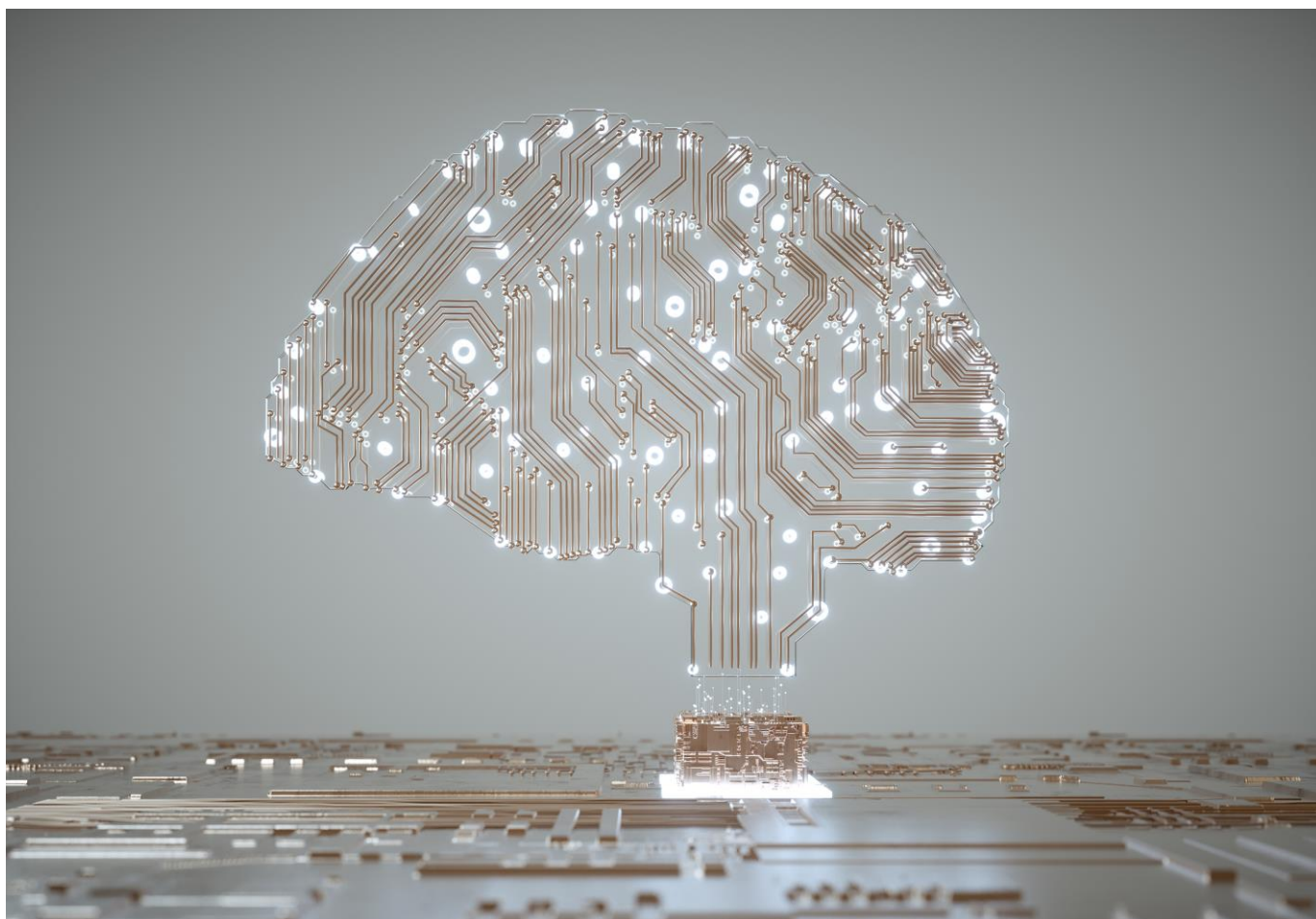


# An Evaluation of the Small Business Research Initiative: Appendices A-D

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Final Report Appendices  
January 2022

# An Evaluation of the Small Business Research Initiative: Appendices A-D

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# A Impact Evaluation Framework

## Introduction

- A.1 The approach, logic model and hypothesis testing used in this evaluation of the Small Business Research Initiative (SBRI) is set out in this Appendix. This Impact Evaluation Framework is an evaluation of the Small Business Research Initiative (SBRI) model, as led by UK Research and Innovation (UKRI). The evaluation was undertaken in 2020-21 and covers the period from 2008 but focuses on the period 2013-2020 to follow on from evidence assessed in the previous SBRI evaluation published in 2015.

## Our Approach

- A.2 The proposed framework for the evaluation of the Small Business Research Initiative (SBRI) is set out in this Appendix. Critically this included:

- A review and update of the existing SBRI theory of change and extant logic model;
- The translation of the updated Logic Model into a set of testable hypotheses to deploy across mixed-methods approaches; and
- The addition of a series of further hypotheses to assess impact and Value for Money (VfM).

## Updating the Logic model

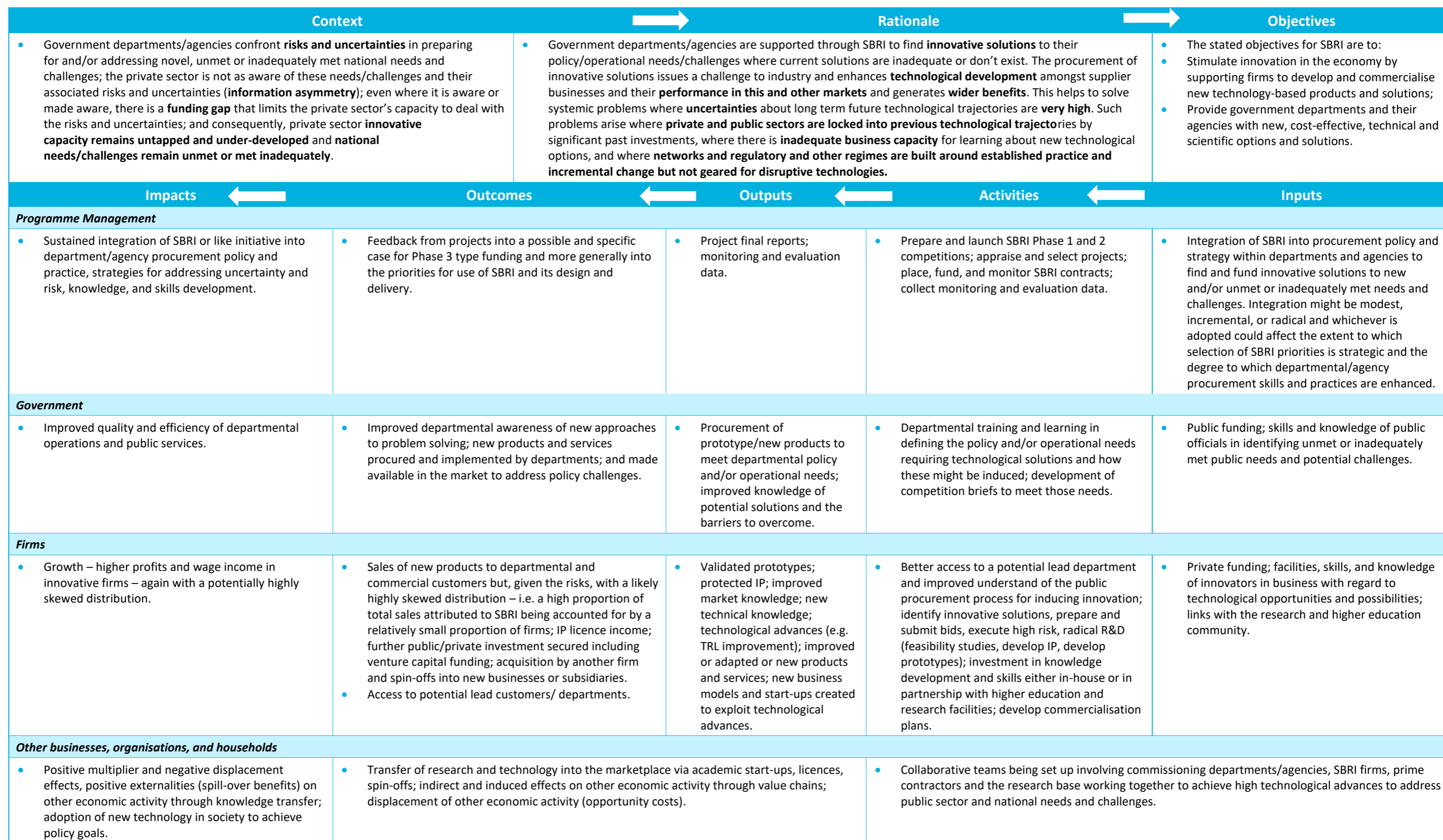
- A.3 The previous evaluation undertaken in 2015 provided the first depiction of a logic model for the SBRI, but this is confined to SBRI process and activities. It also sets out the overall rationale of the SBRI compared with the equivalent programmes in the US and the Netherlands. In 2017, this was built upon to develop a complete logic model with two strands or routes by which SBRI is expected to generate impacts through: (i) government and/or; (ii) the firms directly participating in the SBRI. A review of evidence elsewhere undertaken as part of the literature review has shown that the SBRI logic model should be strengthened to consider the following:

