewed journal articles (<i>Science, Nature Climate Change, Research Policy</i>, 1 in general social science, 2 in applied environmental journals)
A new perspective on spontaneous volunteers	A new perspective that, rather than viewing spontaneous volunteers as a hindrance to professional emergency responders, views them as a useful resource to be managed.	<ul style="list-style-type: none"> • Five peer-reviewed articles (4 in applied emergency management, 1 in operations research) • 1 government report
Evaluating and improving extended access to primary care	Two large evaluation studies found that extending the opening hours of GP (General [medical] Practitioners) surgeries led to 26.4% fewer referrals (10,933 visits) to A&E with minor problems, leading to a 26.6% reduction in costs (GBP 767,000).	<ul style="list-style-type: none"> • 4 peer-reviewed journal articles (medicine & social science, inc. open access) • Two policy reports

RESEARCH UNDERPINNING



Evidence suggests that stronger cases focus on *discoveries, new findings, novel (empirical or theoretical) insights, new perspectives, ...* that in turn lead to impact, not just strong individual pieces of research

[Multi-level perspective on socio-technical transitions](#)

[A new perspective on spontaneous volunteers](#)

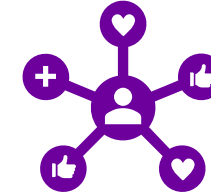
[Foundational economy](#)



Underpinning references should be chosen to tell a compelling and coherent story that enables clear links from the research to the pathway and impact

Case writers need to work back (from impact to the references) as well as forwards

The references need to tell a clear and consistent story ... even if there are differences in terms of methods, data, outlets, etc



Consider the (six) references collectively

They (should) indicate a body of work, ideally a sustained line of inquiry on the focal problem

A mix of references is OK; E.g., policy/industry reports alongside 3* & 4* peer reviewed articles

In REF2021, strong cases often included policy and industry reports as *part* of underpinning

RESEARCH UNDERPINNING

- > Should be equivalent to at least 2*, i.e., of international standing
- > Does highly rated research = highly rated impact?
 - > Some UK evidence that in 2014 for business, UoAs with higher output GPAs were more likely to receive higher grades for impact ($R^2 = 0.37$; see Kellard & Sliwa, 2016)
 - > *But* the quality of research underpinning in the top ten (2.61 CABS) did not differ from the middle ten (2.81 CABS). Note bottom ten = 2.44 CABS
- > High output GPA does not guarantee high impact GPA
 - > In REF2021: LBS 1st vs 49th
- > Units with lower output GPA can still achieve high impact scores
 - > In REF2021 for business, Top 3 on impact GPA scored below average on output GPA
- > But, consider potential 'halo' and 'horns' effects
 - > High quality underpinning can provide a strong signal ...and vice versa
- > **Imperative to describe the originality, significance and rigour of the research**

PATHWAYS TO IMPACT

- > Describes the activities linking the research to the benefit
- > A crucial but often underspecified part
- > Provides credibility & causal attribution
- > Pathway should be:
 - > Specific (dates, events)
 - > Unambiguous (actors identified, causes attributed)
 - > A compelling (and plausible) story
- > Two options for specifying the pathway
 - > Extracted
 - > Embedded
 - > Which is best?

4. Details of the impact

The research led by Shaw has provided extensive benefits to local and regional governments responding to emergencies. In brief, the benefits are:

- A new International Standard for managing emergencies, ISO 22319:2017 'Guidelines for planning the involvement of spontaneous volunteers'
- New policies and plans for local governments, underpinned by a shift in positive attitude toward SVs, which have significantly improved emergency response capabilities
- New guidance from national governments on managing SVs
- Tangible benefits from the deployment of SVs during actual emergencies

Context and pathway

Based on his body of research, the International Organization for Standardization (ISO) invited Shaw to write guidelines for managing spontaneous volunteers, which they published in 2017 as International Standard ISO22319 [A]. Shaw's 2015 report [1] is the only academic work cited in ISO22319, which is available in 5 languages and sold in over 24 countries. International Standards provide an international consensus on the state of the art in the subject of a given standard and provide significant economic and social benefits to organizations adopting them. ISO22319 codified lessons from Shaw's research into a planning framework for governmental emergency managers. The standard provides practical guidance to ensure that SVs safely provide capability and capacity to help communities respond to, recover from and build resilience in the aftermath of major emergencies. Shaw has subsequently worked with local, regional and national governments in the UK, Chile, and Argentina to design and implement new plans and policies for managing SVs, based on his research and the associated guidelines embodied in ISO22319.

Changes in understanding of and attitudes towards SVs

Prior to Shaw's research, the term 'convergent volunteer' was used in the UK Parliament's Civil Contingencies Act 2004 and consequently by local and regional authorities and emergency responders. LAs had not planned for convergent volunteers – most were concerned about the risks they presented, so turned away volunteers or failed

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EVIDENCING QUANTIFIED BENEFIT

- > The most vital part of the case: The numbers!
 - > Who benefited?
 - > How did they benefit?
 - > To what extent did they benefit?
- > One useful tool is a template that strips away unnecessary details and tabulates:
 - > The researchers involved
 - > The underpinning research
 - > The activities of the pathway
 - > The key impacts and pieces of evidence
- > What if I have not described impact using numbers in my case?

Guidance for standardising the use of quantitative indicators of impact within REF case studies

Style guide

This consists of general stylistic items that can be standardised to make quantitative indicators of impact, and specific formulations of them, more discoverable in the case studies. The style guide would apply across all of the specific guidance.



