

Business Research and Innovation Initiative Impact Evaluation

Department of Industry, Science, Energy and Resources

31 August 2021

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1. Executive summary

The Business Research and Innovation Initiative (BRII) is a unique Australian Government demand-side innovation program. The BRII was designed to achieve two goals: foster innovation among small and medium sized enterprises (SMEs) and to help Australian Government agencies find novel solutions to otherwise intractable public policy and service delivery problems. At the launch of the BRII there was a commitment to complete an impact evaluation to determine the effectiveness of the program and to inform a decision on future models of the BRII, including whether the government should scale-up the BRII.

This impact evaluation has found that the BRII has not only achieved both its policy goals but also delivered a substantial net economic benefit to Australia. The evaluation estimated that the first round of the BRII will create a net benefit of \$10.4 million and will return \$1.64 for every \$1 that the government invested in the program.¹ The BRII benefit-cost ratio (BCR) result is similar to the BCR from a 2015 cost-benefit analysis of the comparable UK Small Business Research Initiative. It is important to note that the result of the cost-benefit analysis is based on a small sample that is very sensitive to individual SME outcomes. None the less, the BCR result highlights the significant positive impact of the first round of the BRII.

This evaluation therefore recommends that the Australian Government consider scaling up the BRII to increase its reach and impact.

On the first goal – fostering innovation among SMEs - the BRII has had an overwhelmingly positive impact on participating SMEs. This was especially true for SMEs that progressed to the proof of concept stage. The evaluation has found that participating in the BRII:

- sparked innovation and focused commercial strategy for most participants.
- was a catalyst for new partnerships and enhanced SME capability to access domestic and international markets.
- enhanced government engagement for many SMEs.
- had a positive and lasting impact on the business performance of round one proof of concept SMEs, with a similarly positive commercial outlook for round two proof of concept SMEs.

Of note, more than two thirds of the SME survey and interview respondents confirmed that the Research & Development (R&D) undertaken during the BRII would not have taken place without BRII funding. On this count, the BRII has created additional benefit through the challenge-based procurement approach. There are some particularly noteworthy outcomes for round one SMEs that have gone on to build successful businesses and products off the back of the BRII. One SME that formed specifically for the BRII is now exploring international expansion. Another SME received the Social Impact of the Year award at the 2020 RegTech Awards.

On the second goal - helping Australian Government agencies find novel solutions to otherwise intractable public policy and service delivery problems – round one solutions have already

¹ Net benefit and BCR estimates include forward projections out until financial year 2024/25.

contributed to solving difficult challenges for several agencies. Round two solutions, which were still in the proof of concept stage during the evaluation, also have potential to solve more challenges. Solving these intractable problems deliver a range of benefits for government. These include better policy outcomes, more effective service delivery, improved processes to save time and money for customers of the SMEs (including Australian and State government agencies) and better access to and accuracy of information. The Department of Social Services (DSS) and NSW Department of Communities and Justice (DCJ) were recognised with a gold medal award for delivering innovation through procurement at the 2020 Commonwealth Procurement Awards for Excellence.

The BRIL has been successful because it created genuine and unique impact for challenge agencies that they may not have been achieved through conventional procurement. Challenge agencies highlighted the strong support from the BRIL teams and the ability to simultaneously work with multiple SMEs as important factors that contributed to their positive experience. The BRIL has been such a positive experience for some challenge agencies that they have embraced challenge-based innovation (CBI), either through repeat applications or new internal programs.

Challenge agencies did identify opportunities to clarify expected time commitments and provide guidance on managing real or perceived conflict of interest concerns when working with multiple SMEs. Another issue was the lack of buy-in for the BRIL beyond the executive sponsor and the responsible teams within government agencies. Challenge agencies and SMEs highlighted that this could negatively impact the outcomes of the program. Stakeholders also identified the ongoing need to build procurement processes and a culture in the Australian Public Service (APS) that supports CBI. Challenge agencies and SMEs had to find creative ways to navigate procurement post the BRIL, especially when the program's timing did not align with budget cycles. Both challenge agencies and SMEs identified an opportunity to extend the BRIL support to a follow-on 'commercialisation' stage to overcome this challenge.

The opportunity to scale-up the BRIL is substantial. The BRIL has achieved similar or better outcomes than comparable programs in the US and UK. However, the BRIL has not significantly increased its scale across the first five years of operation. In comparison, Innovative Solutions Canada (a comparable program in Canada) has already reached a scale many times larger than the BRIL even though it launched one year later than the BRIL. To achieve similar scale and maintain the impact of the program the government will need to make some considered decisions on funding, program design and program delivery if it chooses to scale-up the BRIL.

2. Summary of evaluation findings

The Department of Industry, Science, Energy and Resources (DISER) engaged Nous Group (Nous) to conduct an impact evaluation of the Business Research and Innovation Initiative (BRII). This evaluation focussed on the outcomes and impact, delivery and design of the BRII. The evaluation looked at the first three rounds of the BRII.

2.1 The BRII has reached a diverse group of Small and Medium Sized Enterprises (SMEs) and Australian Government agencies

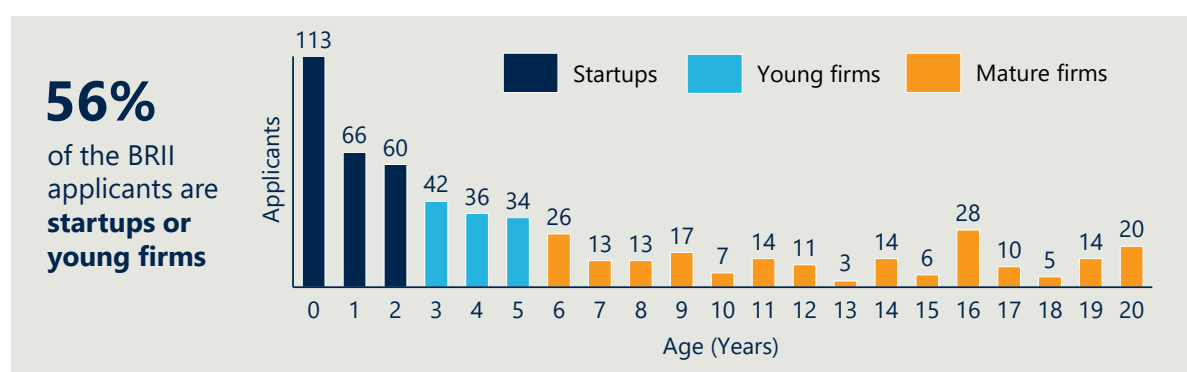
The BRII pilot was announced in December 2015 as part of the 'Government as Exemplar' pillar of the National Innovation and Science Agenda (NISA). The BRII aims to help Australian Government agencies find novel solutions to otherwise intractable public policy and service delivery problems and to foster innovation among SMEs. Across the first three rounds, the BRII has granted \$20.4 million to 58 SMEs across 15 challenges. This funding has been distributed across a diverse group of agencies and SMEs, with very few repeat agencies and SMEs in the program.

2.1.1 The BRII has attracted a range of SMEs with different characteristics.

The BRII was most attractive to start-ups or young firms.² However, there was still healthy representation from mature firms of various ages. The BRII also acted as a catalyst for the formation of new entities, with 113 of the 501 total applicants (20 per cent) zero years old at time of application (see Figure 1). A similar percentage (17 per cent) of new firms went on to receive feasibility grants. SME applicants were from all Australian jurisdictions with a slight overrepresentation from the Australian Capital Territory (ACT). This might be because of the proximity of ACT SMEs to most challenge agencies.

² Based on The Organisation for Economic Co-operation and Development (OECD) business age class definitions.

Figure 1 | Applicants by business age in years at time of application³



Source: BRII administrative data

2.1.2 The BRII has partnered with many diverse government agencies on a range of difficult problems.

The BRII has attracted agencies with challenges across energy, agriculture and environment, tourism, data and digital, human services and information management. Overall, 14 government agencies have participated in the BRII. There has been a good spread of challenges across policy, operational, regulatory and specialist agencies⁴, and Commonwealth corporate entities. The diverse spread of agencies is reflected in the fact that only one of the 14 challenge agencies has been involved in multiple rounds.

2.2 The BRII has produced substantial value for participating SMEs and challenge agencies

Participation in the program has supported innovation and growth for SMEs. The BRII has also influenced a change in attitude towards procurement among some government agencies due to the benefits of participating in the program. These findings align with the dual objectives of the BRII.

2.2.1 The BRII has had a positive impact on participating SMEs.

The impact of the BRII was positive for almost all SMEs that participated in the evaluation. This was especially true for proof of concept SMEs. The evaluation has found that participating in the BRII:

- **Helped many SMEs improve their innovative capability.** More than two thirds of the SME survey and interview respondents confirmed that the research and development (R&D) undertaken during the BRII would not have taken place without BRII funding (see Figure 2). Half of these SMEs have already begun commercialising the outputs of their BRII projects.

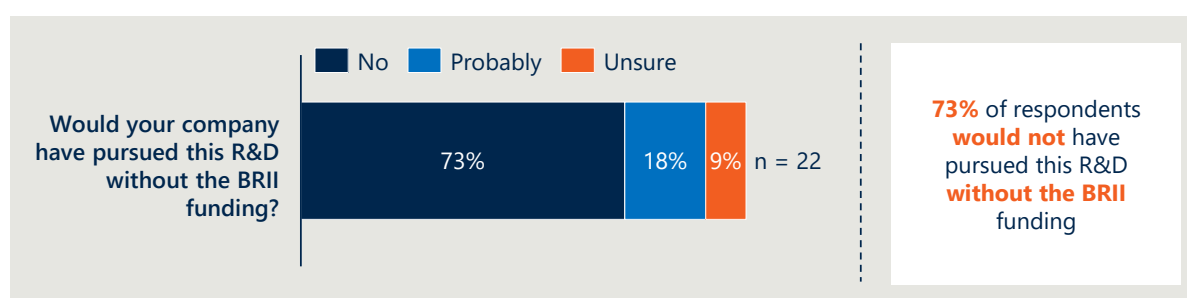
³ Based on years since ABN registration at time of the BRII application.

⁴ Australian Public Service Commission APS Agencies – size and function.

Over three quarters are considering commercial opportunities for the outputs of their BRIL R&D beyond their initial BRIL challenge.

- **Aided in the development of new partnerships.** Almost every SME that completed a survey or participated in an interview noted that they had entered a new partnership thanks to the BRIL. More than half felt that the BRIL positively influenced their ability to access new markets.
- **Enhanced government engagement for many SMEs.** Half of the SME survey respondents had little or no prior engagement with government clients before the BRIL. Most of the same respondents felt that the BRIL had increased their capacity to engage with government agencies.
- **Had a positive and lasting impact for proof of concept SMEs.** Eight of the nine proof of concept SMEs from round one indicated that the BRIL has had a positive impact on their turnover beyond the grant funding that they received. Five of these SMEs have had their product procured by the challenge agencies, and eight out of nine have commercialised their BRIL solution. While round two proof of concept projects have only very recently been completed, four of six round two proof of concept SMEs are exploring procurement with their challenge agency. All round two proof of concept SMEs are seeking firm commercial opportunities beyond the BRIL.

Figure 2 | Impact of the BRIL on SME innovation



Source: Feasibility and proof of concept SME surveys

2.2.2 The BRIL has supported innovation that government procurement does not often support.

Challenge agencies felt their participation in the BRIL has created a genuine and unique impact for their agency that may not have been achievable through conventional procurement.

Challenge agencies indicated that the BRIL:

- Supports higher risk innovation that government procurement does not often support.
- Has supported challenge agencies to develop new commercial partnerships with innovative SMEs.
- Has supported divergent approaches through the competition between multiple SMEs that resulted in higher quality solutions.

Challenge agencies believed this positive impact was bolstered by strong support from DISER.

Several challenge agencies have embraced challenge-based innovation (CBI) since participating in the BRII. Others have approached DISER to implement CBI within their agency based on the strength of the BRII's reputation. These agencies have either implemented their own CBI methods, approached DISER to run specialised rounds, started to explore ways to incorporate challenge-based procurement into their research and development strategy, or indicated they would participate in the BRII again.

Moreover, the solutions developed in round one of the BRII have delivered benefits for challenge agencies. These benefits include:

- Better policy outcomes for government, improved information accuracy and timeliness for market participants and government agencies.
- More efficient service delivery, including improved processes that save time and money for customers and government agencies and more efficient back-end efficiencies for government agencies.

The six solutions from round two have yet to reach similar maturity to the round one solutions. However, the progress made in the proof of concept stage indicates that they could have a similar impact if they find a pathway to commercialisation.

2.2.3 The BRII has achieved similar or better outcomes for SMEs to comparable programs in other jurisdictions.

BRII firms were just as likely to commercialise their intellectual property (IP) and more likely to develop partnerships as the United States (US) Small Business Innovation Research (SBIR) firms. The BRII created a similar level of additionality to the SBIR through the support of projects that would not have occurred otherwise, catalysed start-up creation at the same rate as the SBIR and has had a strongly positive impact on business performance that is similar to the SBIR.

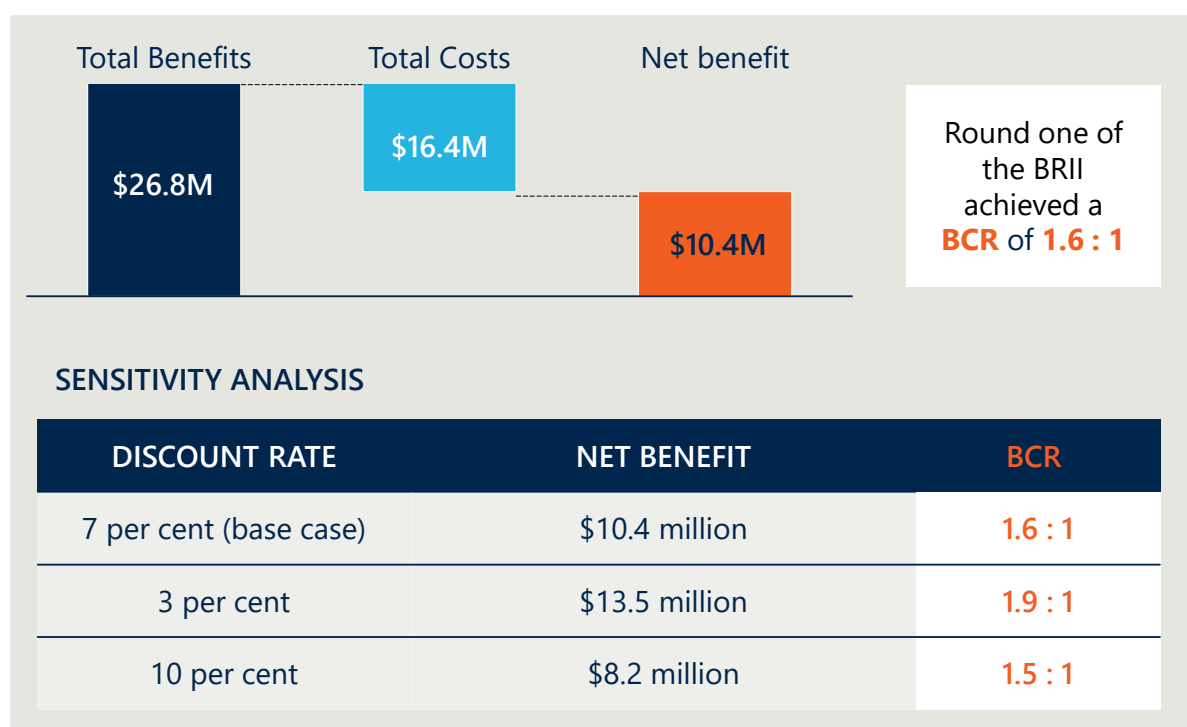
2.3 Round one of the BRII has delivered a substantial net economic benefit to Australia

This evaluation found that the first round of the BRII achieved an estimated net benefit of \$10.4 million and returned \$1.64 for every \$1 that the government invested in the program.⁵ This included total benefits of \$26.8 million, which were made up of \$25.7 million of benefits created through improved SME performance and \$1.1 million in benefits created through the implementation of three round one solutions. The total costs amounted to \$16.4 million, which were predominantly made up of grant funding costs alongside some administrative costs. These results reflect a benefit to cost ratio (BCR) of 1.6 to 1. In line with Australian Government guidance, the cost-benefit analysis (CBA) results are presented at discount rates of 3 per cent, 7

⁵ Net benefit and BCR estimates include forward projections out until financial year 2024/25.

per cent (base case) and 10 per cent.⁶ The resulting net benefit range has a lower bound of \$8.2 million and an upper bound of \$13.5 million (see Figure 3).

Figure 3 | Summary of CBA results



Source: *Nous analysis*

It is important to note that the result of the cost-benefit analysis is based on a small sample (n=8) that is very sensitive to individual SME outcomes.

2.3.1 The BRII has a similar benefit-cost ratio to the United Kingdom (UK) SBRI.

The BRII BCR result is comparable to the BCR for the UK Small Business Research Initiative (SBRI) according to a 2015 cost-benefit analysis. The UK SBRI achieved a BCR of 1.6 (with self-reported benefits) and 2.4 (based only on econometric estimates) for the SBRI. However, the UK SBRI BCR used a lower base case discount rate of 3 per cent. At the 3 per cent discount rate, the BRII BCR is 1.9. Adjustment of some other model assumptions away from base case in the BRII example can result in a BCR even closer to the upper bound of the UK SBRI result.

⁶ See 'Cost-benefit analysis guidance note' (March 2020) from the Department of Prime Minister and Cabinet, available at: https://pmc.gov.au/sites/default/files/publications/cost-benefit-analysis_0.pdf.

2.3.2 The BRII also contributes to other benefits that are not captured as part of this CBA.

The estimate of benefits in the CBA is conservative. There are several benefits created for SMEs, government and society more broadly that are currently not measured (but might be into the future). The other benefits include:

- **Other benefits for the Australian Government and society from the three case study solutions beyond those accounted for in the CBA.** For example, it is possible that the modelled solutions are delivering outcomes more effectively (covered in the CBA) *and* with higher quality outcomes (not covered in the CBA).
- **Benefits created from solutions that are not yet measurable.** For example, the digital solution (Itree's REACH) to address BRII's round one challenge of sharing information nationally to ensure child safety could drive significant benefits through a reduction in the incidence of harm for children at risk.⁷ Given the lack of data and the complex, high-consequence and in some cases unquantifiable risk of some of these outcomes they were not quantified as part of this CBA.
- **Non-monetary benefits that accrue to both round one SMEs and challenge agencies.** For example, SMEs benefit from learning how to navigate Australian government procurement. Agencies benefit from an improved ability to partner with smaller and innovative SMEs into the future. One proxy measure of this is the government procurement trends (sourced from AusTender) for the nine round one proof of concept SMEs that existed prior to participating in BRII. These SMEs increased their cumulative total of government contracts from 61 in the five years prior to the BRII to 88 in the five years post BRII commencement. This resulted in a \$10.1 million increase in the combined cumulative value of government contracts for those SMEs.⁸
- **Benefits that round one feasibility SMEs might create through the BRII.** For example, even SMEs that only progress to the feasibility stage could continue to develop their idea or innovation without further BRII assistance. Even though they receive no further funding, the BRII may have been a catalyst for their innovation or introduced them to partners or customers to support the commercialisation of their solution.

⁷ Note that evaluation interviews indicated that the NSW DCJ is currently undertaking a benefits assessment as part of the REACH interim review which should be completed by the end of October 2021. At this point further outcomes may be possible to quantify.

⁸ To ensure a fair comparison, the count of tenders after engagement with the BRII is based on the period between the beginning of the relevant BRII round (one or two) and 30 June 2021. The count "before" engagement with the BRII is based on an equal period prior to the BRII round as between the beginning of the round and 30 June 2021. For example, if it has been five years since the commencement of a BRII round, then the "before" count of tenders is based on the five years before the commencement of the BRII round. All data for these calculations is sourced from AusTender.