- Inclusion of SBRI's **context and rationale** to explicitly acknowledge the starting point for the theories of change/hypotheses that will need to be tested through monitoring and evaluation;
- Explicit reference to the extent to which SBRI is **integrated in the departmental and agency procurement system** and process at strategic levels as well as in operational terms;
- Acknowledgement of the different ways in which SBRI might be deployed by departments/agencies. Namely:
  - **Modest engagement:** Departments or agencies do not procure anything different or only what was on the shelf but engage smaller businesses to an extent they wouldn't otherwise have done – just to exercise the opportunity for an additional budget;
  - **Incremental engagement:** They procure what they would have done anyway or on the shelf but in different ways, for example, segment their needs into smaller modules (to make them attractive to smaller businesses); and
  - **Radical engagement:** Departments or agencies procure different things or take on more risky things to address unmet needs and/or increase preparedness capacity. In other words, they are induced to procure something that doesn't exist and/or that they otherwise would not have procured at that time or perhaps at all – i.e. there would be full project additionality;
- Reference to the extent to which SBRI is directed to **address uncertainties and take on higher risks;**

- Inclusion of **technology transfer**, for example through collaborative teams involving commissioning departments/agencies, SBRI firms, prime contractors and the research base;
- Acknowledgement of **new business formation** as a means to achieving its objectives, as a possible consequence of SBRI and one that might generate benefits especially where they are spun-out of the research base;
- Awareness of the potential specific role for **venture capital** in follow-on investments needs to 'further public/private investment secured' as an outcome;
- Reference to the likely **skewed distribution of business benefits** (given the risks involved) needs to be reflected in the logic model if only to ensure that monitoring and evaluation does not simply work on averages; and
- A more prominent acknowledgement of the **indirect routes to impact** as the third strand that runs alongside the government and business strands, with the three strands intertwining and reinforcing each other.

A.4 The revised logic model is included in the figure overleaf.

Figure A-1: SBRI Logic Model



Source: Steer-ED, 2021

## Hypothesis testing

- A.5 As stated in the approach outlined in Section One, the evaluation approach is grounded in hypothesis testing. Hypotheses seek to test the mechanisms that link the stages in the logic model (i.e. the theories of change), with testing to be based on 'correlated intelligence' using different sources and methods to be tested across mixed-methods. The hypotheses that attract the strongest test results will be those for which a range of different evidence packages point to the same conclusion.
- A.6 It is important to recognise that these hypotheses are to be tested against the evidence, they are not assertions as to findings in themselves (they are a means to and end not an end in themselves). As such, hypotheses that are not supported by the evidence are as useful as sources of information as those that are supported by the evidence. The Evaluation's conclusions are based on the entire set of hypothesis tests. A summary of what evidence each hypothesis will draw upon is included in the table overleaf.
- A.7 A summary of the findings from our hypothesis testing can be found in the final chapter on Conclusions and Recommendations.

Figure A-2: Primary Hypotheses

Hypothesis	Grouping	Further Considerations	Method					
			Survey	CIE	Programme consultations	Case studies	Literature Review	Monitoring Data
H1	<b>Design, strategy, and governance</b>	1.1: SBRI’s design is the best possible approach in regard to objectives specification 1.2: SBRI’s implementation in practice is the best possible approach in regard to generating outcomes and impacts 1.3: SBRI adopts the best possible approach in regard to reporting			✓	✓	✓	
H2		2.1 Spending departments have adopted the SBRI approach to facilitating government demand-led/procurement-enabled public sector innovation and associate this with the SBRI legacy			✓	✓	✓	✓
H3		None	✓		✓	✓	✓	
H4		SBRI helped: 4.1: Departments improve their understanding of how industry-generated innovations can help them address the policy challenges they face 4.2: Improve their capacity to generate potentially useful procurement-enabled innovations 4.3: Department learn how to engage more effectively with SMEs 4.4: Departments learn how to access new private sector suppliers	✓		✓	✓	✓	
H5	<b>Delivery, implementation, and response</b>	SBRI helped: 5.1: Departments know how best to appraise and select project proposals 5.2: Departments know how best to monitor and evaluate innovation projects 5.3: Improve their understanding of how innovation can help them address the policy challenges they face 5.4: Improve departments’ ability to identify risks faced in procuring innovation from businesses 5.5: Improve their ability to manage the risks faced in procuring innovation from businesses 5.6: Build procurement-based innovation initiatives into their overall innovation strategies 5.7: Create standardised best practice for innovation procurement within departments			✓	✓		
H6		SBRI helped 6.1: Business to better understand public sector innovation requirements 6.2: Business to better understand the nature and extent of skills within government			✓	✓		✓
H7		SBRI helped 7.1: Business to better understand public sector procurement processes 7.2: Business to better understand how public sector procurement can induce innovation 7.3: Businesses able to access to a new potential lead customer/ government department	✓		✓	✓		✓
H8		SBRI helped 8.1: Business to increase TRLs of innovations 8.2: Business to de-risk innovations 8.3: Business to create commercially feasible innovation options for possible application if future circumstances warrant this	✓		✓	✓	✓	
H9		SBRI helped 9.1: Business to develop new business models 9.2: Business to create start-ups exploiting technological advances	✓	✓		✓	✓	
H10	<b>Outcomes, impacts and value for money</b>	SBRI helped: 10.1: De-risk the innovation process in the public sector 10.2: Improve the quality of some public services 10.3: Reduce the delivery cost of some public services 10.4: Generate beneficial spill-over effects within government 10.5: Departments develop options/contingency plans to act if and when required 10.6: Departments to be better prepared for dealing with uncertainties and risks	✓		✓	✓	✓	



H11	SBRI has generated new technologies and innovation that bring private sector benefits in increased sales and employment, profits, and wages.	<b>Outcomes, impacts and value for money... continued</b>	SBRI helped: 11.1: New products come to market 11.2: Develop new process technologies 11.3: Increase measured business productivity above levels 11.4: Increase sales 11.5: Increase employment 11.6: Increase business profits 11.7: Businesses to enter new markets 11.8: Businesses to leverage additional sources of R&D funding	✓	✓	✓	✓	✓	
H12	SBRI generated wider positive impacts (e.g. intellectual property, spin-offs, enhanced skills) and without significant displacement effects.		SBRI helped: 12.1: Businesses deliver additional R&D projects funded by government, the private sector and/or philanthropic organisations 12.2: Generate intellectual property (IP) 12.3: New businesses to start particularly from academia 12.4: Accelerate commercialisation of innovations 12.5: De-risk the innovation process in the business sector 12.6: Generate beneficial spill-over effects within the business sector businesses increase the skills of their workforce 12.7: Businesses improve prototype development capability 12.8: Businesses improve new product introduction processes (post-prototype) 12.9: Businesses in one or more of the above ways but only by displacement of other innovative activity	✓			✓	✓	
H13	SBRI led to sustained and useful interactions between departments and businesses and, to a lesser extent, improved business and HEI collaborations.		SBRI has helped departments to: 13.1: Collaborate with businesses to develop technology solutions that would not otherwise exist 13.2: Collaborate with businesses to improve technology transfer into government 13.3: Liaise with business to explore potential future opportunities to collaborate 13.4: Promote improved business and HEI collaborations.	✓			✓	✓	
H14	SBRI met its objectives with effective and efficient allocation and use of resources, funding and accountability systems and procedures.		14.1: SBRI delivered effectively against the objectives, schedule and budgets assigned to SBRI programmes or initiatives. 14.2: SBRI was adequately resourced in terms of the skills of the public officials delivering it, the resources on which they could draw and the collaborative working with other departments and agencies that might be required. 14.3: SBRI was delivered in ways that allowed for accountability in the use of public funds allocated to initiatives made in its name.	✓		✓		✓	
H15	SBRI has generated overall returns or total benefit cost ratios that meet or exceed required levels (cost-benefit) and/or value for money in the use of public funds (cost-effectiveness).		SBRI has generated: 15.1: Benefit cost ratios that meet or exceed targets taking into account total costs and benefits 15.2: Cost-effectiveness ratios that meet or exceed targets taking into account total public funding and quantified outputs.	✓	✓			✓	

Source: Steer-ED,2021

# B Monitoring Data

## Introduction

- B.1 This section includes the methodology, data limitations and summary of the monitoring data of the SBRI programme as held by UKRI and other delivery partners shared for the purposes of this evaluation. The monitoring data includes information on competitions such as start year, number of phases, applications, contracts, and value of contracts, as well as applicant data which includes contact details and demographics.