Numbers



Percentages and rates



Measures of change



Time periods



Units



Currency

Specific guidance

This covers more specific and commonly occurring quantitative indicators that have been used as evidence of impact in the case studies. Standardisation could improve discoverability of quantitative indicators of impact and their potential aggregation.



Engagement



Mentions in non-academic documents and the media



Employment



Financial figures



Emissions

https://www.rand.org/content/dam/rand/pubs/research_reports/RR2400/RR2463/RAND_RR2463.pdf

IMPACT CASE TEMPLATE

Research participants/collaborators and affiliations

UoA Academics	Non-UoA Academics	Non-academic partners
...		

Research outputs for underpinning

Publications/outputs	Key findings related to the impact
1 ... 6	

The pathway to impact, e.g., ...

Activities/Pathway	Link to research and impact
...	

Details of beneficiaries

Name/Group/Population/Publics	Organization/Sector
...	

Impact and evidence, including nature of impact and numbers indicating reach and significance

Impact	Evidence
<ul style="list-style-type: none">• ...• ...	<ul style="list-style-type: none">• ...• ...

EXERCISE: EVALUATING EXAMPLE IMPACT CASES

Time: Approx. 40 minutes

EVALUATING IMPACT CASES

- > I have provided two sample impact cases from the UK's REF2021

Task (30 minutes)

1. Read the cases individually
2. Rate each case individually (use a 9-point scale, 0, 0.5, 1 ... 4)
3. Discuss the cases in breakout groups
4. Agree a grade. Decide: Which is 1*/2* and which is 3*/4*?



EVIDENCING REACH

Examples from high-scoring cases	Examples from low-scoring cases
<p>Specifying who was reached. Clear identification of beneficiaries: locations, groups, organizations, gov. departments, e.g., <i>Social Enterprise</i>: “Government Inclusive Economy Unit and Office for Civil Society”.</p>	<p>Underspecifying or being ambiguous. Not clear who benefited; e.g., <i>Regional Sustainability</i>: who in the supply chain benefited? <i>Business Modeling</i>: “European technology and solution providers”.</p>
<p>Quantifying reach. Providing numerical descriptions of number of beneficiaries reached, e.g., <i>Gender Diversity</i>: “the report provides all 213 NHS Trusts in England with guidance”.</p>	<p>Lacking details. Not describing size of organizations, not providing numbers of employees benefitting, listing examples but not conveying scale; e.g., <i>Business Modeling</i>: “help train their police officers”.</p>
<p>Strong pathway from research to beneficiaries. Clear how expert research reached the beneficiaries.</p>	<p>Weak pathway to beneficiaries. Not clear how research or expertise came to those affected.</p>

See also Reichard, B., Reed, M.S., Chubb, J. *et al.* Writing impact case studies: a comparative study of high-scoring and low-scoring case studies from REF2014. *Palgrave Commun* **6**, 31 (2020). <https://doi.org/10.1057/s41599-020-0394-7>

EVIDENCING SIGNIFICANCE

Examples from high-scoring cases	Examples from low-scoring cases
<p>Quantified significance. Numerical statement of benefit. E.g., <i>Gender Diversity</i>: “[Previously] only 25% of candidates were female. In 2019, based on research recommendations, the programme was advertised more widely using social media, resulting in 45% of the 100 candidates being female.”</p>	<p>Underspecified significance. Stating type of benefit but not in measurable terms. E.g., <i>Business Modeling</i>: “These developers have enjoyed improved efficiencies in production”.</p>
<p>Showing. Detailed and specific evidence that illustrates the benefit. E.g., <i>Spontaneous volunteers</i>.</p>	<p>Telling. Telling about the impact but not showing it. E.g., <i>Business Modeling</i>: “Six compelling international commercial case studies, supported by testimony” ... but no further detail explicitly provided in the narrative.</p>
<p>Robust evidence. Credible sources corroborate claims, robustness via triangulation of methods/data. E.g., <i>Gender Diversity</i>: Combines numerical evidence with clear descriptions of policy changes in three NHS Trusts.</p>	<p>Weak evidence. Sources are doubtful (partisan), use weak research or evaluation designs (e.g., no baseline), and do not combine evidence. E.g., <i>Regional Sustainability</i>: New toolbox but no evaluation or testimony.</p>

See also Reichard, B., Reed, M.S., Chubb, J. *et al.* Writing impact case studies: a comparative study of high-scoring and low-scoring case studies from REF2014. *Palgrave Commun* **6**, 31 (2020). <https://doi.org/10.1057/s41599-020-0394-7>

EVIDENCING SIGNIFICANCE: SPONTANEOUS VOLUNTEERS

“Prior to Shaw’s research, the Chilean authorities were unprepared for managing SVs. Shaw and Moreno had previously worked with LAs in Chile on community resilience. On hearing of Shaw’s work on SVs, several Chilean LAs requested Shaw and Moreno’s assistance to **implement ISO22319**. Twenty organisations across Concepcion Province (population 960,000) collaborated to develop Latin America’s first SV plan, published in December 2018 [H].