2.4 BRII program design, governance and implementation have been effective

Challenge agencies and SMEs generally reported a positive experience from their participation in the BRII. Although effective overall, stakeholders did note some areas for improvement in the design, governance and implementation of the program that are discussed below.

2.4.1 The design and governance of the BRII has been effective.

The evaluation identified three key findings regarding the design and governance of the BRII:

- **The BRII continues to support the objectives for which it was designed.** The program has reached 14 different government agencies directly and has touched many others indirectly. This impact has triggered some change in agencies, some of whom have planned further challenge-based procurement.
- **The Entrepreneurs' Program Committee (EPC) has been invaluable in its capacity to bring commercialisation expertise.** This has aided in the selection of high-quality applications with the potential to rapidly develop and commercialise products. This expertise was especially valuable as it is not prevalent in either DISER or the challenge agencies. However, current governance arrangements require significant time investment from the EPC. The time-intensive nature of BRII governance, especially for members of the EPC, limits the program's ability to scale up.
- **The BRII policy and program teams have each completed their role effectively.** The BRII policy team has supported improvements to the design of the program. The BRII program team has maintained positive experiences for SMEs and challenge agencies throughout the first three rounds. However, DISER stakeholders did identify opportunities for greater integration through better information sharing.
- **The BRII teams have anticipated, managed and mitigated major risks across the first three rounds.** The main risks were related to designing effective challenges, attracting high quality SMEs and enabling the effective participation of agencies and SMEs. Overall, the BRII teams did a good job to identify and then manage or mitigate these risks. This is reflected in the changes to program design between rounds.

2.4.2 The BRII has improved how it delivers the challenge stage.

The challenge stage is critical to the success of the BRII. During this stage, the BRII must achieve two key objectives:

1. Identify and design challenges that clearly articulate the problem they have been designed to solve but remain open to a range of innovative solutions.
2. Attract high quality, innovative firms that have a high likelihood to develop solutions that can address the chosen challenges.

The BRII has evolved its approach to address these objectives in two important ways:

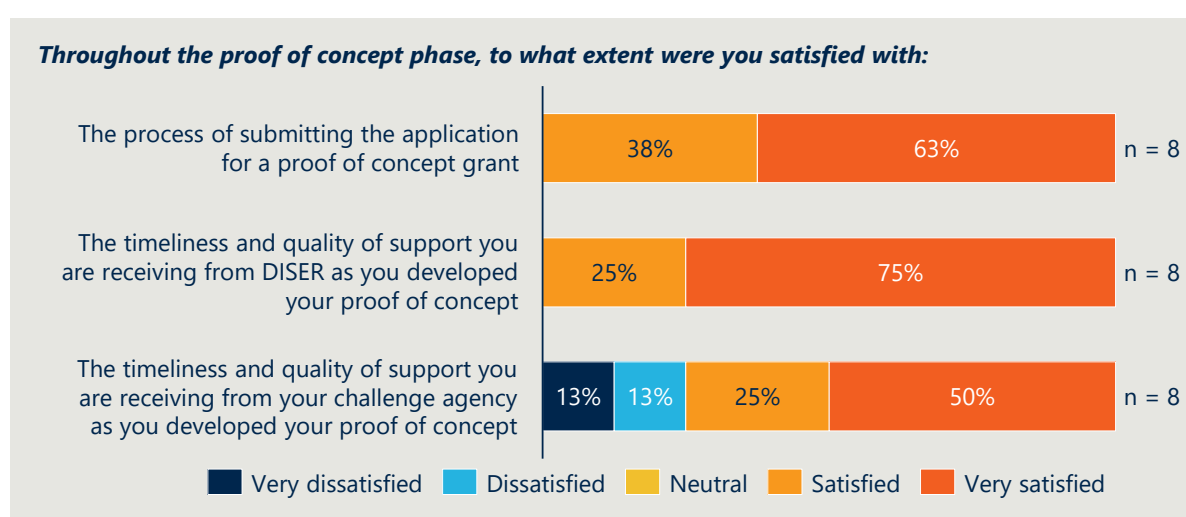
- The introduction of a challenge agency Expression of Interest (EOI) application improved challenge design for round three (priority sectors round). The EOI phase provides DISER and the EPC with the opportunity to work with challenge agencies at an early stage to refine their challenge. This change was in response to the failure of two challenges to progress to the proof of concept stage in round two. Stakeholders attributed this to poor challenge design.
- The BRII improved its marketing and engagement with SMEs between rounds two and three. Prior to round three, DISER initiated a major shift in the communications approach. This resulted in a more targeted, tailored approach and an increased emphasis on social media outreach. This new approach resulted in a significant increase in engagement and applications compared to previous rounds.

2.4.3 SMEs had a positive experience in the BRII but suggested some improvements.

Most SMEs had a positive experience through the feasibility stage. Almost all survey respondents were satisfied or very satisfied with the support received from challenge agencies and from DISER. Many respondents specifically called out the quality and timeliness of support made available to them by DISER.

Later in the program, proof of concept SMEs were generally satisfied (Figure 3). However, some noted shortcomings in the support they received from their challenge agency. Concerns with challenge agency support mostly stemmed from the impact of a lack of accountability on the challenge agencies and staff turnover on the consistency of their experience.

Figure 4 | SME experience throughout the proof of concept phase



Source: Proof of concept SME surveys

2.4.4 Most challenge agencies reflected positively on the BRII.

Challenge agencies were generally positive about their experience with the BRII. All the agency representatives that were interviewed said they would participate in the BRII again. Challenge agencies particularly valued the support and engagement that the BRII team provided throughout the feasibility and proof of concept stages.

Challenge agencies identified three main opportunities to improve the delivery of the BRII into the future:

- **Provide comprehensive information and develop formal guidelines on how agencies should manage multiple SMEs, particularly at the feasibility stage.** Several challenge agencies highlighted concerns that the BRII design, which is in effect a competitive grant, created potential or perceived conflicts of interest.
- **Provide more comprehensive information on the time commitment to get the most out of the BRII.** Many challenge agencies shared that they had little to no understanding of the resources and time commitments necessary to get the most value out of the BRII. This meant that they often delivered BRII activities above and beyond their usual workload.
- **Improve challenge agency engagement to increase agency commitment.** Several challenge agencies provided suggestions on how to get around this. This included several upfront requirements of agencies: agency financial co-contributions for the delivery of the BRII; committed agency funding to support the implementation of successful solutions; and committed staffing resources from within agency budgets.

2.4.5 SMEs and challenge agencies identified an opportunity to include follow-on commercialisation support.

Proof of concept SMEs and challenge agencies described the end of BRII as a cliff. Some were not quite ready to commercialise their product but felt that with additional support they could have done so quickly. A follow on commercialisation stage could help to address several scenarios that have held back the commercialisation of BRII solutions. Suggestions ranged from introducing a third phase in the BRII or adding a dedicated stream of Accelerating Commercialisation (AC) grants for successful proof of concept companies. This also aligns with some international comparison programs, like the SBIR in the US. SBIR Phase III formalises the post-proof of concept commercialisation journey without providing additional funding.

2.5 DISER should consider eleven recommendations to improve the BRII

Based on the findings outlined above, this evaluation has determined a range of improvements to program design and implementation that could further optimise the program. These recommendations should be considered regardless of the BRII's future scale. The recommendations are organised across the three stages of the BRII – challenge design,

feasibility study and proof of concept. Further recommendations are also provided that are relevant to the whole of the BRIL.



Recommendations

Challenge design phase	Supporting findings
<p>1. Explore opportunities to streamline and improve the BRIL marketing and engagement processes for SMEs and challenge agencies – for example through:</p> <ul style="list-style-type: none"> • Embedding challenge communication capabilities within the participating agencies (e.g. through the Portfolio Liaison Officers). • Developing guidance and templates to streamline and quality control the development of marketing and engagement materials. • Expanding the reach and visibility of the BRIL across Australian Government agencies through a targeted communications campaign for government agencies or the use of BRIL challenge agency account managers. 	<p>There is still substantial opportunity to extend the reach of the BRIL across more government agencies. Across the Australian Government there are over 150 potential agencies or departments that could participate in the BRIL. A continued focus on priority challenge areas that align with government priorities may also support the BRIL to extend its reach across more government departments and agencies.</p>
Feasibility phase	Supporting findings
<p>2. Develop an SME engagement framework and accompanying guidance for challenge agencies. The framework and guidance should support challenge agencies to manage real and perceived probity concerns when working with multiple SMEs.</p>	<p>Several challenge agencies highlighted concerns that the BRIL design, which is in effect a competitive grant, created potential perceived conflicts of interest in how the agencies engaged with the SMEs.</p>
<p>3. Provide SMEs the opportunity to engage with the EPC (or whichever body oversees future assessments). This could occur through a mid-feasibility stage presentation to increase transparency and allow SMEs to receive feedback from the project's final decision makers.</p>	<p>Many SMEs felt that they had little practical understanding of the merit criteria the EPC used to assess their feasibility round applications. Some SMEs told us that they would have benefited from early engagement with the</p>

	EPC so they could have adapted their approach to better meet the requirements.
Proof of concept phase	Supporting findings
<p>4. Consider changes to the design of the BRII to encourage collaboration between complementary feasibility SMEs in the proof of concept phase. Both SMEs and challenge agencies highlighted the opportunity for higher impact solutions through collaboration in certain cases. However, changes will need to carefully consider how collaboration will impact on probity concerns, the development, ownership and commercialisation of any resulting IP. DISER should also test whether collaboration is likely to produce a higher quality solution.</p>	Some challenge agencies and SMEs observed circumstances in which different SMEs had complementary solutions. They remarked that there was an opportunity for the BRII to consider collaborations between SMEs in cases when solutions were complementary and together had a higher likelihood of solving the challenge.
<p>5. Provide participating SMEs with better access to information on government procurement processes - for example, through tailored factsheets, briefings, webinars or other resources - to help SMEs navigate procurement with their challenge agency or other government agencies. This could be delivered through the challenge agencies based on guidance from the Department of Finance.</p>	Some SMEs found it difficult and confusing to navigate procurement processes. Many challenge agencies highlighted that government decision-making and procurement processes were areas for participating SMEs to improve their knowledge.
<p>6. Improve support for commercialisation during and after the proof of concept phase. Possible avenues to do this include:</p> <ul style="list-style-type: none"> Offering access to commercialisation coaches during the proof of concept phase to mitigate the risk of SMEs developing bespoke products with limited commercialisation potential post-BRII. The BRII could leverage DISER's broader advisor network or provide incubation style support through an external provider. 	Across both round one and round two, many proof of concept SMEs described the end of the BRII as a cliff. A few SMEs noted that the commercialisation pathway post BRII was up to 18 to 24 months longer than it could have been if funding or other mechanisms were available to support further proof of concept pilots.

<ul style="list-style-type: none"> • Creating a dedicated stream of funding to support post-BRII commercialisation pilots for eligible proof of concept SMEs. • Providing the opportunity for other government departments and agencies not affiliated with the challenge to apply as co-sponsors for post-BRII commercialisation pilots. DISER could develop guidance materials or play an active role to identify and encourage co-sponsors. 	<p>One SME suggested co-sponsors could be included to support the follow-on commercialisation stage.</p>
Whole of program	Supporting findings
<p>7. Increase the efficiency and effectiveness of governance and administrative arrangements through:</p> <ul style="list-style-type: none"> • Embedding a clear approach and rhythm of information sharing between the BRII policy and program teams to drive continuous improvement. • Clarifying the different roles that the EPC play (e.g. assessing challenges and SME applications vs providing commercialisation advice to DISER) to support the BRII and then updating governance arrangements accordingly. For example, DISER could engage EPC members to provide commercialisation support directly to challenge agencies in addition to their assessment role. 	<p>Stakeholders identified the opportunity for tighter collaboration between the BRII policy team, program team and the EPC across the three stages of the BRII. Stakeholders identified the benefit of faster feedback loops to improve the design and delivery of the BRII. EPC members also identified scope creep as a key concern as BRII has evolved over time. This included more requests for commercialisation advice separate to their assessment role.</p>
<p>8. Explore avenues to increase challenge agency buy-in to the BRII projects – for example, through requirements for financial co-contributions, allocated budgets for implementation or dedicated resources within agency budgets. This should also help mitigate the impact of staff turnover in challenge agencies on the SME experience and program outcomes. Additionally, DISER should consider how it can ensure the effective handover of information and relationships when there is the inevitable staff turnover.</p>	<p>There are currently varying levels of engagement and buy-in across challenge agencies. Both SMEs and challenge agency delivery staff noted that poor engagement and buy-in had negative impacts on their experience.</p>

<p>9. Build on current project related data collection and develop ongoing program related data collection to measure the experience, outcomes and impact of the BRII for participating SMEs and challenge agencies. The ongoing, systematised collection of data will support ongoing program improvements and future evaluations. DISER could use the surveys and interview guides developed to support this evaluation as a starting point.</p>	<p>Throughout the evaluation, it was clear that DISER had not collected formal data from SMEs and challenge agencies on their experience with the BRII program. This evaluation developed bespoke survey and interview data collection tools to fill these data collection gaps. DISER had collected some data on round one SME and challenge agency outcomes, however, this was through ad hoc processes and not a formal monitoring data collection approach.</p>
<p>10. Build a longitudinal dataset of the BRII participants to demonstrate the program's impact on business performance and their spill over effects. This should include:</p> <ul style="list-style-type: none"> • Maintaining the CBA model (and relevant guidance material) completed for this evaluation and integrating more SMEs into the CBA model across subsequent rounds, starting with round two SMEs. • Exploring the ongoing use of the datasets developed through the evaluation to create a synthetic 'control group' for CBAs of future rounds. 	<p>There is an opportunity to extend the above methodology so that an increasingly robust evidence base for the costs and benefits of the BRII can be developed over time. The BRII policy and program teams could work closely with the Evaluation and Research Branch in DISER to engage challenge agencies and SMEs to collect the right data to support the CBA model.</p>
<p>11. Develop a benefits realisation framework to monitor the benefits realised through successful challenge solutions. The benefits realisation framework should be flexible so that it can capture the outcomes of the BRII solutions across the various challenges. DISER should consider providing targeted support to challenge agencies to use the benefits realisation framework to develop approaches to measure the impact of successful BRII solutions over time.</p>	<p>To measure the impact of the BRII solutions required longitudinal data that shows the benefits and costs of the various solutions. Due to the unavailability of data or the immaturity of some solutions the evaluation could only provide a high-level assessment of the benefits for three of the</p>

	ten round one solutions. All three of the quantified solutions are also in the early stages of commercialisation. This limited the quantified benefits, which are expected to increase over time if the solutions continue to gain commercial traction.
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2.6 The future of the BRII

One of the purposes of this evaluation was to inform a decision on whether the Australian Government should scale-up the BRII, which remains in its pilot phase. This evaluation was also asked to provide views on future models to support scaling up the BRII.

This evaluation found that the BRII has delivered positive outcomes for both SMEs and government agencies that has produced a considerable net economic benefit for Australia. This evaluation therefore recommends that the government consider scaling up the BRII to increase its reach and impact.

Although much smaller in scale to the more mature UK and US programs, the BRII has achieved similar or better outcomes for participating SMEs and challenge agencies. This highlights the potential for the impact of the BRII to continue as it scales-up in size. However, compared to the Canadian equivalent program - Innovative Solutions Canada (ISC) - the BRII has not significantly increased its scale across the first five years of operation. ISC already has an available budget 17 times larger than the BRII even though it launched one year later than the BRII. In its first two years of operation the ISC has already supported over 140 SMEs work towards solving 70 challenges for 17 different government agencies.⁹ If the BRII is to achieve a similar scale and maintain the impact of the program the Australian Government will need to make some considered decisions on the funding, design and delivery of the BRII.

The BRII is one of the few demand side levers that the government has used to stimulate business innovation and is therefore an important and unique part of the government's suite of innovation programs. Industry Innovation and Science Australia (IISA) recommended in 2020 that, where appropriate, government leverage its procurement of products and services to promote a more innovation-oriented response from business and build business capability. ISA particularly noted the need to focus on procurement policy that can deliver innovative solutions for the government and growth opportunities for innovative firms.¹⁰

⁹ Government of Canada 2020, Innovative Solutions Canada: 2019-20 Annual Report, [https://www1.ic.gc.ca/eic/site/101.nsf/vwapj/00129_en.pdf/\\$FILE/00129_en.pdf](https://www1.ic.gc.ca/eic/site/101.nsf/vwapj/00129_en.pdf/$FILE/00129_en.pdf).

¹⁰ Industry Innovation and Science Australia, 2021, Driving effective government investment in innovation, science and research.

This ISA recommendation also aligns with the recent Department of Education, Skills and Employment discussion paper to support the design of the University Research Commercialisation Scheme (URCS).¹¹ The consultation paper highlights both challenge-based research and stage gated scheme design as two important factors to support innovation. The BRIL has shown itself to be a model that can successfully leverage both factors to deliver significant value. However, any decision to scale-up the BRIL must consider how it will augment other focus areas for government, such as the URCS. More detail on scaled-up considerations is provided below.

2.6.1 The design, funding and delivery of the BRIL must evolve to enable greater scale.

This evaluation has identified four areas that the Australian Government could consider if it were to scale-up of the BRIL. Each area is outlined below:

- **There are several options for funding a scaled-up BRIL.** DISER could set broad expenditure targets and then support government agencies to engage with the BRIL to reach the target expenditure, like the approach taken in the UK. However, this approach has often led to missed targets. A more effective model is to mandate targets as a proportion of departmental expense budgets, like the approach taken in Canada and the US. The US SBIR and the ISC in Canada also offer good benchmarks for the Australian Government to consider what expansion pathway is possible for the BRIL. The SBIR experience offers a moderate and steady benchmark as it saw moderate growth in its first ten years of operation, growing from \$38 million to \$517 million (USD) (normalised CAGR of 34 per cent). Meanwhile, the ISC offers a more ambitious benchmark as it has increased its funding to SMEs from \$6.6 million in year one to almost \$15 million in year two (growth rate of 123 per cent). The ISC's ambition is to reach \$100 million in challenge funding per annum as quickly as possible.
- **Program delivery will need to evolve to enable greater scale.** Current governance and management arrangements will need to change, for example through new EPC arrangements and a centralised governance, administration and policy unit. The program will also need to increase the frequency and nature of challenges, a rolling challenge model is typical in other comparable programs. Workflows and manual processes will also need to be streamlined and automated. A dedicated online portal, like that used by ISC, could support this and other efficiencies.
- **APS capability will need to improve to support a scaled-up BRIL.** New embedded roles across participating portfolios that support the administration of the BRIL can help to address current workload issues and help to deliver more challenges. Similarly, capability uplift in commercialisation assessment to help the assessment and delivery stages is critical

¹¹ Department of Education, Employment and Skills, 2021, University Research Commercialisation consultation paper.

to support a scaled-up BRII. Such uplift may involve the use of dedicated commercialisation advisers.

- **Continued focus on improving SME engagement and support will be vital to success at scale.** A pillar of the BRII's success is the quality of participating SME's. This requires focus on early and effective communication to garner interest from the right businesses. This would be even more critical if the Australian Government is inclined to expand the BRII, noting a comparable size to the ISC would reach up to 2000 applicants per annum. Maintaining quality alongside growth is challenging and will require an efficient and effective SME engagement approach. Maintaining positive SME outcomes and impact, as shown through this evaluation, will also require greater support for SMEs to understand both Australian Government procurement requirements and commercialisation pathways.

2.6.2 DISER should consider three recommendations to scale-up the BRII.

The three recommendations cover funding and changes to program design and implementation.



Recommendations

Scale-up	Supporting findings
12. Consider expanding the scale of the BRII and the potential impact of a larger BRII program. The Australian Government can use the ISC example to provide a yardstick on the higher end target for scale. If the Australian Government chooses to scale the BRII it should identify a clear target within a defined period that allows for a steady scale-up of the program.	The BRII has achieved strong outcomes that are comparable to the larger US SBIR and a return on investment comparable to the larger UK SBRI. This shows the potential for the BRII to achieve the same outcomes it has so far but at a much larger scale. The ISC program should be used as a good benchmark to consider how much larger the BRII could become as it has reached a much larger scale than the BRII in a short timeframe.