## Methodology

- B.2 Previous evaluations and reviews of the programme have delivered clear and consistent conclusions and recommendations around data collection and monitoring:

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“The programme management has a limited view of key aspects of the programme, arising from the fact that there is no single record of SBRI applicants nor is there a single record of ‘winners’. Departments have non-standardised approaches to data collection and management. Communication between departments appears to be limited to providing information about applicants or winners to Innovate UK and providing information for monitoring purposes is not occurring.”<sup>1</sup>

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- B.3 The latest BEIS Review, published in late 2017 concludes similarly, “The current SBRI management data collection processes have limitations that are a barrier to effective monitoring and robust evaluation.”<sup>2</sup> Although this 2017 Review was not referenced in the Specification, it does provide detailed advice around appropriate impact measures & data capture mechanisms.
- B.4 Our approach is designed to produce a more comprehensive database of
- i. Contracts and awards (including the innovation being targeted); and
  - ii. Beneficiary firms (including their characteristics and performance)

### Internal UKRI Data Adequacy Assessment

- B.5 The first step was to review UKRI existing data sets (scope, coverage, currency) and identify gaps in data and documentation (set against evaluation requirements) by variable and spending department/agency. Overall data gaps across departments/agencies were assessed from the perspective of differential scale and scope of SBRI activity. An approach was agreed for department engagement on data issues and the resulting output was a full and frank assessment of UKRI programme data gaps.

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<sup>1</sup> A Review of the Small Business Research Initiative, Manchester Institute of Innovation Research, Enterprise Research Centre & OMB Research, 2015

<sup>2</sup> SBRI Review – BEIS Evidence Document, 2017

## Departmental Data Adequacy Assessment

- B.6 Secondly, a formal Information Request was prepared and circulated (through UKRI) to relevant government departments to include Departmental Data Request & Departmental Impact Tracing instruments. A data 'triage' framework was developed and applied (distinguishing between 'need to have', 'nice to have' and 'not required' data) sensitive to differential departmental SBRI activities. Ranked priorities were identified and agreed for department and agency engagement over data gaps (to be used for subsequent liaison) based on the triage results.
- B.7 There were scoping calls with the 10 highest ranked 'data gap' departments to determine causes, status of data and documentation, consequences, and potential solutions to SBRI data gaps. This provided an opportunity to explore the best approach(es) to consulting department and agencies over SBRI's benefits to them. This was supplemented with a more tailored 'nudge-based' set of approaches to those departments and agencies that have been particularly active in SBRI and for which data gaps are significant from an evaluation 'failure mode' perspective (i.e. a focus on the high priority gaps). The key to progressing this was to recognise at all times the heterogeneity of the programme and its client departments. For example, the innovation needs of the NHS being met by the programme are radically different from those of the Ministry of Defence.

## Synthesis database & data scaping

- B.8 The next stage was to synthesise all available data into a single, standardised database. Ensuring strong coverage of beneficiary firms' details was key for the data-linking that was undertaken to construct a valid non-treatment control group (using Companies House/IDBR matching datasets).
- B.9 Whilst the challenges in data backfilling and baselining were not underestimated and had been well-rehearsed by previous evaluative research, we anticipated that this multi-pronged approach would yield the required result - credible data coverage on firms and awards, and a firm platform for creating a resilient and meaningful control group. Our findings from this first stage informed the design of the evaluation framework and subsequent methods.

## Data Limitations

- B.10 An ongoing challenge for the programme, picked up in both the 2015 evaluation and 2017 Review, is around data collection and monitoring. SBRI is a dispersed and variable model that is delivered through different departments, programmes, and contexts without a standardised or systematic approach to data collection and management. Currently, UKRI centralises data collection to an extent across SBRI competitions that are UKRI-led and department-led, but it is optional for any department or agency to provide SBRI data to UKRI. As such, there is no single record of SBRI applicants nor is there a single record of SBRI beneficiaries.
- B.11 Where data is collected centrally, this focuses on competition and applicant descriptive data and direct outputs, i.e. the number and names of applicants, the date of the competition, the location and contact details of applicants, and the total amount of funding awarded. There is no current data collection that spans the whole spectrum of monitoring and evaluation, namely on outcomes and impacts. This is a barrier to any evaluation activity. Whilst the 2017 review did provide detailed advice around appropriate impact measures and data capture mechanisms, these have not been internalised to improve the quality of data. This is largely due to a lack of resources within the Innovate UK SBRI team.
- B.12 Ideally, data would be collected on private or public sector outcomes and impacts would include levels of firm growth in turnover and jobs, the number of academic-business collaborations, the follow-on funding secured, whether the solution has been adopted by the department or commercialised elsewhere, and any public sector cost savings as a result.
- B.13 Without this data, the correlation and causality of SBRI on public and private sector impacts is difficult to assess and has required taking a layered approach of utilising counterfactual impact assessment (utilising

firm details collected and supplementing with Companies House business data), self-reporting and case study evidence.

- B.14 The biggest challenge for this evaluation (as clearly reflected in the literature gone before) is quantifying public sector impacts as these are particularly long-term, not monitored by the competition owners, largely conditional on adoption, often indirect, and need to account for supplementary funding outside of SBRI.

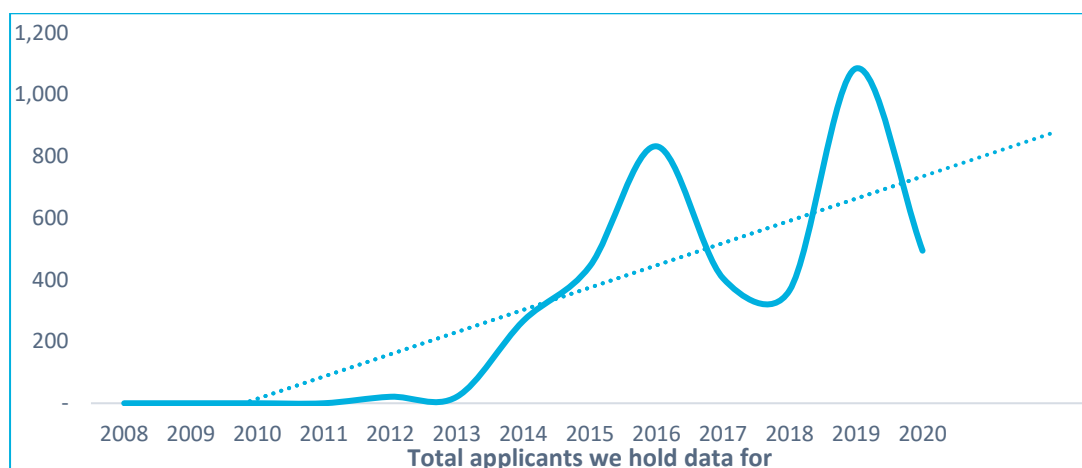
### Applicant dataset summary

Table B-1: Applicant Dataset Summary

	Total number
Total applicants we hold data for	4,026
Competitions we hold applicant data for	137
Total applications we hold data for	6,051

- B.15 The total number of applicants recorded in the UKRI applicant datasets have increased overtime, with the highest number of yearly applicants recorded in 2019. Limited applicant data is recorded in UKRI’s monitoring data pre-2013.