The National Director of the National Youth Institute of Chile (INJUV) and the **Director of the Department of Disaster Risk Reduction** described how the plan was put into action. They state that:

*“ In May 2019 two tornados hit Concepcion Province and caused significant destruction whereby it was necessary to conduct our first activation of our SV plan, which successfully registered **+150 SVs** who were deployed to provide support. These SVs **created capacity** in responders to do other important work, collect information on needs of the public so we could better target our response, **completed tasks for affected citizens, reduced secondary damage to property by the tasks they completed, and hastening recovery of the affected populations**”*



Shaw, D. 2021. Influencing policy, management practices, and response capabilities for the effective management of spontaneous volunteers during disasters

TYPES OF EVIDENCE

Type	Uses
Testimonials	<ul style="list-style-type: none">• The ‘killer’ quote: Kills any doubt in the reader about attribution, reach, and significance<ul style="list-style-type: none">• E.g., “<i>the documents and other activities that we developed are largely based on their work... The research of Edler and colleagues was essential for providing evidence that persuaded agencies that were initially resistant to join in the PPI strategy</i>”• Use selectively, since overuse can suggest lack of objective evidence• Must be carefully curated• Testimony should be used explicitly in the text: Panel members may not read letters
Evaluation studies and formal research designs	<ul style="list-style-type: none">• The gold standard for evidencing benefit (e.g., RCTs)• But, rare and difficult in some fields (inc. business and management!)• E.g., <u>Extending access to primary care</u>
Verifiable sources	<ul style="list-style-type: none">• Independent evidence from credible organizations, e.g., WTO, World Bank, IMF, WEF• Citations in policy documents, official government statistics• References in company/industry reports
Surveys and primary data	<ul style="list-style-type: none">• Can be effective way to combine quantitative and qualitative data,• E.g., <u>Environmental impact of events</u>: “the survey found that 27% had reduced the negative environmental impact of their events as a result of using the toolkit ... [One respondent stated] that they “reduced single use plastic water bottles by more than 50%, from 55,000 in 2017 to 20,000 in 2018”

CAUSAL ATTRIBUTION: CONDITIONS



Temporal precedence

What was the situation before the research?
Describe the previous state of affairs

Explain how the research preceded (or co-developed with) the impact activities



Necessity

Evidencing how the research was a necessary condition for the benefit to occur



Counterfactual

Would the specific benefits have been realised without the research? If no, explain.



Sufficiency

Was the research sufficient to trigger the benefits documented? Particularly important for policy

CAUSAL ATTRIBUTION: LANGUAGE



“Led by”, etc

“X **led** a group of colleagues to analyse”

“Professor X has **developed** a methodology”

“In 2005 X was **engaged** as an expert international adviser”



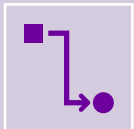
“Used”, etc

“The new plans and practices were **used** in 2020 as part of local government responses to the COVID-19 pandemic”



“Improved”, “increased”, etc

“The University of Manchester research informed the preparation and production of Lincolnshire County Council’s Co-ordination of Spontaneous Volunteers in Civil Emergencies Policy and Procedure thus **improving** practice around the management of and knowledge about Spontaneous Volunteers”



“Resulting in”, “producing”, etc

“The Chilean government then used the MIOIR research led by X for the IDB to develop a government working document for PPI and a national initiative on PPI, **resulting** in national guidelines for public procurement

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CONCLUSIONS AND IMPLICATIONS



CONCLUSIONS AND IMPLICATIONS 1

- > Think in terms of benefit, not impact
 - > Who benefits? (Reach)
 - > How do they benefit? (Significance)
- > Rigorously research the benefits of your own cases
 - > Gathering evidence takes time ... and takes resources to collect, refine, and augment
 - > Evidence gathering requires close relationships with beneficiaries and stakeholders
 - > No amount of story telling can compensate for the lack of strong evidence
- > But, crafting the narrative is a discipline
 - > Like all good writing, writing a good narrative takes many drafts (involving several people)
 - > Difficult to craft a 4* case without understanding what a 4* case looks like and what it does not look like (i.e., a 1* and 2* case)

CONCLUSIONS AND IMPLICATIONS 2

- > Producing an impact submission is a collective endeavour
 - > The unit of analysis is the UoA, not the individual researcher
 - > Where possible, think and act in groups and teams
- > Develop a culture of peer review and learning
 - > Create opportunities for PIs to discuss and collaborate
 - > The 'impact summit'
- > Writing a compelling case requires a promotion focus
 - > Compliance with external evaluation can foster a prevention focus
 - > RAE is an opportunity to showcase your research and how it makes the world a better place

RESOURCES

> Guidance notes on the exercise

> https://www.ugc.edu.hk/eng/ugc/activity/research/rae/2026/guidance_notes.html

> Example cases

> <https://2021.ref.ac.uk/> (REF2021, 6,781 impact cases)

> <https://impact.ugc.edu.hk/> (RAE202, 340 impact cases)

> Tools and publications

> <https://www.fasttrackimpact.com/> (Professor Mark Reed)

> RAND report on standardizing impact metrics

> https://www.rand.org/content/dam/rand/pubs/research_reports/RR2400/RR2463/RAND_RR2463.pdf

> Articles specific to business and management impact cases

> Kellard, N. M., & Śliwa, M. (2016). Business and management impact assessment in research excellence framework 2014: Analysis and reflection. *British Journal of Management*, 27(4), 693-711, <https://doi.org/10.1111/1467-8551.12186>

> Blackburn, R., Dibb, S., & Tonks, I. (2024). Business and management studies in the United Kingdom's 2021 research excellence framework: Implications for research quality assessment. *British Journal of Management*, 35(1), 434-448, <https://doi.org/10.1111/1467-8551.12721>

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THANK YOU!