13. Identify the right funding model to scale-up the BRII and support agency buy-in. The Australian Government should consider several funding approaches, including but not limited to:

- Setting aside a small percentage of each portfolio's annual operating and capital budget for CBI. The percentage of allocated budget could start low and increase over time based on an agreed process to review the scale and timing of the funding.
- Setting portfolio specific targets for either expenditure or number of challenges. In both cases the targets could again start low and increase over time.
- Increasing the funding currently available and administered through DISER for other agencies to access through the BRII challenge application process.

The chosen funding model should support a defined expansion pathway. The Australian Government could consider three potential expansion pathways:

- An ambitious pathway modelled off the experience and ambitions of the ISC.
- A moderate and steady pathway modelled off the early expansion of the US SBIR.
- A middle ground expansion that sits between the moderate and ambitious pathways.

There are a range of potential funding approaches for the BRII. The experience of the US SBIR and the ISC program from Canada support mandated targets. Both programs have achieved broad agency buy-in and substantial funding commitments through this funding model. However, the chosen funding model needs to support the Australian context.

The US SBIR and the ISC also offer good benchmarks for the Australian Government to consider what expansion pathway is possible for the BRII. This ranges from a moderate scale up through to a fast paced and ambitious scale up.

14. Develop the systems, processes, capability and capacity to scale-up the BRII. This should include:

- Using an online platform that can act as a database of potential applicants, deliver direct communications for relevant challenges and streamline and automate the end-to-end workflow from challenge application and SME application through to the delivery of the feasibility and proof of concept stages. The online platform could be modelled on the ISC platform that has enabled rapid scale-up in a small amount of time.
- Transitioning to a rolling challenge model to increase the frequency of challenges and the flexibility for challenge agencies.
- Creating new program delivery roles – including Portfolio Liaison Officers embedded in challenge agencies and DISER central BRII program account managers - to increase challenge agency capacity and capability.
- Implementing a new model to engage the EPC (or equivalent) across a larger number of challenges. The new model should leverage the online platform to streamline the assessment process.

Critical to scale-up will be an online portal and end-to-end workflow system that simplifies and reduces any manual handling. According to DISER stakeholders, the ISC platform is best practice. The ISC platform manages the whole challenge process, including developing challenges, assessment, and managing grant agreements and reporting requirements. Further, to manage the increased frequency of challenges the comparison international programs release challenges on a rolling basis across the year. Lastly, stakeholders across DISER, IISA and challenge agencies identified the need to embed an innovative culture across the APS to ensure the success of a scaled-up the BRII.

3. About the evaluation



Summary

Summary

This evaluation focussed on the outcomes and impact, delivery and design of the BRII. The evaluation was directed towards a set of key evaluation questions relating to the effectiveness and efficiency of the program's design, the outcomes the program generated for SMEs and challenge agencies, and the costs and benefits of the BRII.

This evaluation looked at the first three rounds of the BRII. This evaluation examined each of the phases of a BRII round, from challenge design through to proof of concept. The most recent (RegTech) round was out of scope for this evaluation.

Three limitations impacted the evaluation. Namely, the small size of the program, the response rate from participants and the maturity of solutions developed through the BRII.

3.1 This evaluation focussed on the outcomes and impact, delivery and design of the BRII

The BRII is a demand-side government innovation program. The BRII has two goals: to help Australian Government agencies find novel solutions to otherwise intractable public policy and service delivery problems, and to foster innovation among SMEs.

The impact evaluation followed on from the post-commencement evaluation that Nous also completed in 2019. The post-commencement evaluation was completed prior to the end of round one (see Appendix F for the set of eight recommendations from the post-commencement evaluation).

This evaluation assessed the outcomes and impact, the delivery and the design of the BRII. A key consideration for the evaluation was the future design of a scaled up version of the BRII. The key evaluation questions from the terms of reference for the evaluation and where they are addressed in the report are outlined in Appendix C.1.

This document outlines findings and recommendations from this evaluation. The evaluation findings are based on a review of program data and documentation, a survey of a cross-section of BRII applicants and participants, and a series of interviews with key program and policy stakeholders, challenge agencies and participating SMEs (see Appendix C and Appendix D for further details).




This evaluation also includes a CBA. A CBA assesses and quantifies the direct and indirect benefits that a program creates against the costs to deliver the program. The CBA in this evaluation estimated the benefits that the SMEs that participated in the first round of the BRII

created. The CBA also included discrete analysis of the broader impacts to government and society from three challenge solutions that had available data to quantify the benefits (see Appendix G for technical details).

3.1.1 This evaluation looked at the first three rounds of the BRII.

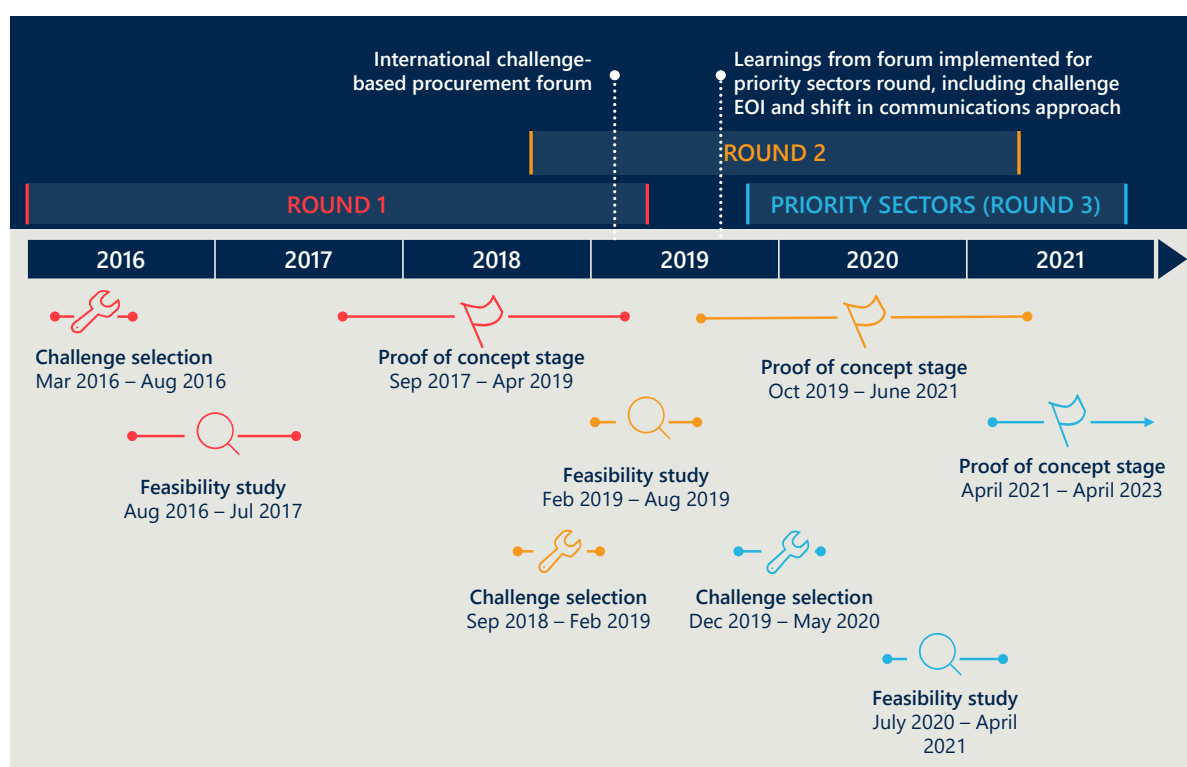
Each of the first three rounds of the BRII have followed the same three phases: challenge selection; feasibility study; and proof of concept stage (see Figure 4).

Figure 5 | The three phases of a BRII round

 CHALLENGE SELECTION	 FEASIBILITY STUDY	 PROOF OF CONCEPT
Australian Government agencies propose challenges, through expression of interest and full application.	SMEs propose solutions to challenges.	SMEs submit feasibility reports and are invited to apply for a proof of concept grant.
EPC complete merit assessment; Minister announces successful challenges.	DISER completes eligibility check; agencies shortlist applicants and the EPC complete merit assessment.	Agencies and the EPC complete merit assessment.
	Up to \$100,000 is awarded for a three month feasibility study.	Up to \$1M is awarded for an 18-month POC study.

Round one of the BRII was completed in April 2019. At the time of the evaluation round two was coming to the end of the proof of concept stage and round three was coming to the end of the feasibility stage. The timeline of BRII since inception is outlined in Figure 5 overleaf.

Figure 6 | Timeline of the BRII^{12,13}



3.2 Three limitations impacted the evaluation

3.2.1 The BRII is a small-scale pilot.

Over the past five years the program has supported only 15 SMEs from rounds one and two that progressed through to proof of concept and 40 SMEs that only participated in the feasibility phase at the time of the evaluation.¹⁴ Consequently, there was a very small population to analyse, both for general findings (from surveys and interviews) and the CBA. These shortcomings were mitigated through the comparison of the findings from this evaluation against evaluations completed for similar, larger programs, namely the SBIR in the USA and the SBRI in the UK. Using this technique allows us to extrapolate the evaluation findings for a larger population size. Nonetheless, the findings of this evaluation must be considered against the impact of a small population size on the replicability and scalability of the program's outcomes.

¹² The "Priority Sectors" round refers to a new approach to challenge selection trialled in round three, whereby challenges from a specific industry sector were selected and published together in a "themed" round.

¹³ Round two finished on June 18, 2021.

¹⁴ For this evaluation proof of concept SMEs are SMEs that received funding for both the feasibility stage and proof of concept stage. Feasibility SMEs are SMEs that only received feasibility stage funding. These numbers also include three SMEs that participated in two separate rounds of the BRII.

3.2.2 There was a low response rate from feasibility SMEs.

Of this population, 21 of a possible 33¹⁵ SMEs from rounds one and two were interviewed (14 of 15 proof of concept SMEs and seven of 18 feasibility SMEs) and only 23 of 55 SMEs¹⁶ from rounds one, two and three completed the survey (10 of 15 proof of concept SMEs¹⁷ and 13 of 40 feasibility SMEs). This sample was reduced as some SMEs were reluctant to provide the relevant commercial data. Feasibility SMEs were also generally unresponsive. The small sample size, especially for feasibility SMEs, is an important consideration for the replicability of the evaluation findings. However, due to the high response rate from proof of concept SMEs, which receive roughly 80 per cent of program funding, the impact and outcomes data of the evaluation should be viewed with a high level of validity.

3.2.3 Only a small number of the BRII solutions were mature enough to quantify their benefits.

A key objective of this evaluation was to measure the impact of the BRII for participating challenge agencies. This included the long-term impact of the solutions that SMEs developed to address BRII challenges. Measuring the impact of these solutions required longitudinal data that shows the benefits and costs of the various solutions. Due to the unavailability of data or the immaturity of some solutions the evaluation could only provide a high-level assessment of the benefits for three of the ten round one solutions. All three of the quantified solutions are also in the early stages of commercialisation. This limited the quantified benefits, which are expected to increase over time if the solutions continue to gain commercial traction.

¹⁵ Two feasibility SMEs from round one are no longer in operation and were not included in the sample size.

¹⁶ Three SMEs have received funding in two separate rounds of the BRII.

¹⁷ Only partial survey responses were received from two proof of concept SMEs.

4. Overview of the BRII



Summary

- **The BRII was designed to achieve two complementary objectives.** To drive innovation and commercialisation within Australian SMEs, and to change the nature of Australian Government procurement through procuring innovative solutions.
- **The BRII has experienced some variance in applications and funding dispersed across the first three rounds.** Round three attracted significantly more applicants than rounds one and two. This was most likely the result of the focused nature of round three as a priority sector round compared with rounds one and two. Meanwhile, rounds one and three involved five and eight more feasibility SMEs than round two, respectively. The lower number of feasibility SMEs in round two resulted from two round two challenges that had a low number of successful feasibility applicants. Both challenges also did not progress to the proof of concept round. Stakeholders attributed this to poor challenge design.
- **The BRII has attracted a range of SMEs with different characteristics.** Many applicant SMEs were small and young. Over 55 per cent of applicants were start-ups or young firms. Almost 50 per cent had four or fewer employees. Approximately 20 per cent of applications (117) were from businesses that formed specifically for the program. A similar percentage (17 per cent) of new firms made up the total number of SMEs that won feasibility grants.

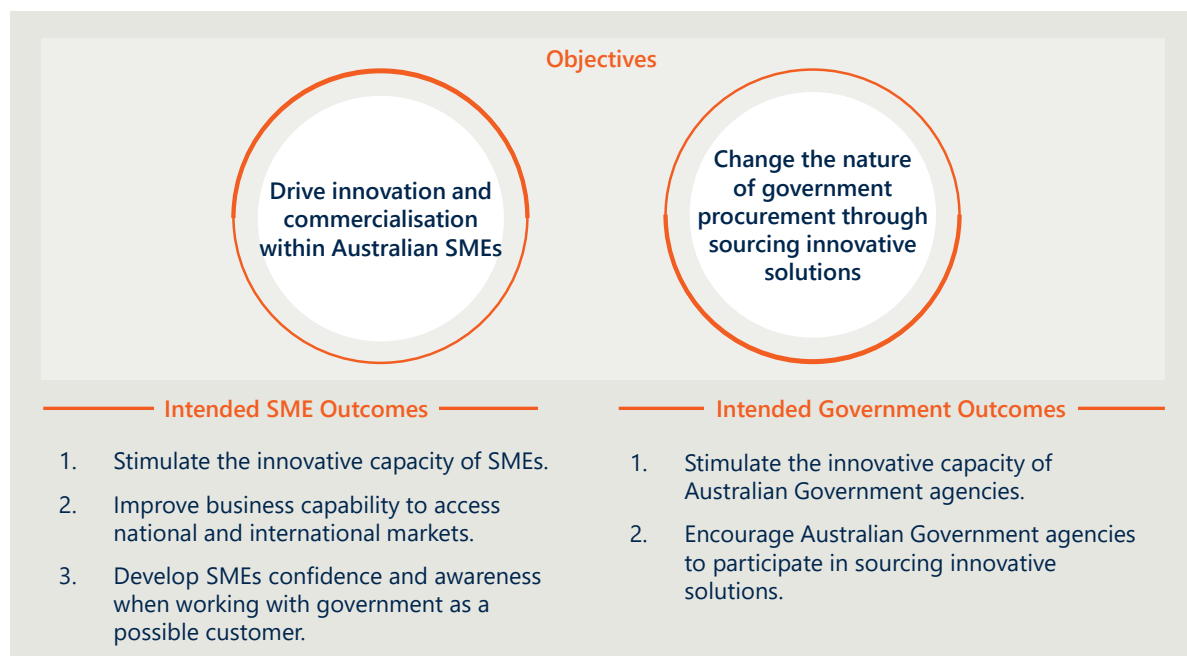
The BRII has partnered with many diverse agencies on a range of difficult problems. The BRII has attracted agencies with challenges across energy, agriculture and environment, tourism, data and digital, human services and information management. Overall, 14 government agencies have participated in the BRII. There has been a good spread of challenges across policy, operational, regulatory and specialist agencies, and Commonwealth corporate entities. The diverse spread of agencies is reflected in the fact that only one of the 14 challenge agencies has been involved in multiple rounds.

4.1 The BRII was designed to achieve two complementary objectives

The BRII pilot was announced in December 2015 as part of the 'Government as Exemplar' pillar of the NISA. Since then, the BRII has completed two full cycles and reached the proof of concept phase in a third. DISER also recently launched a fourth round, which was outside the scope of this evaluation.

The BRII aims to help Australian Government agencies find novel solutions to otherwise intractable public policy and service delivery problems and to foster innovation among SMEs. Underneath each objective are specific outcomes for SMEs and Government (see Figure 6).

Figure 7 | The BRII's dual objectives

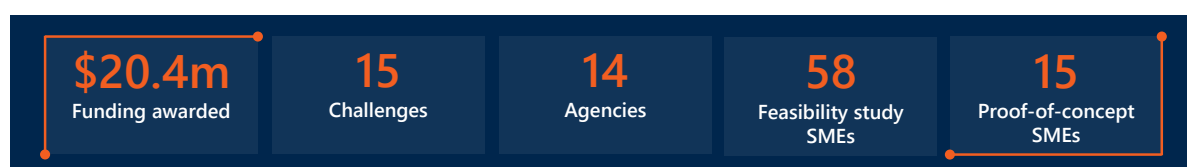


Source: BRII Program Logic 2018, BRII New Policy Proposal

4.2 The BRII has experienced some variance in applications and funding dispersed across the first three rounds

The BRII has given \$20.4 million to 58 SMEs to solve 15 challenges across the first three rounds of the BRII. This funding has been distributed across a diverse group of agencies and SME's, with very few SMEs in the program (see Figure 7). Repeat challenge agencies were also scarce, even though there were many repeat applicants.

Figure 8 | Summary of BRII to date¹⁸



Source: BRII administrative data

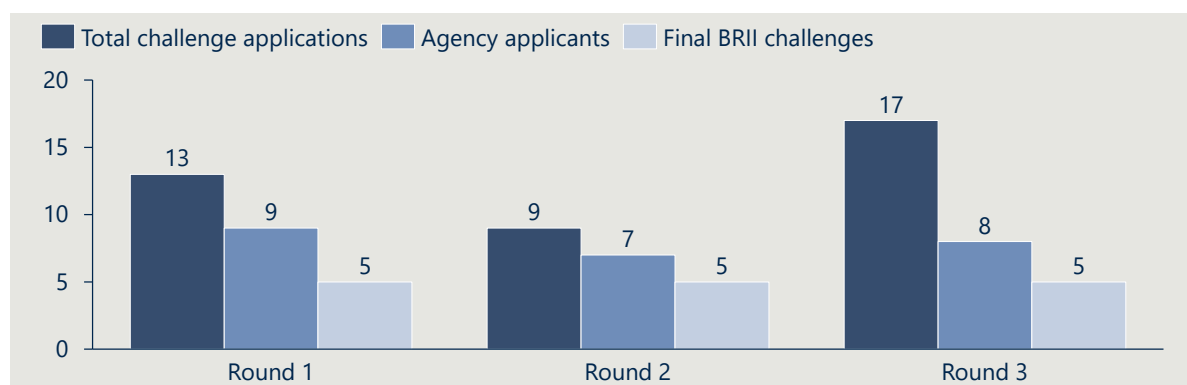
Across the first three rounds there has been considerable variability in challenge applications and SME applications. The variance in challenge applications and SME applications has impacted the amount of funding the BRII dispersed for each round. More detail is provided below.

¹⁸ Three SMEs in the count of 58 received multiple grants across different rounds.

4.2.1 The BRII has received 39 challenge applications from 18 separate Australian Government agencies.

Although the number of applicants has stayed steady, the number of challenge applications have varied considerably (see Figure 8). Round three attracted significantly more applications than rounds one and two. This was most likely the result of the focused nature of round three as a priority sector round.

Figure 9 | Applications for challenges from agencies by round¹⁹



Source: BRII administrative data

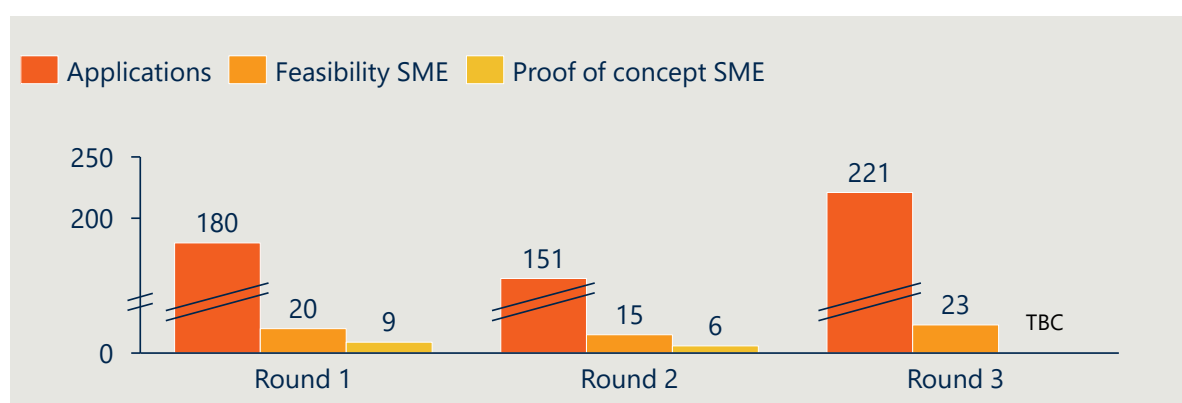
4.2.2 The BRII delivery team has processed 552 eligible applicants since the first round.