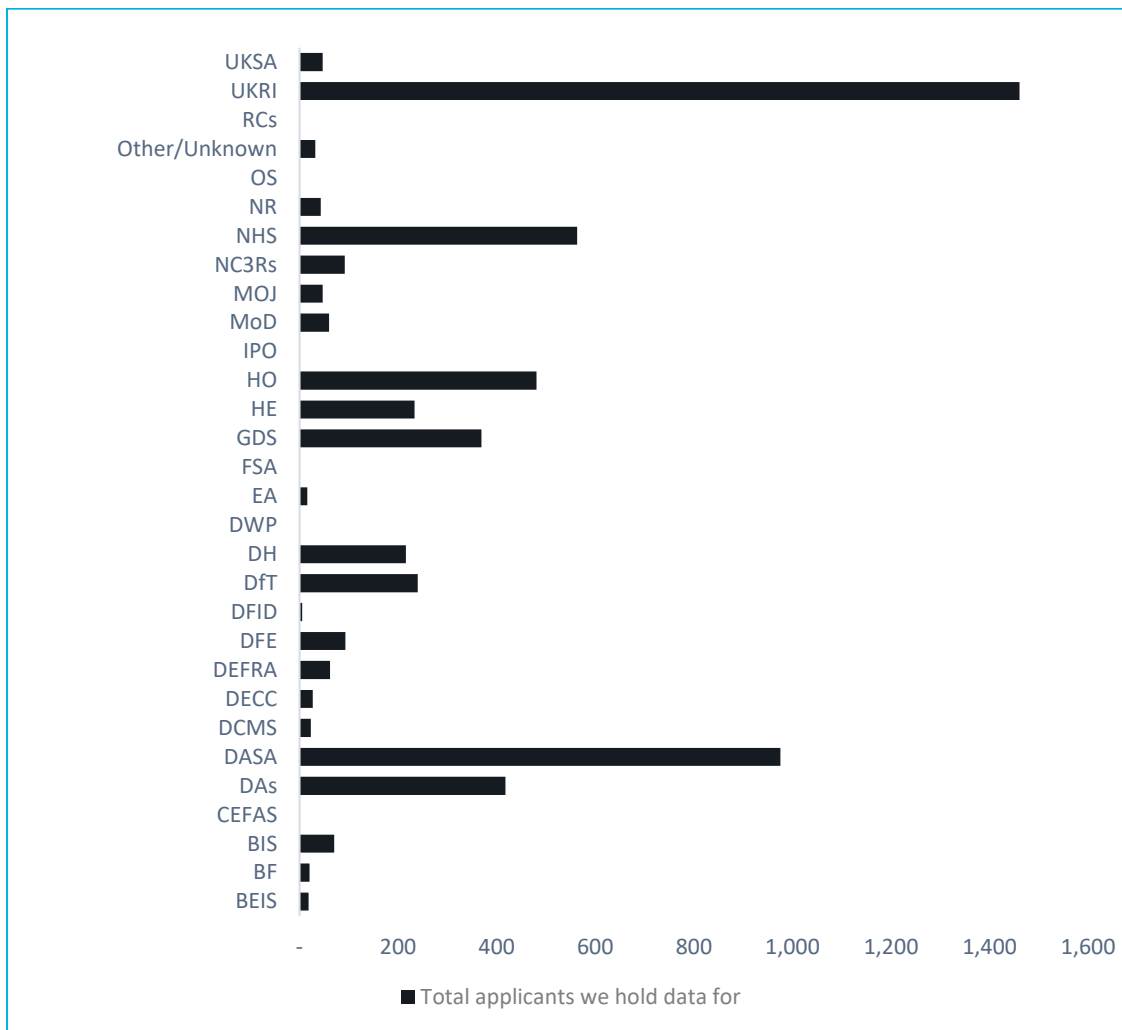
Figure B-1: Total applicants by year



Source: UKRI SBRI Master Monitoring Dataset, 2020

- B.16 On average, 20% of applicants are awarded Phase 1 SBRI competition funding. The number of total applicants peaked in 2014 at 2,179, and the total number of awards peaked in 2018 at 422. However, it should be noted that applicant data is only currently tracked in the UKRI competitions dataset for Phase 1 of competitions consistently.
- B.17 The applicant data held by UKRI varies between departments, with the largest proportion of applicant data coming from UKRI run SBRI competitions. Applicant data coverage varies between departments as monitoring approaches are siloed.

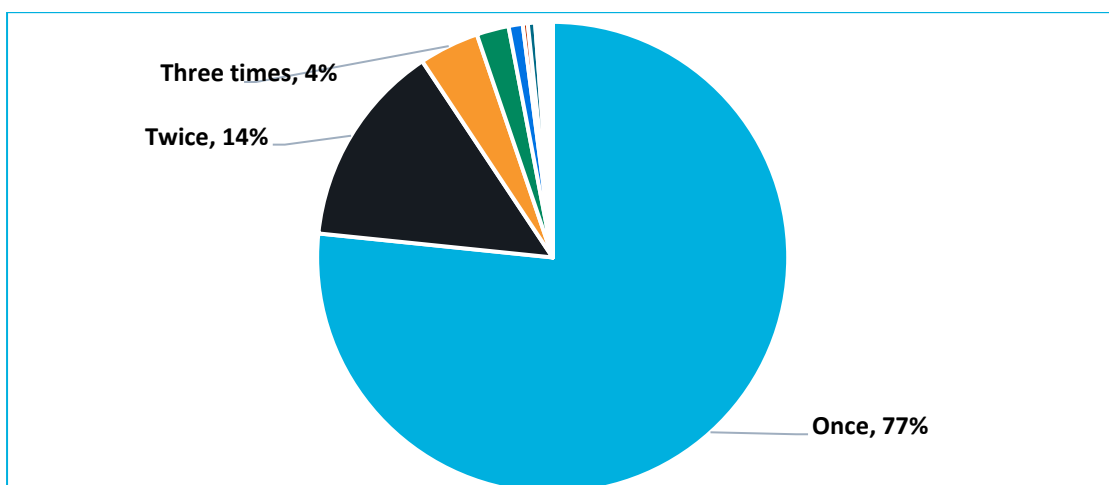
Figure B-2: Total applicants by department



Source: UKRI SBRI Master Monitoring Dataset, 2020

B.18 Of the applicant data recorded in the UKRI monitoring data, 77% of all applicants have only applied to one SBRI competition, 14% to two, and 4% to three. However, there is a ‘long tail’ to this data, with few applicants applying often.

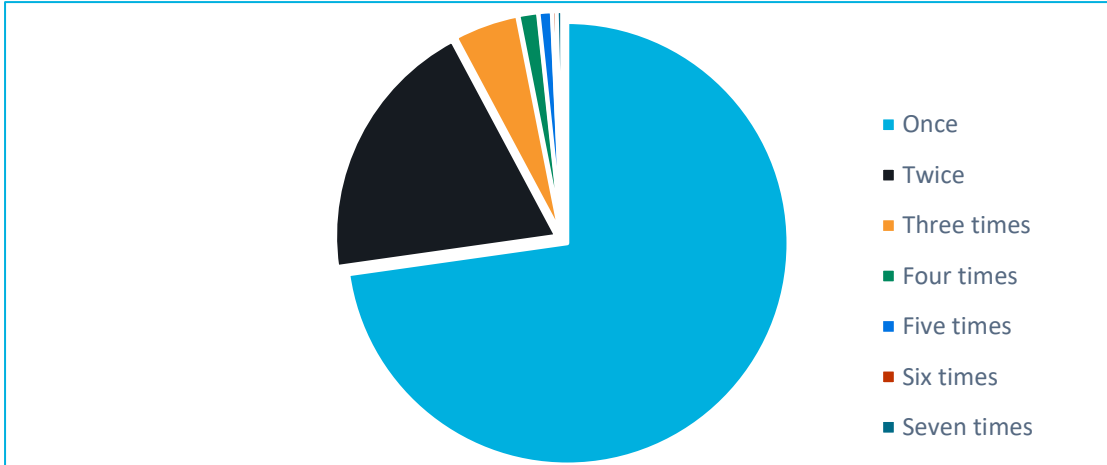
Figure B-3: Multiple applicants



Source: UKRI SBRI Master Monitoring Dataset, 2020

B.19 The result of an application is recorded for some but not all of applicants in UKRI’s monitoring data. Whether applicants were successful or not in each competition they applied to is known. The data indicates 73% of successful applicants were successful just once, 19% successful twice and 5% were successful three times in their applications to SBRI competitions. The greatest number of times an individual applicant was successful according to this data is seven times.

Figure B-4: Successful applicants



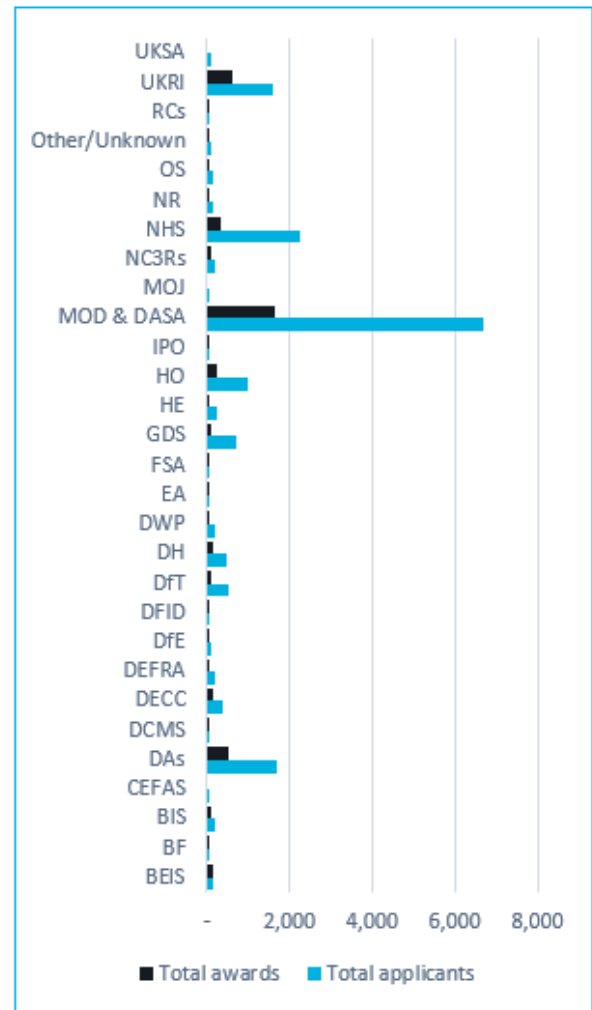
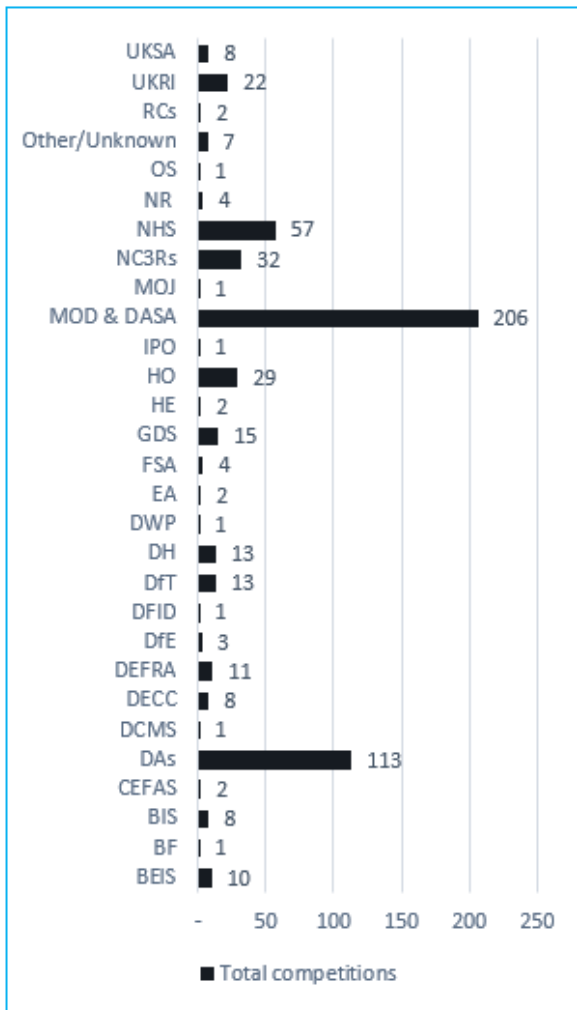
Source: UKRI SBRI Master Monitoring Dataset, 2020

### Competitions data summary

B.20 The MoD and DASA have led the highest number of competitions since 2008, making up 36% of all competitions during that period. DAs make up 19% and NHS 11% of all competitions. Although DAs lead 20% of competitions, only 10% of applicants apply to competitions led by the devolved administrations. Contrastingly, UKRI lead only 4% of all competitions but make up 9% of all applicants.