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Division

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Institution: ██████████		
Unit of Assessment: Business and Management Studies C17		
Title of case study: Business Modeling and Management of Asset Based Development for the Digital Games Industry		
Period when the underpinning research was undertaken: 2014-2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Paul Hollins	Professor Cultural Research Development (IoM)	2003 to present
Dai Griffiths	Professor Educational Cybernetics	2008 to present
Paul Cowley	Researcher Institute of Management (IoM)	2015 to present
Denis Hyams-Ssekasi	Research Coordinator Institute of Management (IoM)	2015 to present
Li Yuan	Research Reader	2008 to 2018
Period when the claimed impact occurred: 2015-2020		
Is this case study continued from a case study submitted in 2014? No		
1. Summary of the impact (indicative maximum 100 words)		
<p>The Institute of Management (IoM) led the research in the Realising an Applied Gaming Ecosystem (RAGE) European H2020 project; investigating the structures, business models, value chains and component-based production processes deployed by the applied digital games industry. Significant impact was achieved as the new component-based production processes and models developed by the project are now embedded in the practice of commercial European games developers and the games containing the assets are accessed by learners located in in France, Portugal, Netherlands, Italy, UK, Spain and Germany. The European Commission selected the project for the prestigious EU 'Innovation impact' award in 2018.</p>		
2. Underpinning research (indicative maximum 500 words)		
<p>The global demand for games designed with a purpose other than leisure or entertainment referred to as applied games is expected to increase over the coming years. The applied games industry in Europe is fragmented and competitively disadvantaged in relation to the more established industries of the United States and Asia. The RAGE project investigated whether the industry could learn form and adopt production and business processes and methodologies deployed by their successful leisure industry counterparts to achieve a competitive advantage. The IoM led the project with other partners contributing technical and pedagogic expertise, commercial exploitation and administration. This research sought to identify good practice in the development processes and business models of the more established leisure industry that could be deployed to increase efficiency and the profitability of developers whilst improving the quality of their products. This involved extensive research in to the process and business models of the</p>		

more established leisure games industry through stakeholder consultation and a comparative analysis of the established and emergent business models and value chains of both industries. The principal aim was to develop new business and process models that could serve to underpin the potential growth in demand for applied games.

A significant barrier to international competitiveness identified was the cost of production related to the efficacy of development processes and specifically the high cost of development. In the leisure industry the use of outsourced middleware and software components was commonplace. Businesses such as Unity served demand by providing a market place of components or assets that were affordable and widely used by the industry. However, whilst these methodologies and business models were well established in the leisure industry in the applied industry they were not. These methodologies and models had not been validated and were largely untested in the applied industry; where complex pedagogic features and functions were identified and highlighted as essential ingredients of applied games. The RAGE project undertook to establish an equivalent asset-based market place for the applied industry in Europe. This involved the development and testing of reusable, interoperable, open source software assets by technical partners. The assets, process and business models were evaluated and tested and the provision of a platform to market these assets. The assets were made available to the European development industry with the aim of condensing the development time to market and several pilots were undertaken with the industry as a proof of concept. The assets were rigorously tested by the developers based in the UK, France, Germany and Holland. The efficacy of the processes assets and business models was further evaluated.

3. References to the research (indicative maximum of six references)

1. Cowley, P, Hyams Ssskasi, D. & Hollins, P. (2020) Triple Helix as a Tool for Knowledge Management, Transfer and Entrepreneurial Outcomes on a European Scale: A Case Study of the Rage Project. Eurasia Business Economics and Society Conference Istanbul 2020 <http://ebesweb.org/Conferences/32nd-EBES-Conference-Istanbul.aspx> (Accessed August 2020)
2. Cowley, P. Hyams Ssekasi, D. & Hollins, P. (2020) Stakeholder Perspectives on an EU project for applied games design. 'Edulearn' 2020 Spain https://iated.org/concrete3/paper_detail.php?paper_id=83198 (Accessed August 2020)
3. Gergiev., Bontchev, B., Boytchev, P., Stefanov, K., Westera, W., Nyamsuren, E., Bahreini, K., Prada, R., Hollins, P. (2017) "The RAGE Game Software Components Repository for Supporting Applied Game Development" International Journal of Serious Games Volume 4, Issue 3, September 2017 ISSN: 2384-8766
4. Santos,P., Romeiro,P., Nunes,F., Hollins,P., Riestra,R. (2016) "The Video Game Industry in Portugal" Extended Paper in "Revista de Ciências da Computação", ISBN 978-989-207148-0 http://vj2016.di.ubi.pt/Santos_VideoGameIndustry_1-10.pdf (Accessed April 2019)
5. Published RAGE Project Deliverables in Work Package 7 (WP7) providing detail of the aspects of the research undertaken All reports Accessed April 2019:

Hollins, P. Yuan. L, Santos,P, Becker,J. Riestra,R. (2016) 'Summary Report of Business Models' <https://research.ou.nl/en/publications/d71-summary-report-of-business-models>
6. Hollins, P., Wistera, W., Manero, B. (2015) 'Amplifying applied game development and uptake' European Computer Games Based Learning Conference (ECGBL) Published in proceedings 8th October 2015 https://www.researchgate.net/publication/282336538_Amplifying_applied_game_development_and_uptake (Accessed April 2019)

4. Details of the impact (indicative maximum 750 words)National and International Impact

As a result of the research; methodologies, production processes and business models developed as outputs within Work-package 7 of the RAGE project have been widely adopted by the key beneficiaries of the research, European based applied game development studios. These developers have enjoyed improved efficiencies in production, gained insight into their competitive market and identified potential growth opportunities in applied games. Six compelling international commercial case studies, supported by testimony, refer to the corroboration of Impact 3,4,5,6,7,8, are provided as supporting evidence of the impact of the project on their internal development processes and business efficiencies. These case studies testimonies include from the United Kingdom Playgen and Gameware, from France BIP Media and from Germany Nurogames. The adoption of processes and asset-based production methodologies and business models have resulted in achieving significant development cost savings in research, development and production by the businesses concerned thereby improving their global competitive advantage.