There has been significant variance in applications and participating SMEs by round (see Figure 9). There was a significant growth in applications in round three, largely attributed by stakeholders to a revamped marketing and communications approach. This is discussed in more depth in Section 7.2.2.

A total of 58 SMEs have progressed to the feasibility stage across three rounds and 15 SMEs have progressed to the proof of concept stage across two rounds. The lower number of feasibility SMEs in round two is due to two challenges that only had two and one successful feasibility application respectively. These same two challenges did not progress to the round two proof of concept stage, which also had a smaller number of participants than round one. Stakeholders indicated that this was due to poor challenge design for the two respective challenges.

¹⁹ "Agency Applicants" refers to the number of government agencies that submitted a BRII challenge.

Figure 10 | Eligible program applications and participant SMEs by round and stage

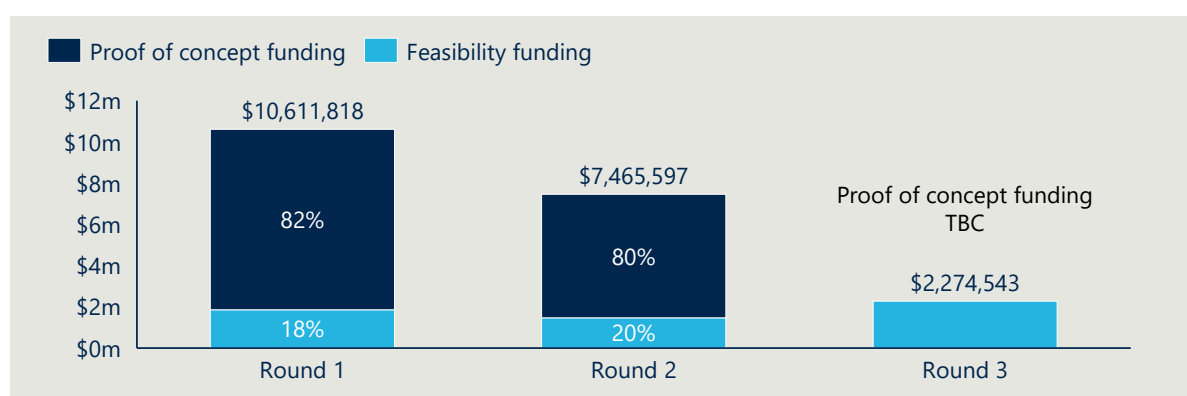


Source: BRII administrative data

4.2.3 The BRII has provided SMEs with a combined \$20.4 million in funding.

Roughly 80 per cent of funding is reserved for the proof of concept stage in each round (see Figure 10). The reduction in total funding for round two is due to the termination of two challenges after the feasibility stage. There was also a smaller number of feasibility SMEs, as outlined above. Lastly, there has been an increase in feasibility funding in round three compared to rounds one and two. This was due mainly to two challenge agencies selecting to work with 6 and 5 SMEs respectively as opposed to the usual four SMEs. Funding for round three proof of concept is marked as 'TBC' as this was not known when the evaluation was completed.

Figure 11 | Program funding by round and stage

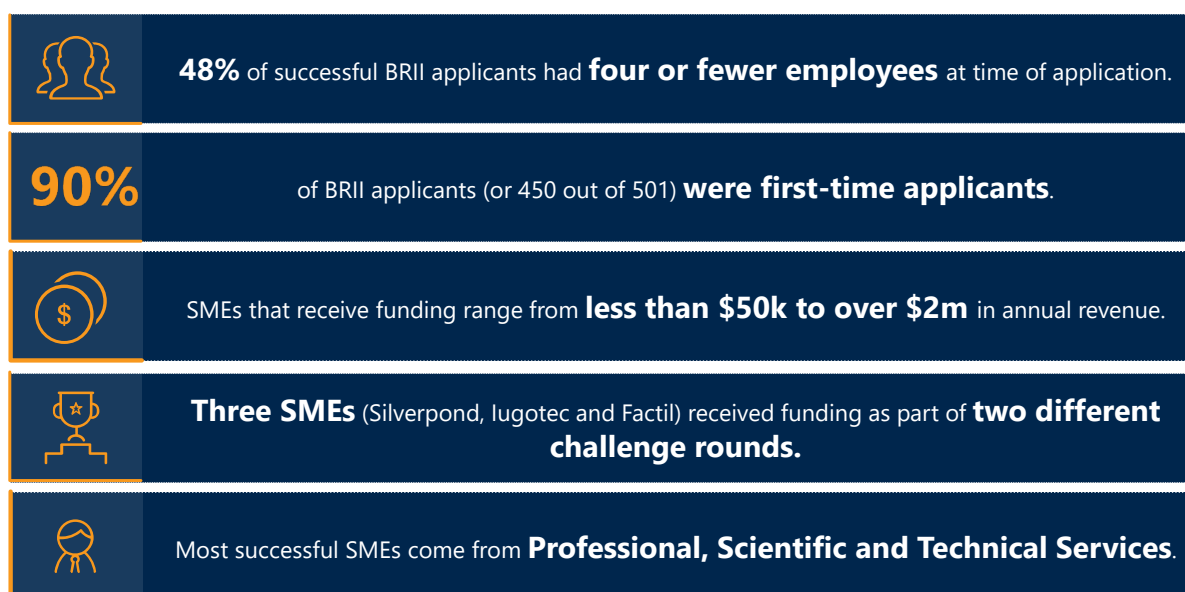


Source: BRII administrative data

4.3 The BRII has attracted a range of SMEs with different characteristics

Applicants to the BRII were diverse in business age and size. There were some prevalent trends, particularly in industry type. Further, while a range of different sized business applied for BRII, almost half employed four or fewer people. These trends are outlined in Figure 11.

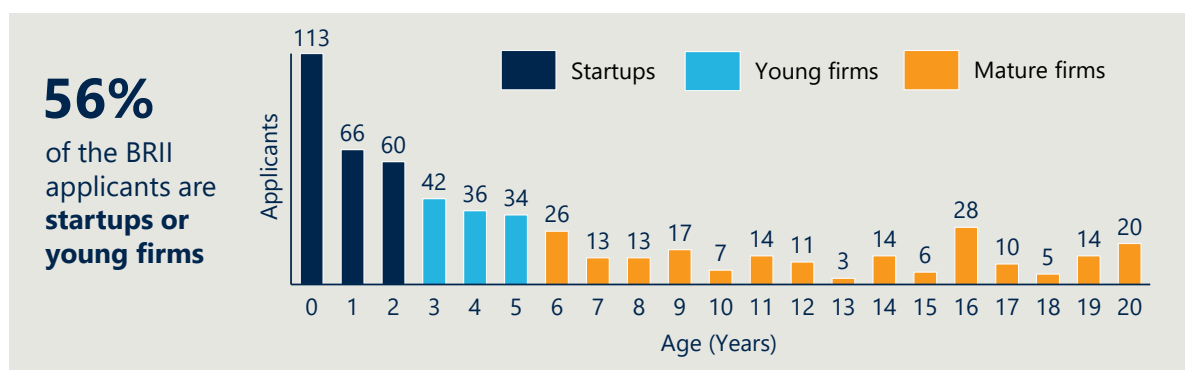
Figure 12 | Summary of BRII applicant characteristics^{20, 21}



Source: BRII administrative data

The BRII appeared to be most attractive to start-ups or young firms (see Figure 12).²² However, there was still healthy representation from mature firms of various ages. The BRII also seemed to act as a catalyst for the formation of new entities, with 113 of the 501 total applicants (20 per cent) less than 1 year old at time of application. A similar percentage (17 per cent) of new firms went on to win feasibility grants.

Figure 13 | Applicants by business age in years at time of application²³



Source: BRII administrative data

There was a good spread of applicants from across Australia. Applicant SMEs were concentrated in the Eastern states, which have larger populations of SMEs. Most SME applicants also came from metropolitan areas – 89 per cent of SMEs awarded funding were based in major cities

²⁰ To be eligible applicants must have a combined annual turnover of less than \$20 million for each of the three financial years prior to application lodgement.

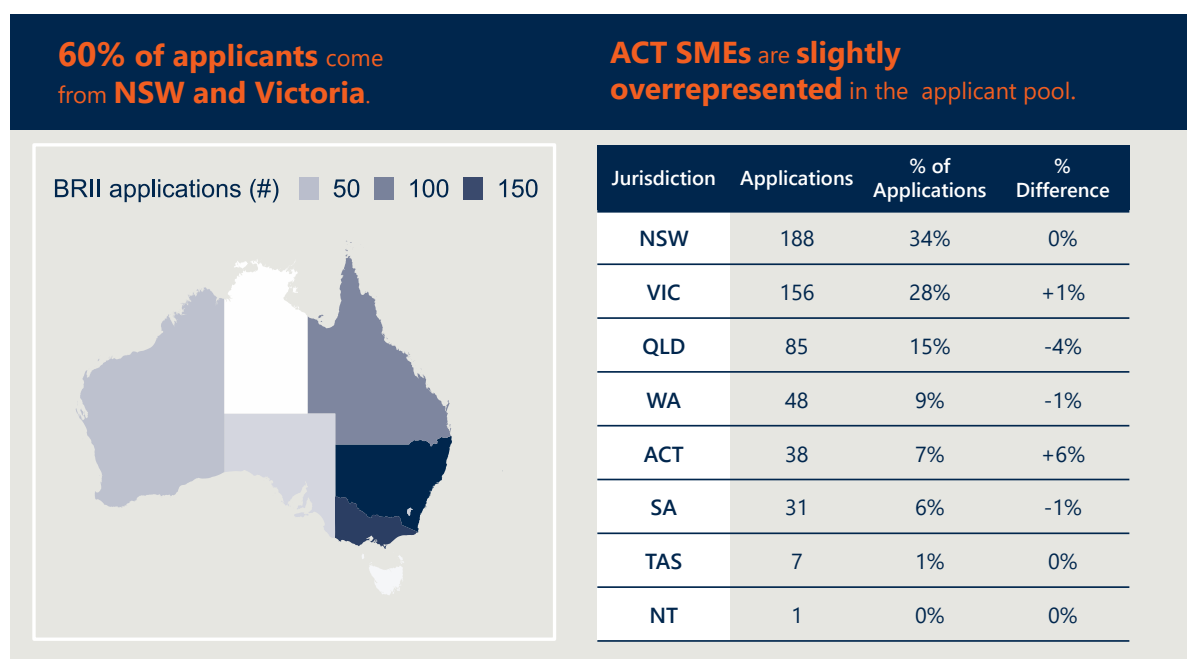
²¹ Industry groups are based on ANZSIC definitions.

²² Based on the OECD business age class definitions.

²³ Based on years since ABN registration at time of the BRII application.

compared with nine and two per cent were from inner and outer regional Australia, respectively. There was little engagement from SMEs in Tasmania and the Northern Territory (NT). There does seem to be a slight overrepresentation from ACT SMEs. Although SMEs from the ACT only represent roughly one percent of the total number of Australian businesses, they represented seven percent of total BRII applications.²⁴ This might be because of the proximity of ACT SMEs to most challenge agencies. These firms are also more likely to have had some experience working with the Australian government prior to application. Figure 13 provides data on the geography of BRII applicants.

Figure 14 | Applications by registered head office location²⁵



Source: BRII administrative data

4.4 The BRII has partnered with many diverse agencies on a range of difficult problems

4.4.1 The BRII challenge agencies are many and varied.

Fourteen different Australian Government agencies have participated in the BRII as challenge agencies (excluding round four, which was not considered in the scope of this evaluation). Challenge agencies are government bodies who propose challenges through the BRII and co-design solutions with successful SMEs.






²⁴ Data taken from ABS Counts of Australian Businesses, including Entries and Exits for June 2020.

²⁵ Per centage difference in Figure 13 represents the difference between the percentage of applications from a jurisdiction and the expected percentage based on the proportion of Australian businesses from that jurisdiction. Data taken from ABS Counts of Australian Businesses, including Entries and Exits for June 2020.

There was a good spread of agencies across policy, operational, regulatory and specialist agencies (see Figure 14). Round three saw four corporate commonwealth entities participate in the BRIL. Two agencies – the Department of Agriculture, Water and the Environment (DAWE) and the DSS – have completed multiple challenges. Only DAWE (and its predecessor departments) has participated in different challenge rounds.

Challenge agencies vary in their function and typically have relatively small operating budgets, indicating that participation in the BRIL is attractive for funding-constrained agencies.

Figure 15 | Summary of successful BRIL challenge agencies

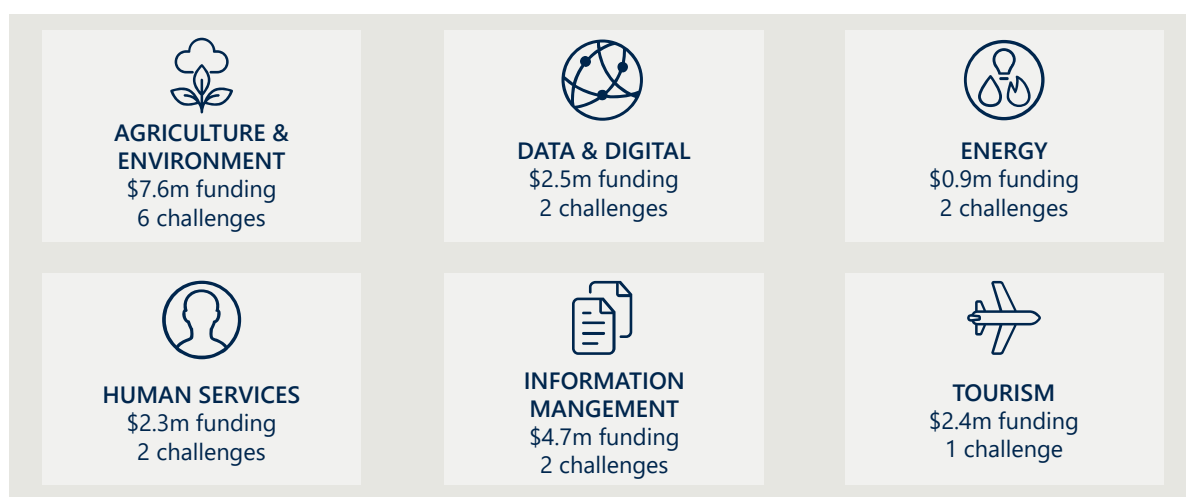
 Policy agency		 Operational agency		 Regulatory agency		 Specialist agency		 Corporate Commonwealth Entity	
Department of Agriculture, Water and the Environment	R1 (x2)	Digital Transformation Agency	R2	Australian Transaction Reports and Analysis Centre (AUSTRAC)	R1	Australian Trade and Investment Commission (AUSTRADE)	R2	Australian Institute of Marine Science	R3
	R2								
Department of Industry, Science, Energy and Resources	R1	Services Australia (formerly Department of Human Services)	R2	National Offshore Petroleum Safety And Environmental Management Authority	R3	National Archives of Australia)	R2	Australian Renewable Energy Agency	R3
Department of Social Services	R1 (x2)							Cotton Research and Development Corporation	R3
								Grain Research and Development Corporation	R3
R1 = Round 1 R2 = Round 2 R3 = Round 3									

Source: BRIL administrative data, Australian Public Service Commission APS Agencies – size and function

4.4.2 The BRIL challenges address a range of difficult problems.

The challenges are drawn from diverse areas, with agriculture and environment the most common (see Figure 15). Round three (also known as the priority sectors round) was the first to focus on a particular subset of ‘priority sector’ challenges. The priority areas included oceans, soil and water quality and technologies advancing recycling. This is the major driver of the relatively large proportion of Agriculture & Environment projects (six challenges, \$7.6 million).

Figure 16 | Summary of BRII challenge sectors



Source: BRII administrative data

5. Outcomes and impact



Summary of findings

The BRII has had a positive impact on most participating SMEs.

- **The BRII sparked innovation and focused commercial strategy for most participants.** More than two thirds of the SME survey and interview respondents confirmed that the R&D undertaken during the BRII would not have taken place without BRII funding. Half of these SMEs have already begun commercialising the outputs of their BRII projects. Over three quarters are considering commercial opportunities beyond their initial BRII challenge.
- **The BRII was a catalyst for new partnerships and enhanced SME capability to access national and international markets.** Almost every SME that participated in the evaluation reported that they entered a new partnership thanks to the BRII. More than half felt that the BRII positively influenced their ability to access new markets.
- **Participating in the BRII has enhanced government engagement for many SMEs.** Half of the SME survey respondents had very little or no prior engagement with Australian Government clients. Most of the same respondents felt that the BRII had increased their capacity to engage with government.
- **The BRII has had a positive and lasting impact on round one proof of concept SMEs.** The BRII increased the turnover of six of the nine SMEs in this group. Five of these SMEs have had their product procured by the challenge agencies, and eight out of nine are exploring additional commercial opportunities.
- **Round two proof of concept SMEs have a similarly positive outlook.** While these projects have only very recently been completed, four of six round two proof of concept SMEs are exploring procurement with their challenge agency. All these SMEs are seeking firm commercial opportunities beyond the BRII.

The BRII delivered significant value for challenge agencies.

- **The BRII continues to support government innovation.** Challenge agencies felt their participation in the BRII has created genuine and unique impact for their agency that may not have been achievable through conventional procurement. These agencies believed this impact was bolstered by strong support from DISER and the ability to work with multiple SMEs simultaneously.
- **Several challenge agencies have embraced challenge-based innovation since participating in the BRII.** Both participant and non-participant agencies have shown increased interest in CBI due to the BRII. All participant agencies said they would participate in the BRII again while some participant and non-participant agencies have either implemented their own CBI methods, approached DISER to run specialised rounds, or have started to explore ways to

incorporate CBI into their R&D strategy. This indicates that the BRII has built a strong reputation to attract interest from a range of government agencies.

- **Round one challenge solutions have delivered a range of benefits.** In four of the five challenges one of the solutions has been procured by relevant agencies. These solutions have delivered a range of benefits through improved processes that save time and money for customers and government agencies, improved information accuracy and timeliness, and increased back-end efficiencies.
- **Round two challenge solutions have the potential to deliver similar benefits.** The solutions from round two have yet to reach similar maturity to round one solutions. However, the progress made in the proof of concept stage indicates that they could have a similar impact if they find a pathway to commercialisation.

The BRII delivers comparable outcomes to similar international programs but lags in scale.

- **The BRII compares favourably to the US SBIR in some key measures.** BRII firms were just as likely to commercialise their IP and more likely to develop partnerships as SBIR firms. The BRII created a similar level of additionality to SBIR as measured through supporting projects that would not have occurred otherwise, catalysing start-up creation at the same rate as the SBIR and improving business performance.
- **The ISC has grown at a significantly faster pace than the BRII.** The ISC has completed almost five times more challenges (70 versus 15) than the BRII although it started one year later. Mandated targets across 20 Canadian Government departments are the major driver of the faster pace at which the ISC has scaled.