Figure B-5: Total competitions by department

Figure B-6: Total applicants and awards by department

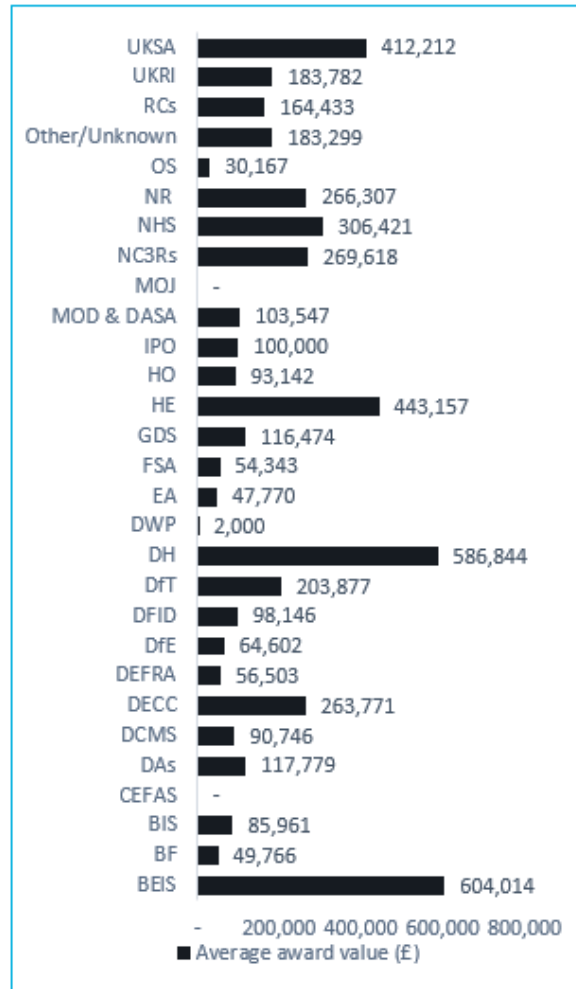
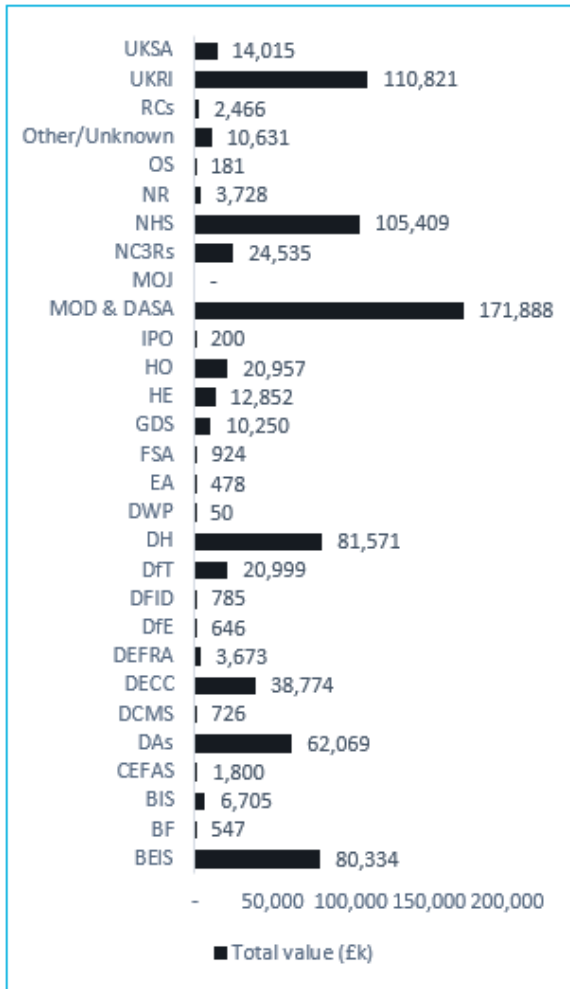


Source: UKRI SBRI Master Monitoring Dataset, 2020

Unsurprisingly, MoD and DASA have awarded the highest value of awards, followed by UKRI, NHS, DH and BEIS. BEIS has the highest average award value at £604k, DH has the next highest average award value at £587k. DWP has the lowest average award value at only £2k.

Figure B-7: Total value of awards awarded by department

Figure B-8: Average value of awards awarded by department



Source: UKRI SBRI Master Monitoring Dataset, 2020



# C Consultations

## Introduction

- C.1 The methodology, scope and design of the consultations used in this evaluation of the Small Business Research Initiative (SBRI) is set out in this Appendix. The primary purpose of these consultations was to identify qualitative behavioural/cultural impacts of the programme in different departments (supplementing case study findings) and to obtain perspectives on programme processes and governance. Further consultations were undertaken with wider strategic stakeholders, including the Cabinet Office, David Connell and other experts, to obtain broader perspectives on the UK programme and how it could be enhanced.

## Methodology

- C.2 A set of consultation questions reflecting the agreed set of testable hypotheses and other information requirements were created. Hard to address aspects were identified and mitigation tactics were agreed in advance of starting work on the consultations.
- C.3 The final stage of the process was to contact and interview relevant consultees. This consisted of contacting 45 consultees which led to the completion of 32, thirty-sixty minute, semi-structured interview (aide-memoire Table C-2 ), conducted via virtually via Team/Skype with relevant UKRI and departmental leads as well as industry experts on innovation policy, to scope out their department's position and experience of SBRI and the data/evidence which could be made available to inform the evaluation.

## Scope

- C.4 A wide range of organisations and departments were contacted to ensure the consultations gathered a variety of opinions and insights. 45 consultees were contacted, however, the number of responses varied, meaning a total of 32 consultations took place.

**Table C-1: Number of Organisations and Departments contacted and interviewed**

Organisation/Department	Consultees contacted	Consultees Interviewed
Archipelago Technology Group Ltd	1	1
BEIS	4	3
Cabinet Office	2	2
Cancer Challenge Scotland	1	0
CEFAS	2	2
Connected Places Catapult	1	1
CivTech (Scotland)	1	1
DASA	3	1
Department for Education	3	2
Department for Transport	2	2
Food Standards Agency	1	0
GovTech Catalyst	2	1

Organisation/Department	Consultees contacted	Consultees Interviewed
HIE	1	0
Highways England	1	0
Home Office	1	0
Innovate UK	5	5
Local Government Association	1	0
NC3Rs	2	2
Network Rail	1	1
NHS England	1	1
NI Government	2	2
SBRI Centre of Excellence (Wales)	1	1
SBRI Healthcare	1	1
Scottish Enterprise	1	1
Scottish Government	1	0
UKRI	1	1
UK Space Agency	1	0
Wave Energy Scotland	1	1
<b>Total</b>	<b>45</b>	<b>32</b>

Source: Steer-ED, 2021

Table C-2: Scoping consultation Aide Memoire

Section	Question
<b>Introduction</b>	Name of consultee
	Department
	Name of consultant
	Consultation date
<b>Background</b>	Please can you briefly outline your role and relationship to SBRI or similar approaches? How long have you been in this role?
	What has been the scale of SBRI/similar investment to date and what is the perception and trajectory of SBRI within the department?
<b>Rationale &amp; Objectives</b>	Why does the department use SBRI/similar as an approach?
	What are the benefits to the department from using SBRI?
	What is the balance of emphasis between catalysing firm growth vs achieving public value effectiveness/efficiency) when using SBRI?
<b>Process</b>	Is there a systematic SBRI process within the department (i.e. designing and delivering competitions; collaboration with UKRI)?
	Does the department run SBRI initiatives independent from UKRI or does it collaborate with UKRI as a matter of course?
<b>Impacts</b>	Is there any evidence of success (departmental savings/firm growth etc.) from using SBRI?
<b>Monitoring and Evaluation</b>	How does the Department monitor and/evaluate the SBRI process and its impact?
	How readily can monitoring information be made available to the evaluation and what is the best route to achieving this (i.e. data dump, share and walk through)?
	Has there been any change in monitoring procedures over time, and if so, to what extent will historic monitoring data be available for us to review?