The impact of the project outputs has extended beyond that of beneficiaries to research and development activities supported by the EU involving major international corporations. One of the highest profile of projects utilising the RAGE outputs is the “Jenner” applied game <http://shura.shu.ac.uk/22448/>.

The game was produced in collaboration between Sheffield Hallam University, Steel Minions Developers and Sony Playstation as part of the REVEAL project. This Virtual Reality (VR) Game included a VR, simulation of the house of Georgian Scientist Dr Edward Jenner and was developed applying the asset-based development methodologies and the use of a several of RAGE components. The 2019 gamification award winning project The Breaking Educational Barriers with Contextualised, Pervasive and Gameful Learning Beaconing project deployed a number of assets and adopted the RAGE processes methodology <https://beaconing.eu/>.

Another EU funded research and development activity to use the processes, asset-based methodologies and business models developed is the Intelligent Verification/Validation for Extended Reality Based Systems project which aims to establish a sustainable competitive ecosystem of European technology and solution providers for interactive technologies. <https://iv4xr-project.eu/>.

In Portugal, The Escola de Policia Judiciara, the Portugese Police training academy have adopted the RAGE processes and deploy the assets with their development partners in their production of learning materials to help train their police officers to be sympathetic with victims of domestic violence and to satisfy a variety of other training requirements.

Recognition and Awards

Early indications of the potential international impact of the RAGE project were recognised in 2017 when it was selected by the European Commission as one of the finalists of the European Innovation Radar prize. This is a prize for the most promising Early Stage Innovations across the breadth of EU Horizon 2020 programme one of the key criteria for the award was impactful innovation.

Furthermore, in 2019, the project was highlighted as being one of the most significant research and innovation projects in the Netherlands.

International applied and leisure industry groups and their members have engaged with the project including the United Kingdom Interactive Entertainment (UKIE), the Dutch (Netherlands) Games Garden, Balkan and French Industries and further evidence of the impact of the project the RAGE Ecosystem, Where the process models and assets are located is that over 850

European industry representatives have directly engaged with the project outputs processes and assets. A number of technical 'hackathons' have tested the processes and assets in Amsterdam, Vienna and in Brussels at the European Parliament. This impact has also been recognised within the EU commission as evidenced by two awards for achievement granted to the project and in the ongoing and significant influence on policy development of future EU research in the applied games development space.

The following is an extract from the RAGE (644187) Project Final Review Report completed by the European Commission, highlighting the impact of the project; '*RAGE as flagship project in the field of advanced gaming has elaborated an ecosystem for the applied gaming market offering a portal in form of a marketplace for all stakeholders of the applied gaming industry.*'

Sustainability of impact is assured as is the legacy of the research outputs under the custodianship of the recently established, RAGE foundation. In summary, the international impact of the Business Modelling and Management of Asset based development for the Digital Games Industry Case Study has been significant in terms of take up of the models and processes and in serving to stimulate the use of new asset-based development methodologies to help gain competitive advantage in the emerging applied games industry in the UK, France, Portugal, Germany, Netherlands, Italy and Spain.

5. Sources to corroborate the impact (indicative maximum of 10 references)

1. Links provided to information to the Technology with a societal Impact Exhibition at the European Parliament November 2018.

<http://rageproject.eu/rage-at-the-tech-with-a-societal-aspect-exhibition-in-the-european-parliament/>

<http://rageproject.eu/rage-goes-to-the-european-parliament/>

2. A link to video testimonials corroborating the use and impact of RAGE assets

<https://www.gamecomponents.eu/page/home>

The following are six testimonials provided by individual Game Development companies which corroborate the impact and cost benefit of engaging with the RAGE project and use of the individual RAGE components:

3. Case Study One - Jeremy Cooke Managing Director Gameware Europe (UK)

<https://www.gamecomponents.eu/page/case-studies> (Case Study 1)

4. Case Study Two – Jared Glass Lead Developer PlayGen (UK)

<https://www.gamecomponents.eu/page/case-studies> (Case Study 2)

5. Case Study Three – Jens Piesk Nurogames (Germany)

<https://www.gamecomponents.eu/page/case-studies> (Case Study 3)

6. Case Study Four – Jared Glass Lead Developer PlayGen (UK)

<https://www.gamecomponents.eu/page/case-studies> (Case Study 4)

7. Case Study Five – Thierry Platon Managing Director BIP Media (France)

<https://www.gamecomponents.eu/page/case-studies> (Case Study 5)

8. Case Study Six - Jeremy Cooke Managing Director Gameware Europe (UK)

<https://www.gamecomponents.eu/page/case-studies> (Case Study 6)

9. Letter of corroboration from Gameware Limited (as a user of the technologies and associated process and business Models)

Impact case study (REF3)