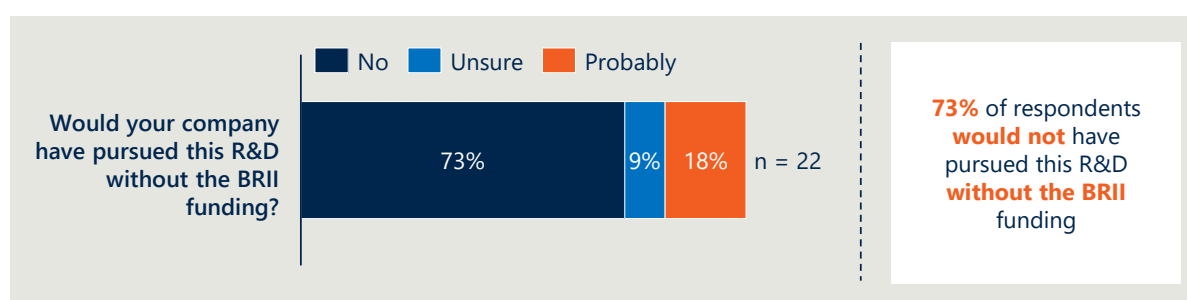
5.1 The BRII has had a positive impact on most participating SMEs

SMEs that participated in the BRII have experienced a range of positive outcomes. This includes outcomes across government engagement, partnerships and market access, innovation and commercialisation. Round one proof of concept SMEs have experienced lasting impact from the BRII. This section explores outcomes across each of these areas in more detail.

5.1.1 The BRII sparked innovation and focused commercial strategy for most participants

Both the feasibility stage and proof of concept stage participants were generally positive about the impact of the program on their R&D and innovation. Of particular importance is the additionality of the BRII – 81 per cent of respondents noted that the BRII has resulted in the development of IP that they would not have otherwise pursued (73 per cent) or that they were unsure of whether they would have pursued (9 per cent) (see Figure 16).

Figure 17 | Impact of BRII on SME innovation

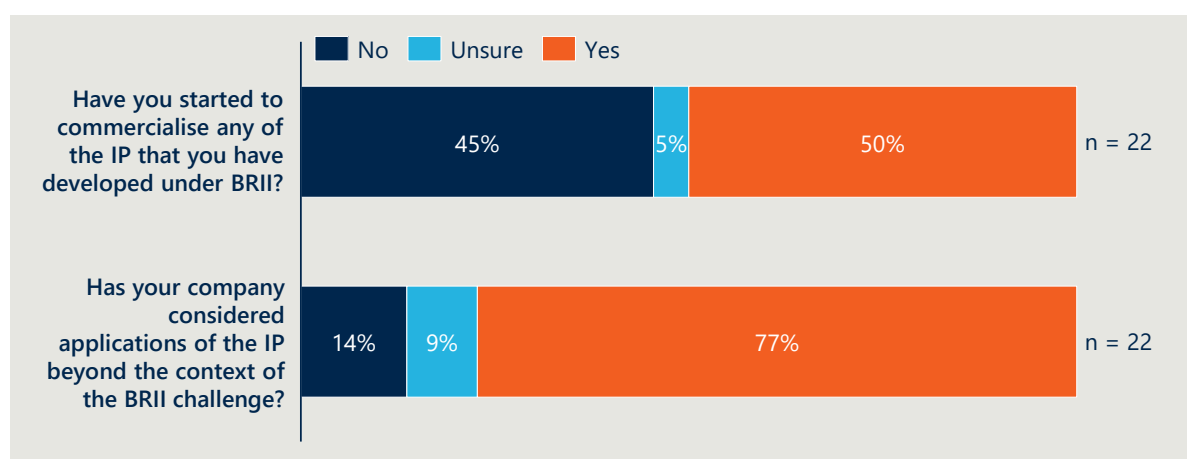


Source: Round one, two and three feasibility and proof of concept SME surveys

The BRII has also created new commercial avenues for many participants. Survey respondents noted that they had started to commercialise IP developed through the program. This included licencing technology to government agencies and submitting patent applications. Most participating SMEs also reported that the BRII inspired them to think about the uses of their IP beyond the context of the BRII challenge (see Figure 17). For example, one round two proof of concept SME has already identified an adjacent use of their technology within the same context in which they have developed their BRII solution. This SME intends to pursue this opportunity post BRII. Most of the SMEs that stated they had not yet started to commercialise any of the IP developed under the BRII were from round two.

Most of these SMEs indicated through interviews that they would pursue commercialisation opportunities once they completed the proof of concept stage.

Figure 18 | Impact of BRII on commercial activities²⁶



Source: Round one, two and three feasibility and proof of concept SME surveys


Interviews offered some more specific insights. Some SMEs reported that the BRII was a catalyst for them to explore nascent ideas or technologies that they could not pursue because of funding or capacity constraints. This was particularly true for smaller SMEs. It also included a few

²⁶ IP includes but is not limited to, patents, trade secrets, memoranda of understanding and licensing agreements.

professional services firms who used the BRII as an opportunity to develop products that were built from the knowledge and experience that they developed through consulting.

Proof of concept SMEs consistently identified that the BRII provided a valuable product development runway to support their R&D and innovation. However, a small number of proof of concept SMEs noted that the IP they developed was bespoke to their challenge agencies context. These same SMEs felt that this limited their ability to commercialise the IP without procurement from their challenge agency.

Overall, SMEs found that the BRII process helped to clarify their organisational strategy, including product-market fit, commercialisation pathways and customer segments. Some feasibility SMEs identified a benefit of the BRII was the competitive process, which forced them to reassess their competitive advantage in the market.

<p>Quotes from respondents</p> 	<p><i>"We were always looking at the bigger picture. We have a solution that we have pitched to five government agencies and we wish to take that further" – Proof of concept SME</i></p>	<p><i>"IP has evolved considerably since the grant and we are thinking about patent process - but need to do that carefully & professionally" – Feasibility SME</i></p>	<p><i>"The IP that we developed... was highly specific to the sponsor agencies... neither of these agencies has engaged with us in relation to the solution we developed" – Proof of concept SME</i></p>
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5.1.2 The BRII was a catalyst for new partnerships and enhanced SME capability to access national and international markets

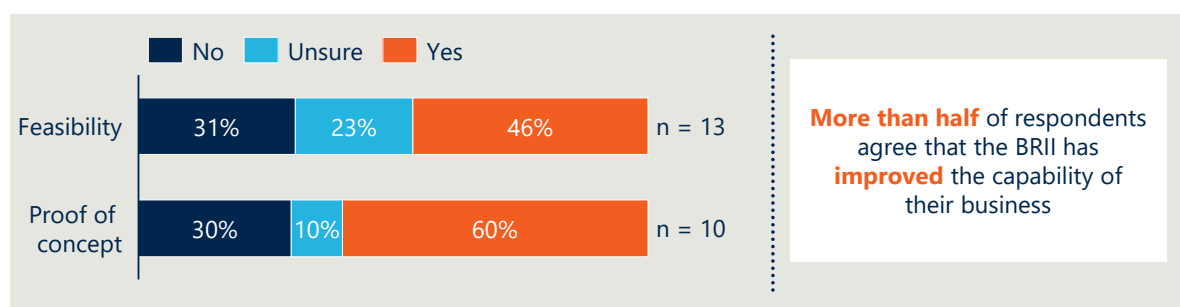
All but two survey respondents indicated that participating in the BRII acted as a catalyst to develop or expand collaborative relationships with other companies or researchers.

For some SMEs this included direct partnerships with complementary technical providers that have expanded over time. An unexpected benefit for several SMEs from these partnerships was new technology capabilities that have either improved the digital maturity of their business or enhanced their service or product offering post the BRII.

For other SMEs, the BRII was a catalyst for new commercial partnerships with potential clients both in Australia and overseas. For example, one SME has developed a lasting partnership with the US Centre for Disease Control. In interviews, a few SMEs highlighted the positive role that challenge agencies played to broker international connections, especially during the proof of concept stage.

One outcome of these new relationships for some SMEs was a perceived improvement in the capability of their business to access national and international markets (see Figure 18). For other SMEs, the work they completed during the BRII provided them with the opportunity to present at national and international conferences, another catalyst for improved access to new markets.

Figure 19 | Has the BRII improved the capability of your business to access national and international markets? (n=23)



Source: Feasibility and proof of concept SME surveys

Participants in both the feasibility and proof of concept stage were positive about the impact of the program on their capability to access national and international markets. Proof of concept stage participants were more positive in this regard.

Quotes from respondents 	<i>"The skills we developed under the BRII program have undoubtedly assisted our ability to engage generally with national and international markets" – Proof of concept SME</i>	<i>"We have developed an extensive network of international experts who are aware of our unique approach and have encouraged us to keep working to build out a full product in this area" – Proof of concept SME</i>	<i>"[It's] a bit too early to say, but the process has enabled us to do the thinking around potential markets... nationally, and in the long-term, internationally" – Feasibility SME</i>

5.1.3 Participating in the BRII has enhanced government engagement for many SMEs

The BRII has successfully engaged several SMEs that had limited experience working with the Australian Government. Exactly half of the survey respondents had never or only occasionally engaged with government clients prior to the BRII.

The SMEs with limited previous government engagement particularly benefited from the BRII when it came to enhancing their ability and confidence to engage with government, as shown in Figure 19. Some SMEs highlighted that their challenge agency played an active role to support them to engage with other government departments that would be interested in their solution. Figure 19 also shows that most SMEs that had engaged with government clients often or very often prior to the BRII also felt that their ability and confidence to engage with government increased.

Figure 20 | Government engagement matrix based on survey responses (n = 22)²⁷

AVERAGE OF RESPONSES TO GOVERNMENT ENGAGEMENT QUESTIONS		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total
How frequently did your company engage with government clients prior to the BRIL?	Never				2	2	4
	Occasionally				6	1	7
	Often			1	2	1	4
	Very often	1		2	2	1	6
	Unsure			1			1
	Total	1	0	4	12	5	22

Source: Feasibility and proof of concept SME surveys

Interviews provided additional insight on the SMEs that had a neutral or negative response on average to the government engagement survey questions. All these SMEs indicated that they engaged with government often or very often prior to the BRIL. These SMEs highlighted that their previous experience working with government meant that they did not learn much from their experience. Meanwhile, not all SMEs who increased their engagement with government were satisfied with the experience. Some highlighted that they found it difficult and confusing to navigate procurement processes.

Interviews with challenge agencies also highlighted that many SMEs that participated in the BRIL had a lot to learn when it came to working with the Australian Government. Many challenge agencies highlighted that government decision-making and procurement processes were specific areas for participating SMEs to improve their knowledge. This became an issue for some challenge agencies during the proof of concept stage as some SMEs had unrealistic expectations for the ability and speed of the challenge agency to procure their solution.

²⁷ There were four relevant government engagement survey questions, with SMEs asked to respond on five point Likert scale to the following statements: 'Our company's knowledge of how government operates has increased post participation in the BRIL'; 'We are more actively monitoring potential business opportunities with government agencies post participation in the BRIL'; 'We feel that we are more likely to win work with government agencies post participation in BRIL'; 'We are more proactively pitching business ideas to government agencies post participation in the BRIL'.

<p>Quotes from respondents</p> 	<p><i>"Partnering with agencies as part of BRII sets up SMEs well for how to approach procurement with government and learn the needs of government clients more generally. This is even more beneficial than the capital from the program" – Proof of concept SME</i></p>	<p><i>"We received great support from our challenge agency to engage with other government departments when we reached the end of the proof of concept stage" – Proof of concept SME</i></p>	<p><i>"Our core clientele for the last decade has been government, so there was probably less of a learning curve for us going through BRII" – Proof of concept SME</i></p>
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5.1.4 The BRII has had a positive and lasting impact on round one proof of concept SMEs

The long-term impact of the BRII has been positive for most round one proof of concept SMEs. Five round one SME solutions were procured directly by their challenge agency. The BRII has had a positive commercial impact on the majority of round one proof of concept SMEs, both through the impact of the BRII on the SMEs commercialisation journey and on the SMEs through turnover. The benefits of the BRII have extended beyond commercial outcomes through to lasting collaborative partnerships. Table 1 summarises the impact of the BRII on each round one proof of concept SME.

5.1.5 Round two proof of concept SMEs have a similarly positive outlook

Round two proof of concept SMEs have a broadly positive outlook. However, it is too early to see any commercial outcomes from their proof of concept studies. Many have plans to commercialise either through direct procurement or otherwise. Many also identified other lasting benefits from their participation in the BRII. Table 2 summarises the impact of the BRII on each round two proof of concept SME.

Table 1 | Overview of the impact of BRII on round one proof of concept SMEs

Challenge agency	A DISER and DSS	A DISER and DSS	B DAWE	C DAWE	C DAWE	D DSS	D DSS	E AUSTRAC	E AUSTRAC
Proof of concept SME	Collabforge	Converlens	Marsden Jacob Associates ²⁸	Iugotec	Atamo	Factil	ITREE	Atraxium	Houston Kemp
Challenge agency Procurement outcome	No	Yes	Yes	Yes	Yes	No	Yes	No	No
Post BRII commercialisation journey	Has a full price contract with a Victorian Government Department and is actively pursuing new contracts	Successfully commercialised their solution across multiple public and private customers, over 100 projects and recently expanded overseas.	The Waterflow product has over 1000 users per month. Exploring expansion into other domestic water markets, including in Queensland and Tasmania.	Considering applications in broader biosecurity, ag-tech and defence sectors.	Executing a contract with the Department of Agriculture and working with the US Center for Disease Control and Prevention.	Further developed their IP through contracts with Victorian Government Departments and currently exploring other commercialisation opportunities.	Received 5-year \$5.9 million contract to deliver REACH. Acquired by ASX listed Objective Corporation in 2019.	Considering applications of technology in banking sector and broader intelligence community.	IP was highly specific to the sponsor agencies and would be challenging to commercialise.
BRII impact on turnover	Positive	Positive	Neutral	Positive	Positive	Positive	Positive	Positive	Positive
Lasting collaboration	Subcontracted a software company.	Data61 CSIRO, Centre for Deliberative Democracy University of Canberra, Engage2.	n/a	Queensland University of Technology and Tofwerk AG, Switzerland.	Collaborating with Innovative Vector Control Consortium.	Informal collaboration University of Melbourne and the ANU. Partnered with Silverpond.	n/a	n/a	n/a

Source: Proof of concept applications; SME interviews; Feasibility stage SME survey; Proof of concept stage SME survey.

²⁸ Marsden Jacob Associates did not provide turnover data. However, since the end of the proof of concept phase, Marsden Jacob Associates has received 12 contracts from DAWR/DAWE worth a cumulative value of \$1.02m (Source: AusTender). Marsden Jacobs also confirmed that they expect Waterflow to reach profitability soon.

Table 2 | Overview of the impact of BRII on round two proof of concept SMEs

Challenge agency	A NAA	A NAA	B AUSTRADE	B AUSTRADE	C DAWE	C DAWE
Proof of concept SME	LENTICULAR	SURROUND AUSTRALIA	NEM AUSTRALASIA	WEJUGO	INDUSTRY SPEC DRONES	TRELLIS DATA
Challenge agency Procurement	The challenge agency is positive about the potential of the solutions and is actively exploring funding options to procure post-BRII.	The challenge agency is positive about the potential of the solutions and is actively exploring funding options to procure post-BRII.	The challenge agency is not the primary customer for the solutions and is actively supporting the SMEs to find commercialisation partners.	The challenge agency is not the primary customer for the solutions and is actively supporting the SMEs to find commercialisation partners.	The challenge agency is positive about the potential of the solutions and is actively exploring funding options to procure post-BRII.	The challenge agency is positive about the potential of the solutions and is actively exploring funding options to procure post-BRII.
Post BRII commercialisation plans	Have pitched the solution to five government agencies and are in advanced discussions with one agency to extend proof of concept for their solution.	Currently investigating the possibility of using the product with Standards Australia, Infosys and Land Information NZ.	Currently testing the product with new customers.	Actively progressing commercial discussions with public and private sector clients and have successfully raised seed capital.	Progressing discussions with DAWE to trial the product further.	In discussion with multiple potential domestic and international commercial partners. Have identified adjacent opportunity to automate container ID verification.
Other benefits of the BRII	Helped "evolve a product we were already developing"	n/a	The BRII provided the opportunity to develop a product that NEM would have struggled to finance independently.	The BRII challenge validated a platform Wejugo were already developing. Participation in the BRII sped up the commercialisation process (e.g. saving Wejugo up to three years of finance raising).	Helped shape the direction of the business, which was relatively young in the beginning of the program.	Has helped identify new issues (and therefore markets) with shipping container contaminants.
Lasting collaborations	Working closely with CSIRO.	n/a	Working with two data providers (a Victorian University and government agency).	Five additional commercial partners.	Collaboration with partner companies for database management and OEM suppliers.	n/a

Source: Proof of concept applications; SME interviews; Challenge agency interviews; Feasibility stage SME survey; Proof of concept stage SME survey.

5.2 The BRII delivered significant value for challenge agencies

The BRII has resulted in various benefits for challenge agencies. The new approach to procurement has contributed to a culture shift in challenge agencies, while simultaneously allowing agencies to develop new relationships with innovative SMEs. A major benefit of the BRII for government has been the solutions, which have delivered a range of benefits from solving service delivery or policy challenges. Round two solutions have the potential to deliver similar benefits.

5.2.1 The BRII continues to support government innovation

The BRII supports innovation that government procurement does not often support.²⁹

Several challenge agencies spoke highly about the opportunity the BRII provided them to work directly with industry on innovation projects. This contrasted with traditional procurement processes that often need a tangible outcome upfront. The BRII differs as only the challenge is specified upfront and not the final product.

Round one challenge agencies were particularly supportive. For some, the BRII has been the catalyst for innovative solutions to wicked problems that may not have been solved otherwise (see Section 5.2.3 for a summary of round one solutions and Section 6.3 for a quantitative analysis of three round one solutions).

Through the BRII some challenge agencies indicated that they had learnt how to better work with SMEs to support innovation. Regarding innovation, SMEs had mixed responses when it came to their experience working with challenge agencies. Several mentioned that they found challenge agencies to be overly rigid and risk averse. This may be due to the novelty of CBI for many challenge agencies. It may also reflect a misalignment between the expectations that SMEs had of government procurement. None the less, a common theme across interviews with SMEs, challenge agencies and other key stakeholders, such as the EPC, was the need to change mindsets within the APS to support more risk taking.

The BRII has supported challenge agencies to develop new commercial partnerships with innovative SMEs.²⁹

Many challenge agencies noted that the BRII has brought to their attention innovative SMEs for whom they would not have otherwise known. In some cases, this has resulted in commercial partnerships to support the agency outside the scope of the BRII challenge. For example, one round three challenge agency has identified an opportunity to engage a current feasibility SME on an adjacent opportunity. This feasibility SME had been working on solutions in a different agricultural sector that were applicable to the challenge agencies focus.


²⁹ Source: Challenge agency interviews; SME interviews; SME survey responses; EPC interviews.

Challenge agencies have valued the opportunity to work with multiple SMEs on their challenges.²⁹

Having multiple SMEs has ensured that challenge agencies have benefited from divergent approaches and solutions. Many agencies thought the competition between SMEs kept them honest, especially at the proof of concept stage. A round one challenge agency noted that the competition also ensured more value for money at the procurement stage. Some challenge agencies and SMEs did identify an opportunity for BRII to support collaboration between SMEs in cases when solutions were complementary and together had a higher likelihood of solving the challenge.

All challenge agencies interviewed from round three report that the feasibility stage has delivered innovative research that may realistically solve their challenge.²⁹

All of the round three challenge agencies expressed excitement for what they have seen so far in the feasibility stage. One challenge agency highlighted that they felt the BRII was a good use of taxpayer funds as it had produced new findings that pushed their understanding of their challenge forward. Each expressed confidence that the proof of concept stage would produce further innovation to solve their challenge.