Section	Question
	Have any project evaluations of SBRI been undertaken, and can these be made available?
<b>Reflections</b>	What are the key challenges, obstacles and opportunities for developing SBRI/similar initiatives within the department?
	Are there any other issues with SBRI, as evaluators, should be made aware of at this stage?
	To what extent do you think the SBRI process may have inspired other activities, approaches or procurement exercises going on in the department?
	What alternatives are there to using the SBRI approach? Does the department routinely use these, alongside SBRI?
<b>Next Steps</b>	i.e. follow ups, data sharing

Source: Steer E-D, 2021

# D Survey

## Introduction

- D.1 The methodology, scope, design, data limitations, survey script, and value for money methodology (VFM) of the beneficiary and non-beneficiary survey are outlined in this Appendix. The survey covered topics including applicant details, impacts, additionality, and the procurement process.

## Methodology

- D.2 A telephone survey was selected as the most appropriate survey method as it allowed the greatest opportunity of contacting a high number of SBRI applicants in a limited time frame, whilst maintaining the benefits of a verbal conversation. The total population of SBRI applicants was estimated to be approximately 11,000 within the study window. Of these, approximately one quarter were beneficiaries and three quarters non-beneficiaries. Approximately 2,000 applicants in the dataset had an unknown status. This is due to UKRI not holding the relevant applicant data and:

- UKRI being unable to provide a contact, or the contact has been approached several times and not returned contact;
- The department no longer exists (e.g. Department for Energy and Climate Change); or
- The data was previously held by TSB, but is not held by UKRI, so is therefore considered 'lost' (this has implications for future data storage and management).

- D.3 The aim of the research was to gather details of as many of these 11,000 applicants as possible, enabling 15-minute telephone surveys to be undertaken. An extensive data gathering exercise was undertaken to gather all known and legally shareable data on SBRI applicants from UKRI and government departments. Data may be stored either within UKRI (if they took the role of administrating/sifting applicants) or with the lead department.

### Issues with the data collection process

- D.4 There is no consistent format for collecting and storing data and varying information sharing agreements operated by the different government departments leading to GDPR constraints. In some cases, third parties (i.e. not UKRI or the government department) had been used to administrate the competition. Overall, approximately 3,700 of the 11,000 applicants were gathered.

### Survey development

- D.5 A set of computer-assisted telephone interviewing (CATI) compatible survey questions were created, reflecting the agreed testable hypotheses & other information requirements for statistically representative beneficiary & non-beneficiary groups. Quotas were set around various parameters to ensure the survey was representative of the underlying population for the study window. The following quotas were recommended:

- An equal split between beneficiary and non-beneficiary interviews, as set out in the proposal and agreed with UKRI in subsequent discussions;
- No quota placed upon time period, since this would add significant constraints to the already limited sample. However, due to the issues found at piloting, it was recommended that contacts from competitions prior to FY2014 should be de-prioritised;

- To reflect the proportions in the underlying population, competitions from DASA, NHS, UKRI, devolved administrations and MoD should ideally be allocated approximately 10-20% of the sample each (and no more than 25%). However, recognising the low number of MoD contacts available, a suggested minimum 1% should be from MoD; and no quota can be placed on NHS data. Although it is highly prevalent in the population, it is almost entirely absent from the contact details held, so would not be feasible to impose any quota; and
- It was considered detrimental to overall sample size to impose any further departmental quotas, and so the remainder can be allowed to come from any other government department, including those listed as 'unknown'.

D.6 All the above quotas were met, barring an equal split between beneficiaries and non-beneficiaries. The survey was then refined and iterated in collaboration between IUK, Steer-ED and QA Research (specialist telephone interview partner). 81 pilot interviews were conducted to test flow, timing, interview prompts/pre-codes, and clarity of questions.

D.7 Some refinements were made to the survey script following these 81 pilot interviews. Most notable was a change in the treatment of applicants who had made multiple applications. All applicants were contacted and invited to discuss a particular competition to which they had applied. If they had been unsuccessful in this competition, but revealed during the introductory questions that they had been awarded SBRI funding from another competition, they were asked to discuss this application instead (since 'non-beneficiaries' were defined as those who had not been awarded *any* SBRI funding during the study window). In addition, those who had made multiple applications were invited to nominate an alternative competition for discussion if they would prefer (for example if they had had greater involvement or were better able to recall details of an alternative competition).

## Scope

D.8 Once the survey was finalised, QA initiated the CATI telephone survey with an objective of securing 720 responses (360 beneficiary & 360 non-beneficiary). A final figure of 677 SBRI applicants were interviewed, achieving a 21% 'hit rate' from the survey dataset, accounting for 6% of the total estimated population. 15 respondents had an unknown status. This is due to the changes in the survey structure at the pilot stage, including the removal of applicant's being treated as neither beneficiary nor non-beneficiary. Their responses were included in the final results as they provided insightful data for the survey analysis.

D.9 A 50/50 split of beneficiaries and non-beneficiaries was not achieved due to time restrictions on the survey. Despite this, adequate data was collected to ensure robust comparisons could be made between beneficiary and non-beneficiary interview responses.

D.10 A summary of the number of applicants in the population, survey dataset, and survey responses, for the study window is included in the table below.

**Table D-1: Number of applicants in the population, survey dataset, and survey responses, for the study window**

	Beneficiaries	Non-beneficiaries	Unknown status	Total
Population (Estimate) <sup>3</sup>	2964	8443	-	11407
Survey Dataset <i>Of which:</i>	612	1195	1892	3699 (pre-cleaning)

<sup>3</sup> Estimated based on information about each of the SBRI competitions that have been run, and approximate number of applicants to each.

	Beneficiaries	Non-beneficiaries	Unknown status	Total
				3255 (post-cleaning) <sup>4</sup>
Data gathered from UKRI	185	421	1825	2431
Data gathered from other departments	427	774	67	1268
Survey Respondents	237	440 <sup>5</sup>	15	677

Source: Steer-ED, 2021

## Design

D.11 The survey covered the following themes/topics of discussion, which are further elaborated on in Table D-2. The full survey script is available in Table D-3. The main themes were as follows:

- Demographics of applicants
- Rationale for applying to a competition
- Impacts that resulted
- Additionality
- Companies' view on the overall process of pre-commercial procurement.

Table D-2: Survey Topics

Section	Description	Purpose	Example Questions
Background	6 questions asked to all respondents.	Confirm key details.	<i>Can I confirm [organisation] is the name of your organisation? Were you successful or unsuccessful in your application to [competition name]? Has your organisation applied to any other pre-commercial procurement competitions?</i>
Organisation Details	8 questions asked to all respondents.	Find out more about the demographics of organisations applying to the SBRI.	<i>In what financial year was your organisation established? What type of organisation is it? What is the main activity of your organisation?</i>
Application Details	5 questions asked to all applicants.	Find out more about why/how organisations applied to the SBRI.	<i>Which of the following Competition's phases did you apply to? Was this a collaborative bid undertaken with other partners? What was the main motivation for seeking assistance from Pre-Commercial Procurement?</i>
Understanding Impacts	15 questions only asked to beneficiaries.	Understand the impacts that the SBRI has had on beneficiaries.	<i>To date, can you estimate approximately how much revenue has been generated from the procurement of your product/ prototype? To what extent have the following areas been affected by your participation in the Pre-Commercial Procurement programme?</i>

<sup>4</sup> 9 applicant datasets were provided by UKRI, containing details of SBRI competition applications. We also received applicant datasets directly from departments detailing SBRI competition application information. We consolidated these applicant datasets into one single master dataset, removing duplicates and entries where the required data was not included. Namely, for the purposes of the survey, for each applicant we required applicant contact details (email or telephone).

<sup>5</sup> 15 of these non-beneficiaries had received funding from other SBRI competitions

Section	Description	Purpose	Example Questions
			<i>Has your experience in the Pre-Commercial Procurement programme benefited your organisation in any other ways?</i>
Additionality	5 questions asked to beneficiaries. 3 questions asked to non-beneficiaries.	Understand what would/did happen to organisations in the absence of the SBRI.	<i>If your organisation had not received support from Pre-Commercial Procurement, would the project have gone ahead anyway? Knowing what you know now, had Pre-commercial Procurement not been available, how could the project have been alternately funded? In what way was the project modified to what would have happened with Pre-Commercial Procurement support?</i>
Pre-Commercial Procurement Overall Process	2 questions asked to all applicants.	Understand how applicants found the process and what improvement could be made.	<i>How did you find the following stages of the process?... In your opinion, in what way could the Pre-Commercial Procurement programme improve?...</i>