Institution: ██████████		
Unit of Assessment: UoA 17 Business and Management Studies		
Title of case study: Increasing gender diversity on UK public and private sector boards		
Period when the underpinning research was undertaken: 2016 to present		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Ruth Sealy	Associate Professor	2016 to present
Louise Tilbury	Research Practitioner Fellow	2016 to present
Period when the claimed impact occurred: 2016 to present		
Is this case study continued from a case study submitted in 2014? No		
<p>1. Summary of the impact</p> <p>Lack of diversity in leadership roles is an issue across UK public and private sector organisations. Research shows that non-diverse boards under-perform in comparison to diverse boards. Sealy has been instrumental in improving board diversity in the UK, using engaged research to identify and address systemic issues.</p> <p>Leadership policy and practice in the NHS: Sealy's research with all 400+ NHS boards, representing over 1.4 million employees, has driven national policy and individual organisational change. This includes changes to hiring practices and board composition, leading to an increased gender balance on NHS Trust boards, better talent management, greater legitimacy with service-users and better quality decision-making.</p> <p>Regulatory and policy impact in the private sector: Sealy's research has contributed to regulatory change within the Financial Reporting Council's update of the UK Corporate Code of Governance, reporting on board evaluation and diversity. The research has helped the 30% Investor Group achieve its goal of 30% of FTSE 350 board directors being women.</p>		
<p>2. Underpinning research</p> <p>Sealy's research focuses on increasing the proportion of women in senior leadership and boardroom positions. Previously, organisations assumed there was a supply problem, and focused on micro-level solutions such as more training for women. Sealy's research reframes the problem as one of demand - revealing systemic issues requiring multiple stakeholders and mechanisms to increase diversity [3.1]. Since 2007, Sealy has provided regular quantitative, qualitative data and advice to government departments, FTSE-listed companies, and major professional service firms, including in the government-backed annual Female FTSE Reports (with colleagues at Queen Mary and Cranfield Universities), and more recently for the NHS. Sealy et al.'s work highlights the need for the regular provision of data and measurable objectives for evidence-based decisions [3.1; 3.2].</p> <p>1. NHS Women on Boards (October 2016 to present)</p> <p>In 2016, the Chair of NHS Improvement announced a target of 50:50 gender balance across all NHS boards of directors by 2020. Based on her engaged research reputation [3.1], Sealy was invited to be the only academic member of the Advisory Board to look at <i>how</i> the NHS could achieve boardroom diversity. Data on gender composition of boards was not available, despite 77% of the NHS's 1.4 million employees being female, and women having outnumbered men as UK medical school graduates since 1993. Based on her research [3.1], Sealy recommended regular reporting and longitudinal data to establish reliable, systematic baseline metrics. This led to the initial data collection (Oct 2016-Jan 2017) on over 6,000 board directors on all 452 NHS boards in England. The findings and key recommendations were launched in March 2017 [3.3] and included the following insights and recommendations:</p> <ul style="list-style-type: none"> • Disaggregation of data revealed women's unexplained underrepresentation in important board roles (Non-executive, Finance Director, Medical Director and Chair) • An absence of intersectional research relating to black and Asian minority ethnic (BAME) women [3.4] • Recommended internal continuous capture and reporting of detailed board data 		

- Recommended NHS Confederation (NHSC- representing all health service organisations), proactively work with search firms to address gender imbalance.

2a. Board Evaluation Study (July-November 2017)

Since 2014, the UK's Corporate Code of Governance required basic reporting on the evaluation of a board and its diversity, including gender and its effectiveness. Research access to private sector boards is rare. Sealy and Vinnicombe (Cranfield University) identified Board Evaluators (BEs), as a novel source of board access. In 2017 Sealy led interviews with BEs representing over 65% of the largest FTSE 350 listed companies. Analysed by Sealy and Tilbury (XXXX), findings highlighted the importance of the Chair's role in avoiding 'tokenistic' dynamics [3.2], spelling out in behavioural terms the difference a diverse board makes, including contributing to board effectiveness through better decision-making [3.1]. The findings were presented within the government-sponsored 2017 Female FTSE Report [3.5], including a recommendation for the Financial Reporting Council's (FRC) new Code to include full disclosure requirements on the type of board evaluation conducted and the company's subsequent actions following evaluation.

2b. Board Diversity Reporting Research (2018-2019)

Acknowledging the importance of data analytics, the FRC supported Sealy's recommendations and commissioned her to conduct further research into FTSE 350 companies' reporting on diversity, board evaluation, and adherence to the current Code [3.2]. Findings provided a benchmark to understand the prominence (or not) of diversity as a strategic issue. Findings evidenced the success of transparency, public statements and measurable targets in subsequent increases in board and senior management diversity. Analysis revealed suggestions not mandated in the Code were not reported on. Therefore, mandating detailed reporting on board evaluation and succession planning leads to greater transparency (for investors) and more effective approaches to increasing diversity. The report was launched at the TUC General HQ [3.6] to over 230 Government officials, politicians, policy advisors, journalists, HR specialists, company secretaries, auditors, investors and accountants.

3. References to the research

- 3.1. Sealy, R.; Doldor, E.; Vinnicombe, S.; Terjesen, S.; Anderson, D. & Atewologun, D.** (2017) Expanding the notion of dialogic trading zones for impactful research: The case of women on boards research, *British Journal of Management*, 28, 64-83. DOI: 10.1111/1467-8551.12203 – 1 of only 4 articles in Special Issue on Impactful Research.
- 3.2. McLaughlin, H.; Silvester, J.; Bilimoria, D.; Jane, S.; Sealy, R.; Peters, K.; Moltner, H.; Huse, M. & Goke, J.** (2018) Women in Power, *Organizational Dynamics*, 47(3), 189-199. DOI: 10.1016/j.orgdyn.2017.09.001. – international peer reviewed journal
- 3.3 Sealy, R.** (2017) *NHS Women on Boards 50:50 by 2020*, NHS Improvement & NHS Employers. Available at: <http://web.archive.org/web/20201218090901/https://improvement.nhs.uk/resources/nhs-women-boards-5050-2020/>
- 3.4. Opara, V.; Sealy, R. & Ryan, M.** (2020) The workplace experiences of BAME professional women: Understanding experiences at the intersection, *Gender Work & Organization*, 27(6), 1192-1293. DOI: [10.1111/gwao.12456](https://doi.org/10.1111/gwao.12456) – international peer reviewed journal
- 3.5. Sealy, R.; Tilbury, L. & Vinnicombe, S.** (2017) *Leading diversity in the boardroom: board evaluation project 2017*. Working paper, available at: <http://hdl.handle.net/10871/32821>
- 3.6. Sealy, R.** (2018) *Board Diversity Reporting*, Financial Reporting Council, UK. September 2018. Available at: <http://web.archive.org/web/20201218092129/https://www.frc.org.uk/getattachment/62202e7d-064c-4026-bd19-f9ac9591fe19/Board-Diversity-Reporting-September-2018.pdf>
- 3.5 & 3.6: Multiply cited in government's 2019 Annual Review of Corporate Governance [Source 5.9].