<p>Quote from respondent</p> 	<p><i>"We have gone years ahead in a very short period of time. BRII has helped us to harness a huge amount of energy and resources on an [ongoing] problem. We will advance 5 years in 18 months" – Challenge agency</i></p>	<p><i>"[The solution] is a new opportunity. We don't want to just [improve] what we do now, we want to revisit the full possibilities of what we can do and how it changes how we operate" – Challenge agency</i></p>	<p><i>"[BRII] provided a unique opportunity for government departments to work with businesses and explain what governments are looking for in a solution, which is not typical in BAU procurement processes" – Challenge agency</i></p>
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5.2.2 Several challenge agencies have embraced challenge-based innovation since participating in the BRII.

Many of the challenge agencies that have participated in the BRII have adopted their own CBI initiatives. Some examples are outlined below.

- **DAWE has participated in two of the three rounds of the BRII and was a successful challenge agency applicant for round four (the RegTech round).** DAWE also introduced a biosecurity innovation program soon after their initial engagement in BRII.³⁰ The biosecurity

³⁰ More information available at <https://www.agriculture.gov.au/biosecurity/research-innovation/program>.

innovation program has evolved to now include a Biosecurity Industry Innovation Challenge that DAWE ran in partnership with the Canberra Innovation Network.³¹

- **Several government agencies have approached the BRII team to run a dedicated BRII round.** This includes the Department of the Prime Minister and Cabinet and the Attorney General's Department.³²
- **The BRII team has also received interest to run CBI rounds from other policy areas within DISER.** This has resulted in the most recent RegTech round.³³
- **The NSW Department of Communities and Justice (DCJ) has incorporated design features from the BRII into their technology procurement processes.** This includes a challenge style feasibility stage for procurements that require a more innovative solution.³⁴
- **Both the Cotton Research and Development Corporation and the Australian Renewable Energy Agency intend to utilise CBI post BRII.** Both agencies indicated that they have already had internal discussions about how they can incorporate CBI as part of their internal R&D toolkit.³⁴

Spillovers and unintended consequences

DISER has taken the initiative to convene CBI practitioners through two key forums that stakeholders saw as positive spillovers from the BRII. The first was the 2019 Challenge-Based Innovation Forum. The Challenge-Based Innovation Forum brought together experts from the US SBIR and the UK SBRI to share insights with interested stakeholders. Representatives from Canada who had recently launched the ISC also attended. This was the first such forum to be hosted. The BRII team took away critical learnings from this forum that informed future program design. The second was the government community of practice for CBI. The community of practice includes representatives from across most State governments. A direct result of the community of practice has been the launch of the NSW Small Business Innovation and Research program³⁵, which was directly modelled off the BRII program. As the NSW SBIR and other similar programs launch across Australia there is an opportunity to use the community of practice to continue to engage, collaborate and share lessons across jurisdictions.

Additionally, all the challenge agencies interviewed expressed that they would participate in the program again. Several provided qualified statements based on the need to improve some aspects of the program (these are explored in Section 7.3.3). However, the strong support for

³¹ More information available at <https://cbrin.com.au/event-news/innovation-is-the-key-to-creating-safer-borders-against-pests-and-disease/>.

³² Source: Federal Budget 2021-22, <https://budget.gov.au/2021-22/content/resilient.htm>.

³³ Source: DISER Policy and Program team interviews.

³⁴ Source: Challenge agency interview.

³⁵ More information available at <https://www.chiefscientist.nsw.gov.au/funding/research-and-development/small-business-innovation-research-program>.

the BRII from challenge agencies reflects both the value they have received from the program and an opportunity to expand opportunities through a scaled-up version of the program.

<p>Quote from respondent</p> 	<p><i>"[CBI] allows a good idea to flourish. It's very blue sky, nothing's off limits. It allows a lot of flexibility on what you do. Novelty is the only way to succeed, and BRII allows that. It also allows you to fail - we haven't achieved all the KPI's. Normal procurement there's more pressure to tick all the boxes" – Challenge agency</i></p>	<p><i>"We are starting to think about maybe having a challenge round here" – Challenge agency</i></p>	<p><i>"Yes, I would look to do this [BRII] if there was another round particularly to leverage funds – if I can contribute money...we would look to do something on a more permanent basis" – Challenge agency</i></p>
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5.2.3 Round one challenge solutions have delivered a range of benefits

The potential economic benefits and public value of solutions that round one solutions generated were explored as part of the 2018 program evaluation. This assessment was made using initial challenge applications. Since the completion of the BRII, challenge agencies directly procured or supported four out of five challenge solutions. This has provided the opportunity to assess the realised benefits.

Table 3 outlines the economic and public benefits that both solution designers (i.e. SMEs) and solution beneficiaries (e.g. government) have described through interviews and other correspondence. Where possible, the economic benefits associated with a small selection of BRII solutions have also been presented as part of the CBA (see Section 6.3).

5.2.4 Round two challenge solutions have the potential to deliver similar benefits to round one solutions

Consultations with challenge agencies and SMEs from round two indicates that if implemented, proof of concept solutions have the potential to deliver a range of economic and public value benefits, not only to their challenge agency, but to Australia more broadly. As round one solutions have demonstrated, the magnitude of potential benefits and the time over which they are realised will vary by solution. Table 4 on page 49 provides an indication of benefits that could potentially stem from round two.

Table 3 | Indication of benefits by challenge (round one)³⁶

Challenges	A Digitally enabled community engagement in policy and program design	B Improve transparency and reliability of water market information	C On-the-spot technology for measuring pyrethroid surface residue	D Sharing information nationally to ensure child safety
Solution	<ul style="list-style-type: none"> Converlens – AI powered web-based consultation platform that can collect, process and analyse complex qualitative data 	<ul style="list-style-type: none"> Waterflow digital tool – platform that provides aggregated professional water market information 	<ul style="list-style-type: none"> Pyrethroid Sampling System - portable sampling and analysis device 	<ul style="list-style-type: none"> Objective REACH – platform that allows users to share sensitive data across multiple systems and organisations
Economic benefits	<ul style="list-style-type: none"> Reduced cost of public consultation by capturing more stakeholder views in a shorter amount of time Increased 'back-end' efficiency in developing insights from across multiple different stakeholder engagements (e.g. producing engagement summary reports on a specific topic 90 per cent faster) 	<ul style="list-style-type: none"> Reduced information asymmetry for water market participants Improved transparency in the water market for 2,000 monthly users, leading to more competitive pricing and efficient water allocations (highlighted in the ACC's recent inquiry)³⁷ Reduced time for 200 monthly water market searches 	<ul style="list-style-type: none"> Significant avoided costs through mitigation of biosecurity/public health risks by (a) sampling a greater number of planes with potential pests entering Australia; and (b) more accurate sampling of planes entering Australia Reduced time and cost of current monitoring processes (e.g. pyrethroid sampling system runs 10 samples in 20 minutes) 	<ul style="list-style-type: none"> Reduced time and costs of information sharing across jurisdictions Reduced likelihood of error in sharing sensitive information Reduced cost to governments from more effective child protection system Potential for solution to be applied in other complex information sharing contexts
Public benefits	<ul style="list-style-type: none"> More direct contribution of citizen views to policymaking and public debate 	<ul style="list-style-type: none"> Increased community confidence in water markets Better information available to improve government policy outcomes and service delivery 	<ul style="list-style-type: none"> Increased public safety from the reduced likelihood of the introduction of exotic mosquito vectors into Australia 	<ul style="list-style-type: none"> Earlier identification of children at risk More tailored interventions Enhanced child safety
Likely beneficiaries	<ul style="list-style-type: none"> DISER, DSS and other agencies that adopt the solution Citizens who contribute to government consultations 	<ul style="list-style-type: none"> Water market participants, including farmers and water brokers DAWE and other relevant Australian and state government agencies 	<ul style="list-style-type: none"> DAWE Australian public The aviation industry, including airline staff 	<ul style="list-style-type: none"> Vulnerable children and their families State and national child protection authorities Frontline child protection practitioners

Sources: feasibility study final reports; SME interviews and surveys; challenge agency interviews

³⁶ Challenge benefits from the fifth round one challenge, "Tracking the effect and value of information products", have not been included in this table. Both challenges developed were not commercialised and therefore have not delivered any economic or public benefits beyond the benefits that the challenge agency experienced from participating in the BRII.

³⁷ More information available at https://www.accc.gov.au/system/files/Murray-Darling%20Basin%20-%20water%20markets%20inquiry%20-%20Final%20report_0.pdf.

Table 4 | Indication of benefits by challenge (round two)

CHALLENGES	A Automating complex determinations for Australian Government information	B Intelligent data to transform tourism service delivery	C Managing the risks of hitchhiking pests and contaminants on shipping containers
POTENTIAL ECONOMIC BENEFITS	<ul style="list-style-type: none"> Reduction in the backlog of un-evaluated data avoiding labour intensive costs of traditional manual methods Greater capacity to free up valuable IT infrastructure resources for other more productive means Transferrable technology that can be used across all types of archives (both government and private sector) 	<ul style="list-style-type: none"> Improved evidence base to enable more effective and better informed policy interventions that deliver better value for the Australian taxpayers and improved outcomes for tourism Increasing tourism trade and facilitating continued foreign investment 	<ul style="list-style-type: none"> Reduced pressure in the freight supply chain achieved with faster clearance of goods Cost savings for both government and importers through reduced, more targeted inspections
PUBLIC BENEFITS	<ul style="list-style-type: none"> Reduced risk of losing important cultural artefacts 	<ul style="list-style-type: none"> Promotion of tourism outwardly 	<ul style="list-style-type: none"> Increased consumer confidence in the national biosecurity system
LIKELY BENEFICIARIES	<ul style="list-style-type: none"> National Archives and other government agencies Australian private sector 	<ul style="list-style-type: none"> Austrade and Tourism Research Australia (TRA) State tourism agencies Tourism operators and peaks Small businesses and tourism businesses in tourism-centric areas 	<ul style="list-style-type: none"> DAWE Importers and stevedores Freight industry

Sources: feasibility study final reports; SME interviews and surveys; challenge agency interviews

5.3 The BRII delivers comparable outcomes to similar international programs but lags in scale

The evaluation completed a comparative analysis of BRII with three similar programs around the world: the SBIR (US), the ISC (Canada) and the SBRI (UK). These programs are not identical to the BRII and have a variety of different design characteristics (see Appendix A.2).

The SBIR has a variety of outcome evaluations against which some BRII outcomes can be compared. The Innovative Solutions Canada (ISC) program is too young for any outcome or impact evaluations to have taken place. However, the design and delivery of the program to date has been compared to the BRII. Key findings from the comparative analysis are provided below.

Only the UK SBRI has a comparable CBA. A comparison of the UK SBRI and BRII CBA results is outlined in Section 6.5.

5.3.1 The BRII compares favourably to the US SBIR in some key measures

The SBIR in the US (founded in 1982) is significantly older than the BRII. It is also significantly larger. In 2019, the SBIR distributed over three billion dollars in grant funding. Although there are significant differences in maturity there are several directly comparable measures from recent evaluations of the SBIR. There were also several proxy measures that supported an indirect comparison.

Many of the firm-level outcomes that the BRII achieved (noting the small sample size) compare favourably to the SBIR. These are outlined below.

- **BRII firms were just as likely to commercialise their IP as SBIR firms.** According to survey responses, 75 per cent of the BRII proof of concept SMEs have already commercialised their IP, while a further 12.5 per cent plan to in the near future. This compared favourably with the SBIR's "market reach" indicator, which outlines the proportion of firms whose idea has been commercialised in some capacity.³⁸ In the SBIR, the market reach indicator varied from 40 to 70 per cent depending on the challenge agency.
- **BRII firms were more likely to develop relationships than SBIR firms.** Almost 90 per cent of BRII feasibility SMEs and 100 per cent of proof of concept SMEs suggested that the BRII helped them to build innovative new partnerships. This compared with 30-70 per cent of SBIR projects (depending on the agency) that used academic support in some capacity. While these measures are not directly comparable, they do provide a proxy comparison of the impact of each program on firm relationship building.
- **The BRII created a similar level of additionality to SBIR through the support of projects that would not have occurred otherwise.** Seventy five per cent of the BRII proof

³⁸ "Market reach" is defined as the percentage of SMEs that have generated revenue from the sale of their challenge solution.

of concept projects and 67 per cent of feasibility projects would not have started without the BRII funding compared with 70 per cent of SBIR projects.

- **The BRII catalysed start-up creation at the same rate as the SBIR.** Eighteen per cent of SBIR companies were founded because of the program, while 17 per cent of BRII feasibility grant recipients in rounds one, two and three were formed in the same year as the BRII round commenced.
- **The BRII has had a strongly positive impact on business performance that is similar to the SBIR.** Seventy five per cent of the BRII proof of concept SMEs noted a positive impact on their turnover from the BRII compared with 70 per cent of SBIR firms that noted a transformative or strongly positive impact on their business trajectory.

The comparison measures are outlined in Table 5.

Table 5 | Summary of BRII and SBIR comparator statistics

Characteristic	Measure(s)	BRII	SBIR
Commercialisation	BRII - Proportion of firms that have already commercialised IP SBIR - Projects that have "reached the market" SBIR - Projects that have made sales/expect to make sales (Energy projects only)	75% (proof of concept) ³⁹ 40% (feasibility) ⁴⁰	40-70% (reached the market) ⁴¹ 72% (sales/expected sales) ⁴²
Relationship building	BRII - New innovative partnerships formed SBIR - Use of academic support throughout project (SBIR)	100% (proof of concept) ³⁹ 87% (feasibility) ⁴⁰	30-70% (depending on agency) ⁴¹
Additionality	SBIR, BRII - Proportion of projects that would not have taken place without funding (SBIR, BRII)	75% (proof of concept) ³⁹ 67% (feasibility) ⁴⁰	70% ⁴¹

³⁹ Proof of concept SME survey.

⁴⁰ Feasibility SME survey.

⁴¹ R Gaster 2017, Impacts of the SBIR/STTR Programs: Summary and Analysis, <https://sbtc.org/wp-content/uploads/2018/02/Impacts-of-the-SBIR-program.pdf>.

⁴² The National Academies Press 2016, SBIR/STTR at the Department of Energy – Chapter 7, <https://www.nap.edu/read/23406/chapter/7>.

Characteristic	Measure(s)	BRII	SBIR
Start-up creation	BRII – proportion of feasibility grant recipients founded in the year of the BRII round SBIR - Proportion of Phase II (proof of concept equivalent) firms founded because of SBIR grants	17% (feasibility grants) ⁴³	18% ⁴¹
Impact on business performance	BRII - Proportion of firms with a positive impact on turnover SBIR - Proportion of firms with a transformative or strongly positive impact on business trajectory	75% (proof of concept) ³⁹ 40% (feasibility) ⁴⁰	70% ⁴¹

5.3.2 The ISC has grown at a significantly faster pace than the BRII

The ISC (founded in 2017) is newer than the BRII and has not yet had an evaluation published. Due to this, this evaluation could not make a direct comparison of outcomes and impact. However, it was beneficial to compare some characteristics of each program, particularly relating to program delivery and scale, due to the relatively similar ages of both programs.

The major difference has been the pace at which the ISC has reached scale. The ISC has completed almost five times more challenges (70 versus 15) than the BRII in a shorter amount of time (excluding the RegTech round). A major driver of this difference is the use of mandated procurement targets for participating agencies in the ISC program. The ISC has also been more flexible in its challenge rollout than BRII. This has allowed the ISC to be more responsive to urgent policy needs. As an example, the ISC supported several COVID-19 specific challenges while the BRII has not.⁴⁴

One similarity is the challenge focus areas. The majority of ISC challenges have focused on environmental technologies, sensors and artificial intelligence. However, the most common challenge agencies for the ISC to date have been the National Research Council and the Department of National Defence. The Australian equivalents are yet to participate in the BRII.

⁴³ Based on ABN registration date. Includes all three rounds (58 SMEs, 10 of which were founded in the year of round commencement). Source: BRII administrative data.

⁴⁴ Government of Canada 2020, Innovative Solutions Canada: 2019-20 Annual Report, [https://www1.ic.gc.ca/eic/site/101.nsf/vwapj/00129_en.pdf/\\$FILE/00129_en.pdf](https://www1.ic.gc.ca/eic/site/101.nsf/vwapj/00129_en.pdf/$FILE/00129_en.pdf).

6. Cost-benefit analysis



Summary of findings

Summary

Round one of the BRII will achieve an estimated net benefit of \$10.4 million and return \$1.64 for every \$1 invested.

- **Mixed methods quantified the benefits from improved business performance and solution implementation.** The CBA was designed to measure the dual objectives of the BRII. As such, the first objective of the CBA was to quantify the benefit from the direct impact of BRII on the business performance of round one proof of concept SMEs. The second objective was to quantify the outcomes to government and society from successful government-SMEs partnerships. The CBA framework developed in this evaluation provides a foundation to track and demonstrate the impact of the BRII over time.
- **Improved business performance was the driver of total benefits with a small contribution from the BRII solutions.** The BRII is estimated to provide a total of \$26.8 million in benefits over the period FY16/17 to FY24/25. \$25.7 million (96 per cent) of the benefits were created through improved SME performance and the resultant Gross Value Added (GVA), which extend the benefits beyond the SMEs. Three commercialised solutions from round one deliver \$1.1 million in benefits to a variety of users, depending on the solution.
- **The BRII contributes to other benefits that are not captured as part of this CBA.** These non-quantified benefits include other benefits for government and society from the three case study solutions beyond those accounted for in the CBA; benefits created from solutions that are not yet measurable; non-monetary benefits that accrue to both round one SMEs and challenge agencies; and benefits that round one feasibility SMEs might create through the BRII. For this reason, the CBA can be considered conservative in benefits measurement.
- **Grant funding and program administration are the major costs for the BRII.** Round one of the BRII is estimated to cost a total of \$16.4 million. This included \$13.2 million in grant funding, \$3.1 million in program administration costs and \$0.1 million in challenge agency labour costs.

The BRII had a similar benefit-cost ratio to the UK SBRI. The BRII BCR of 1.6 was comparable to the UK SBRI BCR of 1.6 (based on self-reported SME data) and 2.4 (based on econometric analysis). This highlights potential for further impact for the BRII.

6.1 Round one of the BRII will achieve an estimated net benefit of \$10.4 million and return \$1.64 for every \$1 invested

As outlined in the preceding section, the BRII has had a positive impact on most participating SMEs and delivered significant value for challenge agencies. Of note is the positive impact that round one SMEs (see Section 5.1) and challenge agencies experienced (see Section 5.2) from participating in the BRII.

This evaluation undertook a CBA of round one of the BRII to further demonstrate and quantify the impact of the BRII. The CBA compares the total costs to deliver round one against the total benefit to society.⁴⁵ The CBA focuses on the benefits accrued from round one before sufficient time has passed since launching this round to complete a robust ex-post assessment of the program's impact on SME performance and the benefits created from the implementation of BRII solutions.^{46 47}

The results of the CBA demonstrate that round one of the BRII has so far delivered a net benefit of \$10.4 million to Australia. This included total benefits of \$26.8 million, which were made up of \$25.7 million of benefits created through improved SME performance and \$1.1 million in benefits created through the implementation of three round one solutions. The total costs amounted to \$16.4 million, which were predominantly made up of grant funding costs alongside some administrative costs. These results reflect a BCR of 1.64 to 1 (see Figure 20).

In line with Australian Government guidance, the CBA results are presented here at discount rates of 3 per cent, 7 per cent (base case) and 10 per cent.⁴⁸ The resulting net benefit range has a lower bound of \$8.2 million and an upper bound of \$13.5 million.