Source: SBRI Beneficiary & Non-Beneficiary Survey, 2021

## Data Limitations

- D.12 Survey piloting suggested that response rates were poor for older competitions, with issues including wrong numbers, refusals to participate (interviewees stating that the staff member involved has moved on, or that they cannot remember enough about the scheme to be able to answer questions), and poor-quality responses even amongst those willing to respond.
- D.13 While it had been hoped to achieve equal numbers of beneficiary and non-beneficiary responses (since beneficiary responses considered to be most useful/give greatest insights as to the impact and lessons learned from SBRI participation), the final number of interviews (425 non-beneficiaries, 237 beneficiaries, 15 with unknown status<sup>6</sup>) was weighted towards non-beneficiaries (63% of responses). This is reflective of the underlying population – which is approximately 75% non-beneficiary.
- D.14 Interviewees were asked questions about competitions they had been involved in historically – some going as far back as 2012. This created challenges in collecting adequate survey responses for some of the older competitions: key staff members having moved on; telephone numbers no longer working; or individuals no longer being able to remember the details of the competition or being unwilling to engage in the survey because SBRI was no longer of interest. As a result, the survey responses are skewed towards more recent competitions. This is a function of the response rate rather than the underlying survey population. The result is likely to be an under-reporting of impact, since there is a bias towards firms who have received SBRI funding more recently, and therefore not yet had time to accrue full benefits.
- D.15 Challenges of self-reporting for quantitative data collection (such as on questions around firm profitability, growth, and the level of growth/profits arising from SBRI involvement) – interviewees may give inaccurate answers to such questions, either because they do not know, can't recall, or are unable

<sup>6</sup> These arose from the pilot interviews, prior to the change described in the treatment of applicants who had made multiple applications. Partial beneficiaries were those who answered the survey questions in discussion of a competition for which they had not been awarded funding; but they had been awarded funding from a different SBRI competition.

to disentangle various contributory factors to give an accurate assessment of the isolated impact of SBRI. Apparent outliers on quantitative data were cross referenced using alternative sources such as Companies House data. Additionality as reported in the survey is used as indicative evidence to support/refute the findings of the counterfactual, rather than taking the findings ‘at face value’.

## Survey Script

Table D-3: Survey Script

	Reference	Question
<b>Background</b>	Q1	Can I confirm [Organisation] is the name of your organisation or the name of your parent or subsidiary organisation?
	Q2	(If name is incorrect) What is the correct name?
	Q3	Can I confirm your organisation has applied to [Competition Name]?
	Q3a	And that the competition took place in financial year [Competition Year]?
	Q3ai	(If competition year is incorrect) Please specify which year, using financial years.
	Q4	Were you successful or unsuccessful in your application to [Competition Name]?
	Q5	Has your organisation applied to any other pre-commercial procurement competitions?
	Q6a	(If yes to Q5) How many other pre-commercial procurement competitions has your organisation applied to, and of these how many times have you obtained funding successfully? Total times
	Q6b	(If yes to Q5) How many other pre-commercial procurement competitions has your organisation applied to, and of these how many times have you obtained funding successfully? Successful
<b>Additional Section for Alternative Competition</b>	Q1A1	Were you awarded funding for any competitions between Financial Year 2012/13 and Financial Year 2018/19?
	Q1A2	(If yes to Q1A1) How many competitions were you awarded funding for during that period (2012/2019)?
	Q1A3	(If yes to Q1A1) What was the name of the competition?
	Q1A4	(If yes to Q1A1) Which government organisation/department sponsored the competition?
	Q1A5	(If yes to Q1A1) What year was the funding awarded?
	Q1A6	Did you apply to any competitions between Financial Year 2012/13 and Financial Year 2018/19?
	Q1A7	(If yes to Q1A6) How many competitions did you apply for during that period?
	Q1A8	(If yes to Q1A6) What was the name of the competition?
	Q1A9	(If yes to Q1A6) Which government organisation/department sponsored the competition?
	Q1A10	(If yes to Q1A6) What year did you apply to the competition?
<b>Organisation Details</b>	Q7	In what financial year was your organisation established?
	Q8	What type of organisation do you work for? <ul style="list-style-type: none"> <li>• Public (Department or Agency)</li> <li>• Private, Academic</li> <li>• Third Sector</li> <li>• Other</li> </ul>



	Reference	Question
	Q9	Is your organisation headquartered in the UK?
	Q10	<p>What is the main activity of your organisation?</p> <ul style="list-style-type: none"> <li>• ABDE: Agriculture, mining, electricity, gas, water, and waste</li> <li>• C: Manufacturing</li> <li>• F: Construction</li> <li>• G: Wholesale and retail trade; repair of motor vehicles</li> <li>• H: Transportation and storage</li> <li>• I: Accommodation and food service activities</li> <li>• J: Information and communication</li> <li>• K: Financial and insurance activities</li> <li>• L: Real estate activities</li> <li>• M: Professional, scientific, and technical activities</li> <li>• N: Administrative and support service activities</li> <li>• O: Public administration and defence</li> <li>• P: Education</li> <li>• Q: Human health and social work activities</li> <li>• R: Arts, entertainment, and recreation</li> <li>• S: Other service activities</li> <li>• Don't know</li> </ul>
	Q11	What percentage of your competitors are based in the UK?
	Q12	What percentage of your current sales/revenues come from activities undertaken in the UK?
	Q13	What percentage of the goods and services needed to generate sales/revenues comes from UK sources?
	Q14	In terms of level of innovation activity in your organisation, approximately what proportion of your overall annual turnover would you say is allocated to research & development and innovation activities?
<b>Pre-Commercial Procurement Application Details</b>	Q15	<ul style="list-style-type: none"> <li>• Which of the following Competition's phases did you apply to?</li> <li>• Feasibility (Phase 1)</li> <li>• Prototype Development (Phase 2)</li> <li>• Both (Phase 1 &amp; 2)</li> <li>• Don't know/can't remember</li> </ul>
	Q16	What was the amount of funding requested from SBRI for your project/ prototype's development?
	Q17	Was your project a collaborative bid undertaken with other partners?
	Q18	<p>What were your partners' organisation type(s)?</p> <ul style="list-style-type: none"> <li>• Public (Department or Agency)</li> <li>• Private</li> <li>• Academic</li> <li>• Third Sector</li> <li>• Other (please specify)</li> </ul>
	Q19	What was the main motivation for seeking assistance from Pre-Commercial Procurement?
<b>Understanding impact</b>	Q20a	<p>Following completion of the Pre-Commercial Procurement project, which of the following statements are true?</p> <ul style="list-style-type: none"> <li>• The product/ prototype was procured by the commissioning organisation</li> <li>• The product/ prototype was procured by one or more other organisations</li> </ul>

Reference	Question
Q21	What was the procurement value (if procured by commissioning organisation)?
Q22	What would you say was the main reason it was not procured by the commissioning organisation (if not procured by the commissioning organisation)?
Q23	What other organisation(s) procured the product (if any)? <ul style="list-style-type: none"> <li>• Other UK public sector organisations</li> <li>• Public sector organisations (Non-UK)</li> <li>• Private companies (UK)</li> <li>• Private companies (Non-UK)</li> <li>• Third sector</li> <li>• Individuals</li> <li>• Other</li> </ul>
Q24	(If procured by other organisations) To date, can you estimate approximately how much revenue has been generated from the procurement of your product/ prototype?
Q25	(If not procured by other organisations) What would you say was the main reason why the product/prototype was not sold to other organisations?
Q26	How many FTEs/Revenue/Profits/Private investments did your organisation have in [COMPETITION YEAR], and how many FTEs/Revenue/Profits/Private investments does it have now?
Q28	To what extent have the following areas have been affected by your participation in the Pre-Commercial Procurement programme? <ul style="list-style-type: none"> <li>• FTEs</li> <li>• Revenue</li> <li>• Profits</li> <li>• Private investment</li> </ul>
Q29	Would you say that these effects? (for FTEs/Revenue/Profit & Private investment) <ul style="list-style-type: none"> <li>• Have occurred in the past, but are no longer occurring</li> <li>• Will continue to affect your organisation this year only</li> <li>• Will continue for more years at the same level</li> <li>• Will continue but steadily diminish</li> <li>• Will increase in the future</li> <li>• Don't know</li> </ul>
Q30	How many years do you think these effects will last? (for FTEs/Revenue/Profit & Private investment) <ul style="list-style-type: none"> <li>• 1-2 years</li> <li>• 3-4 years</li> <li>• 4-6 years</li> <li>• 6-10 years</li> <li>• More than 10 years</li> <li>• Don't know</li> </ul>
Q31	Has your experience in the Pre-Commercial Procurement programme benefited your organisation in any other ways? (Yes or No) <ul style="list-style-type: none"> <li>• Additional sales to existing customers/markets</li> <li>• Additional sales to new customers/markets</li> <li>• Additional public sector sales</li> <li>• Catalysation of further private investment</li> <li>• Access to new market opportunities</li> <li>• Employee growth</li> </ul>