4. Details of the impact

Sealy's research has impacted national policy, strategy and local workplace practices across the NHS, leading to increased diversity in board composition. In the private sector Sealy's research changed regulatory guidelines and provided data on regulatory adherence, impacting how key groups, responsible for the governance of FTSE 350 listed companies, respond to diversity (e.g. Financial Reporting Council, institutional investors).

NHS: National level changes of policy and practice

Sealy's long-standing work on boardroom diversity led to her being commissioned in 2016 to advise on *how* this could be improved across the NHS. The 2017 Women on Boards report's sample of over 6,000 board directors [3.3] provided national-level board data for the first time, revealing an additional 500 female directors were required to achieve gender balance. This became the national target, formally adopted by NHS leadership, including the Secretary of State for Health and Social Care, Matt Hancock in 2018 [5.1]. The Chair of NHS Improvement (the regulator) said: *"I am very grateful to ... Professor Ruth Sealy... who has carried out much of the work and written her report based on her research and experience of working with Lord Davies"* [3.3].

In 2019, the CEO of NHS Employers, turned to Sealy again to commission an update on the national data and previous recommendations. Scheduled for spring 2020, the launch was delayed by COVID-19 until September 2020 [5.2; 5.3]. Both the 2017 and 2020 Women on Boards reports highlight the need for the NHS to develop continuous capture of board data, allowing evidence-based initiatives for problem areas. This was acknowledged by multiple NHS board Chairs and various NHS leaders [5.2] and is now in development [5.3; 5.5].

The 2020 data identified the 20 most diverse Trust boards, in terms of gender and ethnicity, and as Chairs are responsible for changing board composition [3.1], Sealy interviewed 13 of those Chairs regarding *how* they had successfully diversified their boards since 2017 [5.2]. Compiling best practice and case studies, the report provides all 213 NHS Trusts in England with guidance on this. Key changes included stopping 'rolling appointments', recruitment training for governors, outreach to communities, using proven head-hunters, gender-balanced panels, and purposeful short-lists. Findings were discussed in a 13-minute interview on BBC Radio 4's Women's Hour in September 2020 [5.4]. The report made 16 *"very practical actionable recommendations"* [5.3] to further embed the changes to leadership diversity. The CEO of NHS Confederation sent the report to all Trust Chairs and organised round-table discussions, in November 2020, on how to implement the recommendations. Unfortunately, these were cancelled due to the second lockdown, but will be rescheduled spring 2021 [5.3].

Following the 2017 Women on Boards report, new leadership programmes were set up across the NHS. The NExt Director Scheme encourages more inclusive board appointment processes for NHS Trusts, providing development opportunities for women and BAME candidates. Several of the Chairs interviewed in 2019/20 had used the programme to engage diverse non-executive director (NED) candidates [5.2, pages 12, 36, 37].

The NHS Leadership Academy runs courses aimed at senior roles, but previously not for Chief Medical Director (MD) - identified as having low female representation in 2017 [3.3]. Following report recommendations, the Aspirant Medical Director programme was launched in 2018. Current MDs (75% male) were asked to nominate potential candidates. As a result, only 25% of candidates were female. In 2019, based on research recommendations [3.2], the programme was advertised more widely using social media, resulting in 45% of the 100 candidates being female.

Based on 2017 report recommendations [3.3], in 2019, NHSC launched a taskforce, partnering with a major search firm, to increase NED diversity. The Director of Partnerships and Equality at NHSC and Chair of the taskforce confirms Sealy's recommendations *"helped us to think about how to move forward with a framework (code of conduct) to work purposefully and effectively with search firms"* In addition, the taskforce is *"pushing forward*

the recommendation for [national] data set ... to better self-monitor...and improve NED diversity” [5.5].

NHS: Trust level changes of policy and practice

Between 2017 and 2020, the percentage of women on NHS trust boards increased by 5% to 44.7% [5.2], reaching parity (as defined by the European Commission). Sealy’s research has been cited by NHS Trust Chairs across the country as galvanising them to make changes to board composition [5.2; 5.6]. For example:

Doncaster and Bassetlaw Trust:

When Sealy’s 2017 report was released, the Trust had all-male NED membership. The Chair used the report to persuade the Board and Governors to change their practices: *“Using your report...Governors agreed to an open and fair [appointment] process...[Now] we not only have a much more ethnically diverse board but a true gender balance with a high level of skill and experience which is making a difference for our Trust in what are difficult times.”* The Chair states these actions led directly to the trust’s CQC rating moving from ‘requires improvement’ to ‘good’, with improvements in the contribution of the board to decision-making and greater wellbeing of staff at all levels [5.2, p.33; 5.3 & 5.6].