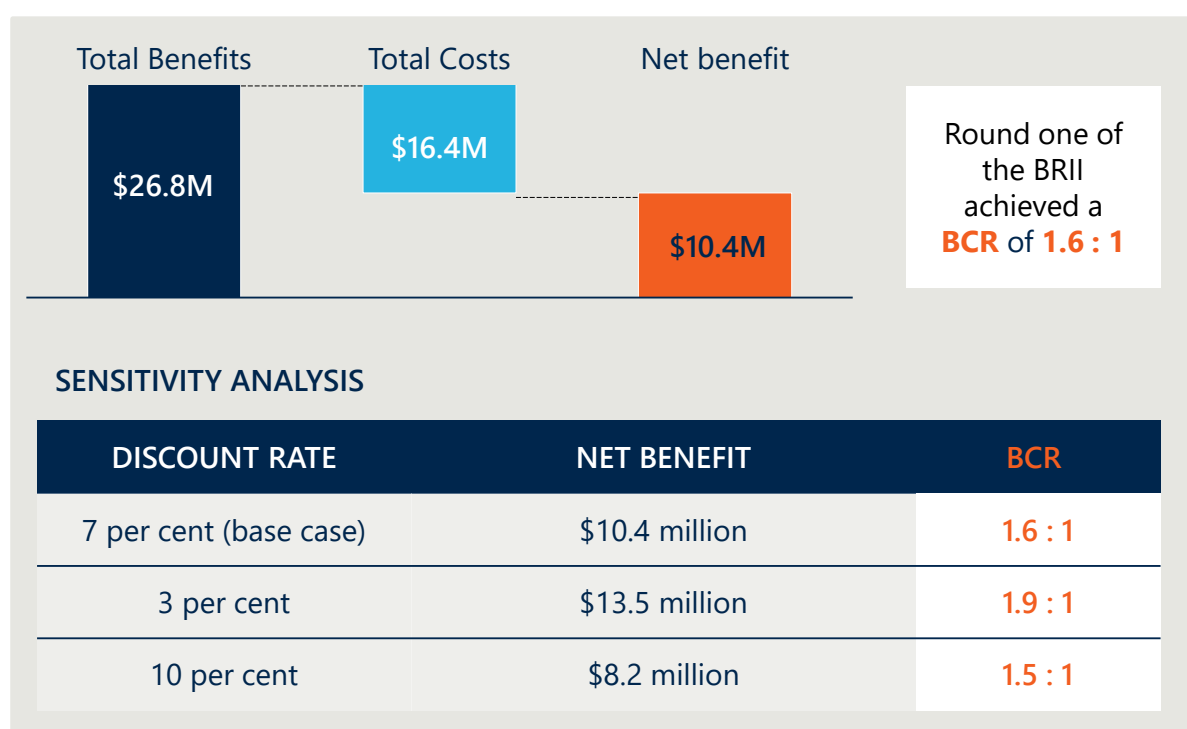
⁴⁵ The CBA has focused on determining the cost and benefits of BRII from FY17 (as the first year of activity for round one) onwards. Results are reported in FY21 net present value (NPV) throughout using a seven per cent discount rate.

⁴⁶ Note that when referring to SMEs and challenge agencies in this section we are referring to round one SMEs and challenge agencies only.

⁴⁷ Eight out of nine round one proof of concept SMEs have provided the financial information needed to complete the CBA. As a result, the results are based on a response rate of 89 per cent. A non-response factor of 1.13 has been applied to the survey responses received to estimate the benefits that the one non-response SME. It is noted that the non-responsive SME has had commercial success with their solution post BRII. The non-response factor is therefore conservative, as it takes the average of the eight responsive SMEs, three of which have little or no commercial success with their BRII solution.

⁴⁸ See 'Cost-benefit analysis guidance note' (March 2020) from the Department of Prime Minister and Cabinet, available at: https://pmc.gov.au/sites/default/files/publications/cost-benefit-analysis_0.pdf.

Figure 21 | Summary of CBA results



This is a positive result for the BRII. The BCR result demonstrates that the first pilot round of the BRII delivered a positive return on investment for the Australian Government. This is additional to the various qualitative outcomes and impact that SMEs and challenge agencies experienced.

This CBA is not exhaustive in the benefits it can measure at this stage due to the availability of data and limited time since commercialisation. Over time the benefits created through the implementation of round one solutions are expected to increase, particularly if the user base for each solution grows.

The remainder of this section will first summarise the conceptual and methodological approach to the CBA. It will then provide more detail on the results of the CBA.

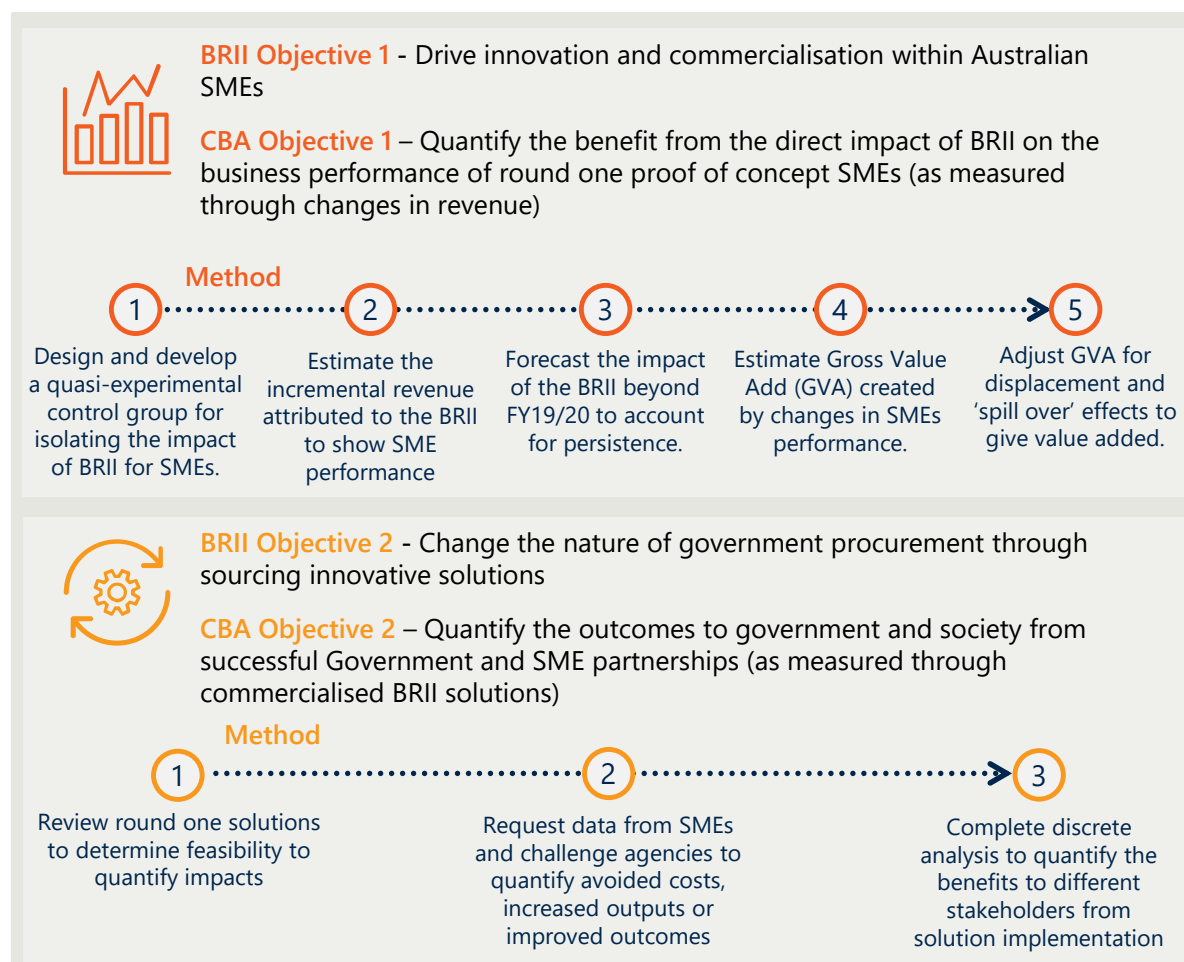
6.2 Mixed methods quantified the benefits from improved business performance and solution implementation

The CBA was designed to measure the dual objectives of the BRII: to drive innovation and commercialisation within Australian SMEs and to change the nature of government procurement through sourcing innovative solutions. To achieve this the CBA used a mixed methods approach that incorporated econometric analysis with discrete analysis based on qualitative research. The objective of this analysis was to:

1. Quantify the benefit from the direct impact of the BRII on the business performance of round one proof of concept SMEs (as measured through changes in revenue).
2. Quantify the outcomes to the Australian Government and society from successful government and SME partnerships (as measured through commercialised BRII solutions).

Figure 22 summarises the CBA conceptual approach and method to quantify the impact of BRII on its dual objectives. Further detail on the key aspects of the CBA approach and method for each objective follow.

Figure 22 | Summary of the CBA conceptual approach and method



6.2.1 Quantifying the benefit from the direct impact of BRII on the business performance of round one proof of concept SMEs

There were three key aspects of our approach and methodology:

- **Designing a synthetic control group through an innovative method.** Underlying SME growth was accounted for with a control group designed using a combination of modelled ABS data and a nearest neighbour matching method⁴⁹ that used anonymised financial records from DISER's 'Lighthouse' data warehouse.

⁴⁹ Nearest neighbour is a matching approach that searches a group of treated SMEs and selects the closest eligible control unit based on a set of business and market characteristics. Nearest neighbour matching is the most common form of matching used and has a strong evidence base – see Thoemmes, Felix J., and Eun Sook Kim. 2011. "A Systematic Review of Propensity Score Methods in the Social Sciences."

- **Isolating the incremental impact of the BRII on SME performance between FY16/17 and FY 24/25 through a combination of econometric and self-assessed estimates.** Econometric analysis demonstrated the performance of SMEs resulting from the BRII over and above what would otherwise be expected. Persistence of this impact into the future is also accounted for through SME self-reported assessments.
- **Converting increased SME performance into benefits to society through GVA estimates.** The improved performance of the BRII SMEs results in incremental revenue and gross value add for each firm. This improved performance also drives additional value in the Australian economy (i.e. second round benefits), after accounting for displacement and 'spillovers'. Value added therefore, which is the combination of both, provides a more holistic measure of benefit created than the use of incremental revenue growth alone.

6.2.2 Quantifying the outcomes to government and society from successful government and SME partnerships

There were two key aspects of our approach and methodology:

- **Taking a case study analysis approach to explore the BRII solution outcomes in their early stages of implementation.** A case study analysis of the BRII solutions allowed for the assessment of the unique mechanisms through which each solution addresses its challenge. The case study analysis also allowed for a deep dive into three select solutions to quantify emerging outcomes to both government and society more broadly despite the BRII round one solutions being in the early stages of commercialisation.
- **Using broad estimates from both government and SME interviews to complete high-level modelling of outcomes.** Preliminary and anecdotal data was captured about BRII solution implementation through consultation with solution designers and users. Evidence of changes to user inputs and outputs because of solution implementation then informed a high-level assessment of the outcomes under certain scenarios (e.g. levels of solution uptake by users).

6.2.3 This CBA provides a foundation to track and demonstrate the impact of the BRII over time

There is an opportunity to extend the above methodology so that an increasingly robust evidence base for the costs and benefits of the BRII can be developed over time. The BRII policy and program teams could work closely with the economics experts within the Evaluation and Research Branch of DISER to engage challenge agencies and SMEs to collect the right data to

Multivariate Behavioral Research 46 (1): 90–118. <https://doi.org/10.1080/00273171.2011.540475> and Zakrisson, T. L., Peter C. Austin, and V. A. McCredie. 2018. "A Systematic Review of Propensity Score Methods in the Acute Care Surgery Literature: Avoiding the Pitfalls and Proposing a Set of Reporting Guidelines." European Journal of Trauma and Emergency Surgery 44 (3): 385–95. <https://doi.org/10.1007/s00068-017-0786-6>.

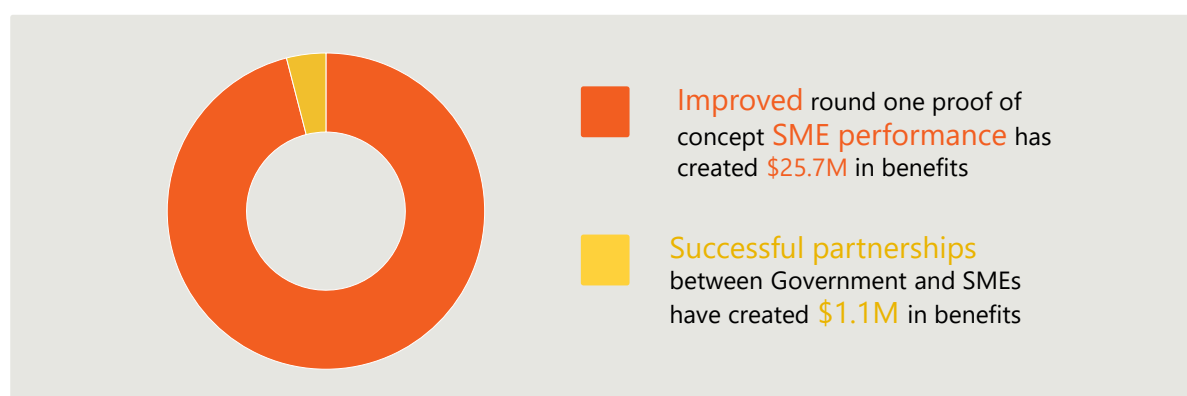
support the CBA model. It is noted that a CBA tool has been submitted as part of this evaluation to enable the ongoing assessment of impact. More detailed recommendations are provided in Section 7.4.

6.3 Improved business performance was the driver of total benefits with a small contribution from the BRII solutions

6.3.1 The BRII is estimated to provide a total of \$26.8 million in benefits over the period FY16/17 to FY24/25.

The improved performance of round one proof of concept SMEs was responsible for \$25.7 million (or 96 per cent) of the total benefits. Three successful government and SME partnerships that resulted in commercialised solutions was responsible for \$1.1 million (or 4 per cent) of the total benefits. The component parts of the total benefits are summarised in Figure 22.

Figure 23 | Split of total benefits



6.3.2 The benefits from improved business performance extend beyond the SMEs.

The \$25.7 million in benefits created through improved business performance starts with the impact of BRII on the incremental revenue growth of the SMEs. The BRII is estimated to contribute \$34.8 million in incremental revenue to the BRII participants through improved performance between FY16/17 and FY24/25. However, the concept of revenue (or turnover) is different to the socioeconomic concept of benefit. After converting revenue to GVA and adjusting for displacement and other spill over effects to give value added, the overall benefit increase is \$25.7 million. Value added measures the broader benefits to society from improved business performance. This includes the benefits that employees, other businesses and government experience from more successful firms.

6.3.3 Estimated net benefit of the BRII is sensitive to some key parameters related to SME business performance.

In line with Australian Government guidance, the CBA results are presented here at discount rates of 3 per cent, 7 per cent (base case) and 10 per cent.⁵⁰ The resulting net benefit range has a lower bound of \$8.2 million and an upper bound of \$13.5 million. However, there are other parameters set in the base case that have the potential to influence the overall outcome.

Two of the most significant of these are:

- **Years of persistence in impact to SME performance because of the BRII.** This parameter has a slightly larger impact on the BCR in the lower bound scenario. Years of persistence varies due to the maturity of both the participating SME and the IP that sits behind the solution. For example, SMEs that formed specifically for the BRII reported higher expectations for years of persistence compared with mature SMEs that in some cases were using their own existing IP to solve the challenge.
- **Expected future revenue growth for BRII round one proof of concept SMEs.** This parameter has a similar impact on the upper and lower bound scenarios. The model uses a common base case future growth rate due to the uncertainty of forecasting future revenue growth for early stage ventures or products. However, expected future revenue growth is likely to differ significantly for the participant SMEs. For example, some firms may experience a rapid growth in revenue if their product achieves traction. Others may see more subdued revenue growth if the commercialisation of their product takes longer than expected or if the BRII product only makes up a small portion of their other product and services offerings.

A summary of how these two parameters can impact the overall results is presented in Table 6 below.

Table 6 | Model parameters sensitivity analysis (holding all else constant)

Characteristic	Lower bound	Base case	Upper bound
Years of persistence	3 years	5 years ⁵¹	7 years
Net benefit	\$2.7m	\$10.4m	\$17.8m
BCR	1.16	1.64	2.09

⁵⁰ See 'Cost-benefit analysis guidance note' (March 2020) from the Department of Prime Minister and Cabinet, available at: https://pmc.gov.au/sites/default/files/publications/cost-benefit-analysis_0.pdf.

⁵¹ The persistence of impact is five years per the survey response from BRII round one proof of concept SMEs. See Appendix G for more.

Characteristic	Lower bound	Base case	Upper bound
Future revenue growth (YoY)	2.7%	4.7% ⁵²	6.7%
Net benefit	\$3.8m	\$10.4m	\$17.3m
BCR	1.23	1.64	2.06

6.3.4 Three commercialised solutions from round one deliver \$1.1 million in benefits.

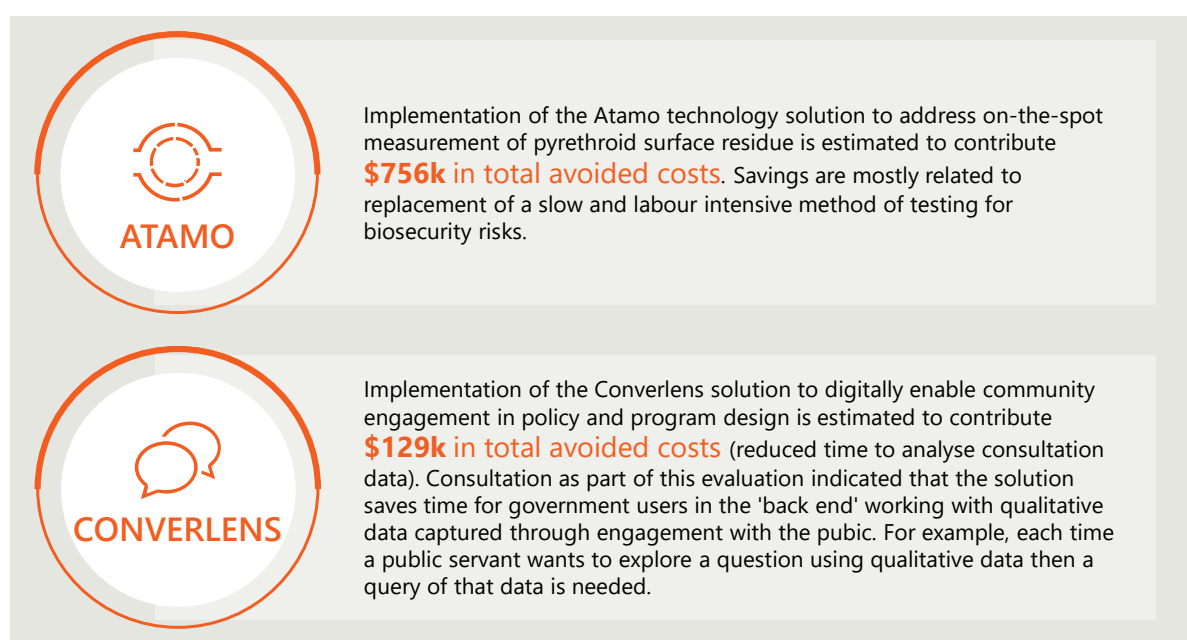
The CBA focused analysis on three case studies to demonstrate the benefits achieved through successful government and SME partnerships that resulted in commercialised solutions. The three case studies chosen were the only round one solutions that had the data available to quantify their impact at this stage.

The benefits from each of these solutions is modelled using scenarios. Scenario estimates are based on assumptions tested in evaluation interviews with SMEs and Challenge Agencies (a full list of these assumptions is provided in Appendix G). Each scenario provides a total forecast benefit over a five year horizon equal to the timeline used in the SME component of the CBA (i.e. out until FY24/25).

Two of the case studies resulted in benefits from improved government service delivery (see Figure 23).

⁵² Base case set at 4.7% which is the market growth average for the control group. See Appendix G for more.