	Reference	Question
		<ul style="list-style-type: none"> <li>• Increased current or planned investment in R&amp;D</li> <li>• Development of new technology</li> <li>• Development of new IP</li> <li>• Development of a new prototype</li> <li>• Commercialisation of a new product</li> <li>• Creation of a new organisation or spin-out</li> <li>• Creation of a new business model</li> <li>• Acquisition of technical expertise</li> <li>• Development of skills within the organisation</li> <li>• Collaboration with new technology specialist</li> <li>• Collaboration with new partners</li> <li>• Improvement of relationships with partners</li> <li>• The de-risking of technology development</li> <li>• The de-risking of the innovation process</li> <li>• Solving societal or governmental problems</li> <li>• Other</li> <li>• Don't know/ can't remember</li> </ul>
	Q32	Did the Pre-Commercial Procurement process benefit any other organisation or group? (Yes or No)
	Q33	Which organisation or group did it benefit? <ul style="list-style-type: none"> <li>• Public sector</li> <li>• Research or academia</li> <li>• Partner/ collaborators</li> <li>• Competitors</li> <li>• Wider society</li> <li>• Other</li> </ul>
	Q34	(If yes to Q17) Earlier, you mentioned that your bid was a collaborative bid, undertaken with other partners did working together on the bid/ project lead to any future opportunities?
	Q35	(If yes to Q34) What were these?
<b>Additionality</b>	Q36	Prior to applying to Pre-Commercial Procurement, had you sought any alternative funding streams for this project/ prototype from public and/or private sources? <ul style="list-style-type: none"> <li>• Stream 1</li> <li>• Stream 2</li> <li>• Stream 3</li> <li>• No alternative funding sought</li> </ul>
	Q37	(If yes to Q36) What type of private financing was it? <ul style="list-style-type: none"> <li>• Venture capital</li> <li>• Internal funds</li> <li>• Angel funding</li> <li>• Bank</li> <li>• Family/ personal network</li> <li>• Other</li> </ul>
	Q38	<ul style="list-style-type: none"> <li>• (Beneficiary only) If your organisation had not received support from Pre-Commercial Procurement, would the project have gone ahead anyway?</li> </ul>
	Q39	<p>(Beneficiary only) Without Pre-Commercial Procurement support would the project have been?</p> <ul style="list-style-type: none"> <li>• Exactly the same as it was with Pre-Commercial Procurement support</li> <li>• Completed more quickly</li> </ul>

	Reference	Question
		<ul style="list-style-type: none"> <li>Completed more slowly</li> <li>Started much earlier</li> <li>Started much later</li> <li>Completed but with lower ambition or quality</li> <li>Completed to a higher quality</li> <li>Completed but with fewer resources invested</li> <li>Completed but by taking on greater risk</li> <li>Completed taking on less risk</li> <li>Don't know</li> </ul>
	Q40	<ul style="list-style-type: none"> <li>(Beneficiary only) Knowing what you know now, had Pre-commercial Procurement not been available, how could the project have been alternately funded?</li> <li>Internal funding</li> <li>Family/personal network</li> <li>Bank loan or other bank finance</li> <li>Business angel or other equity funding</li> <li>Another public R&amp;D support scheme</li> <li>R&amp;D tax credit</li> <li>Other</li> <li>None of these, it wouldn't have happened</li> </ul>
	Q41	<p>(Non-beneficiary only) Following notification that the Pre-Commercial Procurement application was unsuccessful, which of the following best describe what happened next to your project/ prototype:</p> <ul style="list-style-type: none"> <li>The project stopped completely</li> <li>The project continued in the same way as it would have done with Pre-Commercial Procurement support</li> <li>The project continued but was modified in some way</li> <li>Don't know</li> </ul>
	Q42	<p>(Non-beneficiary only) In what way was the project modified to what would have happened with Pre-Commercial Procurement support?</p> <ul style="list-style-type: none"> <li>Completed more quickly</li> <li>Started much earlier</li> <li>Started much later</li> <li>Completed but with lower ambition or quality</li> <li>Completed to a higher quality</li> <li>Completed but with fewer resources invested</li> <li>Completed but by taking on greater risk</li> <li>Completed taking on less risk</li> <li>Don't know</li> </ul>
	Q43	<ul style="list-style-type: none"> <li>(Non-beneficiary - if project didn't go ahead) What would you say was the main reason the project didn't go ahead?</li> </ul>
<b>Pre-Commercial Procurement Overall Process</b>	Q44	<p>How did you find the following stages of the process?</p> <ul style="list-style-type: none"> <li>The application process</li> <li>The selection/award process</li> <li>Working with departments through Phase 1</li> <li>Working with departments through Phase 2</li> <li>Programme closure</li> </ul>
	Q45	<p>In your opinion, in what way could the Pre-Commercial Procurement programme improve?</p> <ul style="list-style-type: none"> <li>Selection criteria/process</li> <li>Administrative burden</li> <li>Clarity of brief/project</li> <li>Relationship with the department</li> </ul>

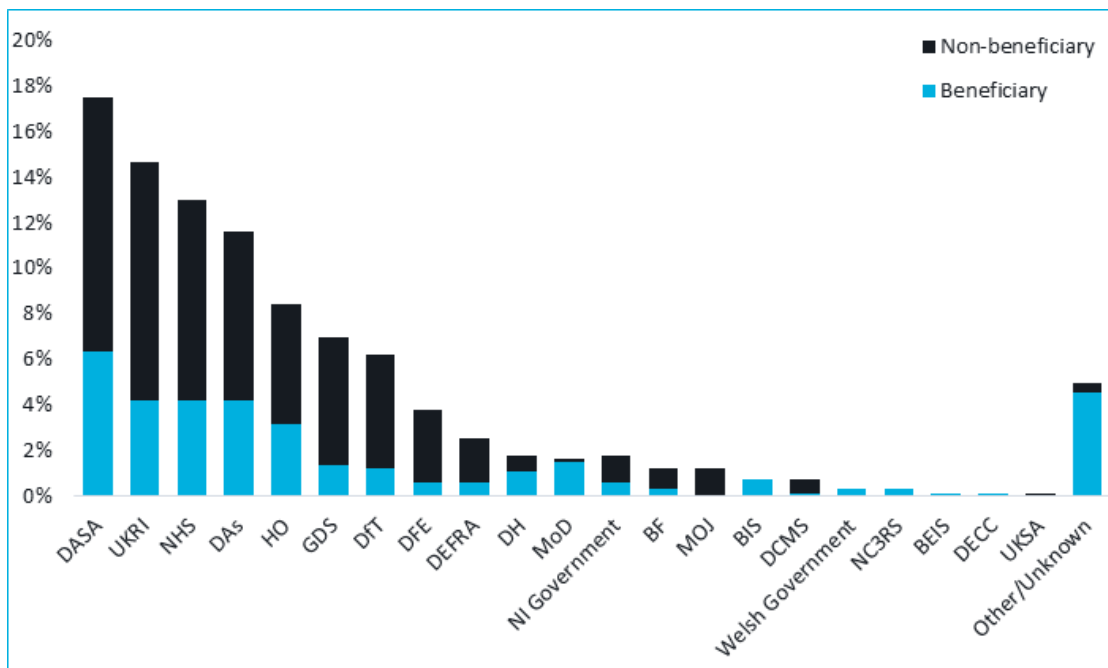
Reference	Question
	<ul style="list-style-type: none"> <li>• Procurement process</li> <li>• Technical/legal/regulatory advice offered</li> <li>• Amount of funding available</li> <li>• Other</li> </ul>

Source: SBRI Beneficiary & Non-Beneficiary Survey, 2021

## Survey Beneficiary Summary

D.16 DASA had the highest number of applicants represented in the survey (n=116). Of these, 36% were beneficiaries. A similar proportion of beneficiaries can be seen across departments with 50 or more respondents, ranging between 29%-36%. GDS (20%), DfT (19%) and DfE (16%) had a notably smaller proportion of beneficiaries than those with a higher number of respondents.

Figure D-1: Proportion of applicants by department



Source: SBRI Beneficiary & Non-Beneficiary Survey, 2021

Table D-4: Reported nature and persistence of revenue impacts

Would you say these revenue effects...		a) Have occurred in the past, but are no longer occurring	b) Will continue to affect your organisation this year only	c) Will continue for more years at the same level, for the next:	d) Will continue but steadily diminish, for the next:	e) Will increase in the future, for the next:	f) Don't know/didn't answer	Total
How long do you expect these revenue effects to last?	1-2 years			1	-	2		3
	3-4 years					3		3
	4-6 years			4	-	4		8
	6-10 years			1	-	1		2

	10+ years			-	-	3		3
	Don't know			1	1			2
	n/a	3	1				51	55
	<b>TOTAL</b>	<b>3 (4%)</b>	<b>1 (1%)</b>	<b>7 (9%)</b>	<b>1 (1%)</b>	<b>13 (17%)</b>	<b>51 (67%)</b>	<b>76</b>

Source: Beneficiary & Non-Beneficiary Survey: Q29 & Q30 Table D-5: Reported nature and persistence of employee impacts

Table D-6: Reported nature and persistence of revenue impacts

Would you say these employee effects...		a) Have occurred in the past, but are no longer occurring	b) Will continue to affect your organisation this year only	c) Will continue for more years at the same level, for the next:	d) Will continue but steadily diminish, for the next:	e) Will increase in the future, for the next:	f) Don't know/didn't answer	Total
How long do you expect these revenue effects to last?	1-2 years	-	-	6	2	6	-	14
	3-4 years	-	-	6	-	12	-	18
	4-6 years	-	-	7	1	14	-	22
	6-10 years	-	-	1	-	1	-	2
	10+ years	-	-	2	-	9	-	11
	Don't know	-	-	2	-	4	-	6
	n/a	17	5	-	-	-	11	33
	<b>TOTAL</b>	<b>17</b>	<b>5</b>	<b>24</b>	<b>3</b>	<b>46</b>	<b>11</b>	<b>106</b>

Source: Beneficiary & Non-Beneficiary Survey: Q29 & Q30

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