Lincolnshire Partnership NHS Trust:

The Chair tweeted in November 2018, that after *“re-reading @RuthSealy’s NHS Women on Boards report”*, Lincolnshire had *“3 NED posts and the MD role out for recruitment & I’d welcome applications from women who are under-represented on our board.”* In 2020, the board has 42% women and 25% BAME. The Chair described how, in response to the 2017 report, he had completely transformed the appointment process, resulting in many more applications from strong diverse applicants: [5.2, p.12].

East London NHS Foundation Trust:

The Chair states *“the research you’ve done leads to better decisions, financial viability and better quality. The changes we’ve made in the past couple of years have increased gender and ethnic diversity. My evidence is a diverse board makes better decisions”* [5.2, p.26].

The Chairs interviewed also articulated three important benefits of board diversity for the hospitals, experienced since the 2017 report:

1. Representation of Staff leading to greater staff satisfaction: *“Most of us [Chairs] are leading organisations with 2-4,000 staff. They need to feel that their board understands them and part of that is about being able to see both cognitive and physical diversity around the table. We have that now”* [5.2, p.24]

2. Representation of Service-Users leading to greater legitimacy: *“the more representative of the community, the better we will be at acknowledging the particular needs of the particular communities within our region.”* [5.2, p.23]

3. Board Processes leading to better decision-making and effectiveness: *“[with diversity] you get much better quality discussions, much better decisions and better outcomes. And it’s based on experience, it’s not based on reading other people’s experience or research, but my own personal experience”* [5.2, p.22]

Regulatory & Policy Impact (Private sector):

Sealy’s 2017 Board Evaluators (BE) research [3.4] was launched at KPMG’s HQ in London, with Secretary of State & Business Minister Penny Mordaunt, MP, to an audience of 150+ FTSE Chairs, CEOs, senior business people, policy-makers, regulators and politicians. Recognising her expertise, Sealy was then asked to present evidence to the parliamentary Women & Equalities Committee on evaluation and boardroom diversity [5.7], and invited by the FRC Director Corporate Governance & Stewardship to discuss the research findings with the FRC (November 2017).

The relationship with the FRC resulted in Sealy and Tilbury being invited to add their recommendations from the BE research to the FRC’s Corporate Governance Code consultation [5.8]. Their recommendations were fully adopted into the new Code (published July 2018, effective 2020), including that organisations must now provide detailed information

about their board evaluation, and the actions taken as a result [5.9; 3.5]. This is the first time that board evaluation has been so prominently featured within the Code and mandates BE's focus on diversity. This provides more information for institutional investors allowing them to question the Board on their actions and progress.

The 2018 Board Diversity Reporting research for the FRC [3.6] evidenced the success of transparency, public statements and measurable targets in subsequent increases in board and senior management diversity. In February 2019, The Economic Secretary to the Treasury, John Glen MP, citing the report at the Wealth of Diversity Conference, explained a target for women in the Senior Civil Service of 50% by 2020: "*This has now risen to 48.2%, and we are committed to building on this progress*". Findings from the Board Diversity Reporting study and the BE research adopted in the changed Code, are evidenced multiple times in the government's Annual Review of Corporate Governance 2019 [5.10, pages 28, 37].

Following the FRC report launch, Co-Chairs of the prestigious 30% Institutional Investor Group (responsible for £11trillion of investments), invited Sealy to present her research on the importance of post-evaluation data for voting activity, in January 2019 ahead of the AGM season. The Head of Corporate Governance, Legal & General Investment Management (LGIM) said: "*the research for diverse boards and leadership teams was compelling...and there continues to be growing evidence that investors are taking action on diversity through their voting.*" On 10th March 2019, a Financial Times article stated that some of the largest investors, such as Columbia Threadneedle, LGIM, Aviva, and AXA started voting against non-diverse boards. On 2nd October 2019 the 30% Club announced they had achieved their goal of 30% female directors of FTSE 350 and tweeted citing "*@RuthSealy's relentless efforts*" to collect data as instrumental in setting the baseline measures against which they set and tracked their targets.

Through influencing improvements in the governance requirements around board evaluations and diversity reporting in the private sector, and at the level of both national policy and workplace practice across the NHS [5.3], Sealy's work has impacted the understanding of, and practices to improve boardroom diversity.

5. Sources to corroborate the impact

5.1 Transcript of speech by Matt Hancock, Leaders in Healthcare conference 15/11/18

5.2 WoB Report 2020 – confirms report delayed; shows increased numbers of WoB across NHS; Chairs citing the 2017 report as galvanising; changed appointment processes; used NExt Director scheme; need for national data-set; impacts of & advice on how to diversify boards

5.3 LoT CEO NHS Employers/Interim CEO NHS Confederation: stating significance of Sealy's work; confirms report delayed; acknowledges national data-set now in development; personally requested all Trust Chairs to read report; implementation roundtables cancelled due to COVID.

5.4 BBC Radio 4 Interview (09.09.2020) <https://bit.ly/3vYZO8p> Sealy interview from 01"30' – 1"45'

5.5 LoT Director of Partnerships and Equality at NHSC and Chair of the NED Diversity Taskforce attesting impacts of both reports on NHS, and pushing forward national data-set

5.6 LoT Doncaster NHS Board Chair stating board changes as result of 2017 report

5.7 Women's Equalities Select Committee 29th November 2017 Sealy presenting evidence: <https://bit.ly/3vZGt79>

5.8 UoEBS response to FRC consultation document for new Code, January 2018

5.9 Pages showing wording of new July 2018 Code, incorporating UEBS recommendations regarding board evaluation

5.10 Government Regulators' 2019 Annual Review of Corporate Governance – citing Board Diversity Report and Board Evaluators study recommendations, pages 28 & 37.