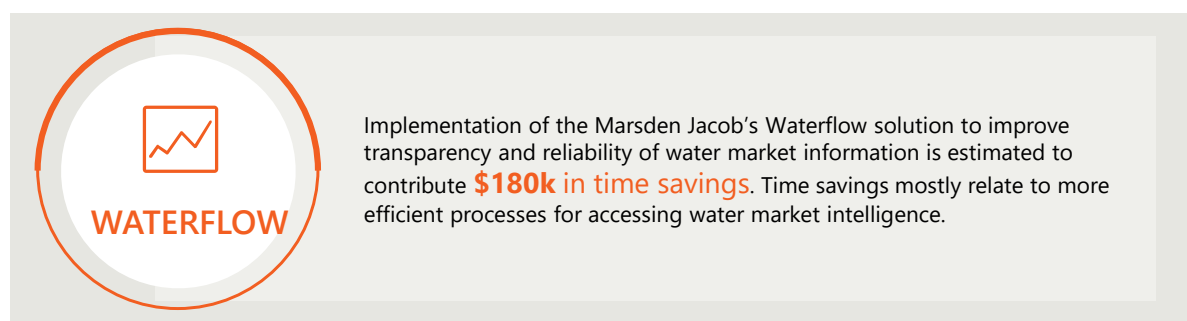
Figure 24 | Benefits from improved government service delivery



Source: SME interviews and Challenge Agency interviews

The third case study resulted in benefits from improved policy outcomes for government (see Figure 24).

Figure 25 | Benefits from improved policy outcomes for government through Waterflow



Source: SME interviews and Challenge Agency interviews

6.3.5 The BRII contributes to other benefits that are not captured as part of this CBA

The estimate of benefits in the CBA is conservative. There are several benefits created for SMEs, government and society more broadly that are currently not measured (but might be into the future). These include:

- **Other benefits for government and society from the three case study solutions beyond those accounted for in the CBA.** For example, in the case of Waterflow and Converlens it is possible that the solutions are delivering outcomes more effectively (covered in the CBA) *and* with higher quality outcomes (e.g. in the case of Waterflow this could involve more *accurate* water market information and consultation queries alongside time savings).

- **Benefits created from solutions that are not yet measurable.** For example, the digital solution (Itree's REACH) to address BRIL's round one challenge of sharing information nationally to ensure child safety could drive significant benefits through a reduction in the incidence of harm for children at risk.⁵³ Additionally, the technology solution (Atamo) for measuring pyrethroid surface residue is likely to reduce the overall probability of a costly biosecurity incident in Australia (where outbreaks can run into the millions of dollars).⁵⁴ Given the lack of data and the complex, high-consequence and in some cases unquantifiable risk of some of these outcomes they were not quantified as part of this CBA.
- **Non-monetary benefits that accrue to both round one SMEs and challenge agencies.** SMEs benefit from learning how to navigate government procurement. Agencies benefit from an improved ability to partner with smaller and innovative SMEs into the future. One proxy measure of this is the government procurement trends (sourced from AusTender) for the ten round one and round two BRIL proof of concept SMEs that existed prior to participating in BRIL. These SMEs increased the combined cumulative total of government contracts from 61 to 88. This resulted in a \$10.1 million increase in the combined cumulative value of government contracts for those SMEs after their first involvement with the BRIL.⁵⁵
- **Benefits that round one feasibility SMEs might create through the BRIL.** Even SMEs that only progress to the feasibility stage could continue to develop their idea or innovation without further BRIL assistance. Even though they receive no further funding the BRIL may have been a catalyst for their innovation or introduced them to partners or customers to support the commercialisation of their solution.

As the BRIL continues to mature and more rounds come to an end it may be possible to include these further benefits. A high-level assessment of benefits that have and have not been estimated as part of the CBA is provided in Appendix G.

⁵³ Note that evaluation interviews indicated that the NSW DCJ is currently undertaking a benefits assessment as part of the REACH interim review which should be completed by the end of October 2021. At this point further outcomes may be possible to quantify.

⁵⁴ See report 'Key Result Summary: Valuing Australia's Biosecurity System' (August 2020) published by Centre of Excellence for Biosecurity Risk Analysis (CEBRA), available at: https://cebra.unimelb.edu.au/_data/assets/pdf_file/0020/3535013/CEBRA_Value_Docs_KeyResultSummary_v0.6_Endorsed.pdf.

⁵⁵ To ensure a fair comparison, the count of tenders after engagement with BRIL is based on the period between the beginning of the relevant BRIL round (one or two) and 30 June 2021. The count "before" engagement with the BRIL is based on an equal period prior to the BRIL round as between the beginning of the round and 30 June 2021. For example, if it has been five years since the commencement of a BRIL round, then the "before" count of tenders is based on the five years before the commencement of the BRIL round. All data for these calculations is sourced from AusTender.

6.4 Grant funding and program administration are the major costs for the BRII

6.4.1 The BRII is estimated to cost a total of \$16.4 million for round one over the period FY16/17 to FY24/25.

Most costs for the BRII accrue to government, specifically DISER and the challenge agencies participating in BRII. The main cost components are outlined below:

- **Grant funding costs** totalled \$13.2 million for round one. This included \$2.4 million in feasibility funding and \$10.7 million in proof of concept funding. Note that the feasibility costs for all SMEs in round one are included to reflect the intention of the BRII design to support multiple SMEs through feasibility to reach the best solution at the end of the proof of concept.
- **Program administration costs** for running the BRII totalled \$3.1 million. Only those program administration costs needed to support the delivery of the BRII round one are included.
- **Challenge agency labour costs** totalled \$0.1 million. This reflected the cost for challenge agencies to commit time to guide SMEs in the development of the solution.

It should be noted that there are costs that accrue to SMEs in the form of opportunities costs for time taken to apply to BRII and to meet ongoing reporting requirements. However, these costs are considered negligible or at least offset by the BRII funding that SMEs receive.

Spillovers and unintended consequences

Program staff and challenge agency participants also indicated through evaluation interviews that the BRII had exposed them to new ways of working that supported innovation in their roles. For example, one challenge agency participant noted that they had learnt about design thinking methodologies through their engagement with the BRII and had taken these learnings into other programs and initiatives they were involved in. Some stakeholders highlighted this as a spillover or unintended impact of the program. The impact that the BRII had on workforce capability indicates the potential for greater impact on APS capability should the BRII expand.

6.5 The BRII had a similar benefit-cost ratio to the UK SBRI

The UK SBRI has had a similar CBA completed to that conducted in this evaluation. Based on this a reliable comparison can be made between the BCR of each (specific references for data are provided in the summary tables below).

The BRII BCR result is comparable to the BCR for the UK SBRI according to a 2015 CBA. The UK SBRI achieved a BCR of 1.6 (with self-reported benefits) and 2.4 (based only on econometric

estimates).⁵⁶ However, the UK SBRI BCR used a lower base case discount rate of 3 per cent. At the 3 per cent discount rate, the BRII BCR is 1.9. Adjustment of some other model assumptions away from base case in the BRII example can result in a BCR even closer to the upper bound of the UK SBRI result. This highlights potential for further impact for the BRII.

Both BRII and UK SBRI adopted an approach that quantified the improved business performance of SMEs as a driver of benefits. Similar costs were also included in both cases. However, where this evaluation has attempted to quantify some of the outcomes achieved with BRII solutions, the UK SBRI review focused instead on surveying the qualitative strategic benefits of the program only.⁵⁷

On other measures the BRII compares favourably with the UK SBRI. The UK SBRI had a greater degree of additionality to the BRII as 95 per cent of projects would not have taken place without funding from SBRI compared to 75 per cent for the BRII. An area of similarity between the two programs is the length of expected impact on turnover for participant firms. BRII participants expected the BRII to have an impact on turnover for 4.8 years compared to 3.8 years for SBRI participants. The comparison measures are summarised in Table 7.

Table 7 | Summary of the BRII outcomes compared to the UK SBRI outcomes

Characteristic	Measure(s)	BRII	SBRI
Additionality	BRII, SBRI - Proportion of projects that would not have taken place without funding	75% (proof of concept) ⁵⁸ 67% (feasibility) ⁵⁹	95% ⁶⁰
Duration of program impact on business performance	BRII, SBRI - Average number of years for which the BRII is expected to impact turnover	4.75 years (proof of concept) ⁵⁸	3.8 years ⁶⁰
Benefit-cost ratio	BRII, SBRI - Benefit-cost ratio	1.6 (mixed method)	1.6 (self-reported benefits) ⁶⁰ 2.4 (econometric estimates) ⁶⁰

⁵⁶ This method refers to an approach to CBA that does not involve any self-reporting, but rather a direct comparison to market performance. The lower BCR result from the self-reported method compared to the econometric method indicates that SBRI firms have likely underestimated the impact of the SBRI on their present and future performance.

⁵⁷ Manchester Institute of Innovation Research 2015, *A review of the small business research initiative*, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/662657/A_Review_of_the_Small_Business_Research_Initiative.pdf

⁵⁸ Proof of concept SME survey

⁵⁹ Feasibility SME survey

⁶⁰ Manchester Institute of Innovation Research 2015, *A review of the small business research initiative*, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/662657/A_Review_of_the_Small_Business_Research_Initiative.pdf

7. Program design and implementation



Summary of findings

The design and governance of the BRII has been effective.

- **The BRII continues to support the objectives for which it was designed.** The program has reached 14 different government departments and agencies directly and has touched many others indirectly. This impact has triggered some change in agencies, some of whom have planned further challenge-based procurement. However, BRII's lack of scale limits the overall impact on the start-up and SME ecosystem.
- **Governance arrangements have fulfilled their purpose but will need to evolve if the BRII is to increase in scale.** The BRII policy and program teams have been instrumental to the program's success but could benefit from greater integration. All stakeholders valued the input and role of the EPC. However, the current model may have limited ability to scale.
- **The BRII team have anticipated, managed and mitigated major risks across the first three rounds.** DISER successfully navigated risks relating to SME and agency engagement, allowing the BRII to deliver on its objectives. The BRII program was also largely uninterrupted by the impacts of the COVID-19 pandemic.

The BRII has improved how it delivers the challenge stage.

- **The BRII has made important changes to enable challenge design but could benefit from new approaches to engage challenge agencies.** While communication with SMEs has improved, similar outreach efforts to prospective challenge agencies have proven difficult. The BRII will benefit from a continued focus on challenge design to mitigate poor program outcomes.
- **The BRII has greatly improved its marketing to SMEs.** Prior to the Priority Sectors round (round three), DISER initiated a major shift in the communications approach that focused on a more targeted, tailored approach with greater focus on social media engagement. This approach resulted in a significant increase in engagement and applications compared to previous rounds.

SMEs and challenge agencies reflect positively on the BRII but suggested improvements to program design.

- **Most SMEs had a positive experience through the feasibility stage.** Almost all survey respondents were satisfied or very satisfied with the support received from challenge agencies and from DISER.

Proof of concept SMEs were generally happy with the program, but some had concerns about challenge agency support. Concerns with challenge agency support mostly

7.1 The design and governance of the BRII has been effective

The BRII's administrative arrangements have supported effective challenge selection, design and project delivery. The role of the EPC has been particularly important in providing a commercial perspective in assessment and challenge design phases. However, this is currently a centralised process requiring significant time investment. New models must be considered to allow the BRII to scale.

7.1.1 The BRII continues to support the objectives for which it was designed

The BRII has been appropriately designed and implemented to address its two distinct objectives (see Section 4). The consistent outcomes across the early challenge rounds affirms the appetite to extend the reach of the BRII. At present the reach of the BRII is limited, especially regarding the start-up and SME ecosystem. The tables below provide an overview of the extent to which the BRII addresses each objective and the program's reach.

Table 8 | Performance against the BRII program objective 1

Objective 1	Change the nature of government procurement through sourcing innovative solutions
Extent to which the BRII supports the objective	<ul style="list-style-type: none">• The program is a novel procurement approach that has a focus on innovation. There are few programs like it in Australia.• All challenge agencies that participated in the evaluation are supportive of challenge-based procurement and would participate again.• Some agencies have used their experience in the BRII to develop new procurement approaches loosely based off the BRII.
Program reach	The BRII has now reached 14 different departments or agencies directly, and a further three agencies (Australian Criminal Intelligence Commission, Family and Community Services NSW DCJ and the ACT Community Services Directorate) were co-partners on two previous challenges. The consistent outcomes across the participating challenge agencies signals the potential for the program to have a widespread impact on government procurement. This has already begun to take place, with increased federal emphasis on challenges through a \$33.7 million federal scheme for artificial intelligence and \$59.6m to support a National Soil Carbon Innovation Challenge. ⁶¹ NSW has also launched its own SBIR program. Other state government programs also exist or have existed, such as the CivVic Labs Accelerator in Victoria, Go2Gov in South Australia (a start-up focus), and Queensland's discontinued SBIR scheme.

⁶¹ Source: Federal Budget 2021-22, <https://budget.gov.au/2021-22/content/resilient.htm>

Table 9 | Performance against the BRII program objective 2

Objective 2	Drive innovation and commercialisation within Australian SMEs and start-ups
Extent to which the BRII supports the objective	<ul style="list-style-type: none"> • The BRII grant is sizeable and of sufficient value to enable SMEs to develop close-to-final prototypes. • The most successful challenges have involved wicked, previously unsolved challenges that have stimulated innovative solutions. • Most of the proof of concept SMEs experienced positive innovation and commercial outcomes from their participation in the program. • Working in sustained proximity to the potential end customer also gives SMEs the opportunity to design a product for a clearly defined market.
Program reach	<p>The BRII reach remains limited due to the small number of challenge rounds and substantial period between challenges.</p> <p>Due to this, it is not possible to make any findings on the impact of the program on the broader start-up and SME ecosystem.</p>

Source: DISER briefing documentation

7.1.2 Governance arrangements have fulfilled their purpose but will need to evolve if the BRII is to increase in scale

The BRII is largely managed and administered by the BRII policy and program teams. The Industry Innovation and Science Australia (IISA) Board, through the EPC, also play an important role in the challenge design and assessment process. Although governance arrangements have been broadly successful up until now, these will need to evolve to facilitate greater scale.

The BRII policy and program teams have each completed their role effectively, however, there is opportunity for greater integration.⁶²

Each of the specific BRII teams within DISER have successfully supported the growth and success of the BRII. The policy team has driven improvements to the design of the program and were instrumental in organising the successful international Challenge-Based Innovation Forum. Meanwhile, both challenge agencies and SMEs have had positive experiences with the role the program team has played to implement the BRII (see Section 7.2.2).

However, various DISER stakeholders identified the opportunity to improve governance arrangements for the program. This includes stronger interfaces between each team throughout the delivery of the BRII so learnings can be shared between teams more effectively. Currently,

⁶² Sources: Program and policy team interviews, EPC interviews, challenge agency interviews.

information is shared between policy, program and the EPC on an ad-hoc basis. A more systematic approach may be more effective. Some stakeholders also identified opportunities to streamline departmental governance by clarifying the roles of each team across the BRII lifecycle.

The EPC has made a positive contribution to the BRII.⁶²

DISER stakeholders from the policy and program teams noted that the EPC has been invaluable in its capacity to bring commercialisation expertise. This has aided in the selection of high-quality applications with the potential to rapidly develop and commercialise products. This expertise was especially valuable as it is not prevalent in either DISER or the challenge agencies.

EPC members provided similar views. The members believed that the EPC brought a vital commercialisation mindset to the BRII. Additionally, committee members felt their role as an advisor to DISER contributed to capability development. They also noted a need for clearer distinction between the role of the EPC as an assessor of applications and as a strategic advisor to agencies and the BRII team, which played a substantial role in the higher-than-expected workload for some. Members also believed that the effectiveness of the EPC has been constant across the BRII, but their processes have become more efficient.

The time-intensive nature of the BRII governance, especially for members of the EPC, limits the program's ability to scale.⁶²

Current governance arrangements require significant time investment from the EPC, well beyond their originally agreed commitment. As a result, there was a consensus among policy and program stakeholders as well as EPC members that a re-structure of the governance is necessary for the BRII to scale-up (see Section 8.1.4 for potential models).

Regardless of the future model, it was clear that capability uplift in DISER and challenge agencies is needed to aid in commercial assessment, alongside a more efficient model to leverage the EPC or similar expertise.

DISER could improve ongoing data collection to enable effective monitoring

The BRII program requires embedded data collection mechanisms that collect data on:

- SME and challenge agency experience
- Procurement outcomes for proof of concept SMEs
- The costs and benefits for challenge agencies, including full-time equivalent staff dedicated to program delivery
- Other commercial outcomes for participating SMEs.

This evaluation utilised bespoke surveys and interviews to gather this information due to absent longitudinal data. DISER should consider building from the surveys and interview guides developed for this evaluation to implement ongoing data collection.

7.1.3 The BRII team have anticipated, managed and mitigated major risks across the first three rounds

The BRII program - and CBI in general – is largely new to Australia. This led to some uncertainty about how effectively the BRII would be able to achieve its intended outcomes. The main risks for the BRII relate to level and quality of participation from agencies and SMEs. Poor engagement from either party would significantly hinder the outcomes of the BRII. More detail on these risks and the mitigations DISER put in place to address them are presented in Table 9.

Table 10 | Major program risks and mitigations⁶³

Major risk for the BRII	How the risk has been anticipated, managed and/or mitigated
Challenges are not designed in a way that supports optimal outcomes for SMEs and challenge agencies	DISER identified early in round one that challenge design was critical to a successful program. At first the response to this risk was reactive. Round two also suffered from two challenges that did not advance to proof of concept due to poor challenge design. This risk was managed more effectively for round three through the introduction of a challenge EOI process.
Insufficient engagement from the right challenge agencies	DISER worked with other Departmental Secretaries to ensure visibility across a variety of Departments. DISER also utilised the Minister to announce the launch of each round to bring additional publicity.
Lack of innovative SMEs participating, either through poor selection or not attracting enough to apply	This was well anticipated and mitigated through two main avenues. Firstly, to attract the right SMEs, DISER employed a broad reaching marketing campaign on various platforms each round. This approach was improved greatly after a review between rounds two and three. Secondly, DISER used the EPC's expertise extensively to help optimise the SME selection process.
Process issues hamper or stop projects from achieving their potential	DISER provided extensive support to both SMEs and challenge agencies throughout projects and between phases to help answer questions and address emerging concerns. Participants provide consistently positive feedback regarding this support. Many SMEs were grateful for the broker style role the BRII program team played to manage issues.
Working with multiple SMEs simultaneously causes agencies to	Agencies were provided with ongoing support to guide the way they worked with SMEs to ensure probity concerns did not manifest into genuine conflict of interest issues.

⁶³ Source: SME interviews and survey responses, challenge agency interviews, DISER and EPC interviews.

Major risk for the BRII	How the risk has been anticipated, managed and/or mitigated
violate conflict of interest rules	

Going forward, DISER should consider the risks associated with increased scale. The two main risks are:

- **Dilution of SME quality at scale.** The success of the BRII is predicated partly on the innovative nature of participating SMEs. Should the program expand, the quality of SMEs involved must remain high to maintain the positive outcomes and impact the BRII has achieved so far. If the BRII does scale-up DISER should monitor how the increase in scale impacts access to innovative SMEs.
- **Quality of support provided to SMEs and challenge agencies at scale.** The support provided by DISER to date has been very useful to both SMEs and agencies. However, it has also been bespoke and personal. As the program grows, investment in maintaining the service outcomes delivered so far will be important to enable the ongoing effectiveness of the BRII.

The COVID-19 pandemic had a limited impact on the BRII.

The COVID-19 pandemic also presented a substantial risk for the BRII. However, the impact of the pandemic on the program's outcomes was insignificant. Most agencies and SMEs, as well as DISER stakeholders, did not identify major delays or disruptions to projects. However, a small number of projects targeted at sectors most affected by the pandemic, such as tourism or air travel, were interrupted in their ability to trial their products. Projects that required in-person testing of their products also experienced disruptions. SMEs that COVID-19 did impact provided positive feedback on the flexible support that DISER provided them to help projects deliver on their timelines regardless of the disruption.

7.2 The BRII has improved how it delivers the challenge stage

The challenge stage is critical to the success of the BRII. During this stage the BRII must achieve two key objectives:

1. Attract and mould challenges that are both difficult enough to require new innovative solutions and targeted enough to provide SMEs that right.
2. Attract high quality, innovative firms that have a high likelihood to develop solutions that can address the chosen challenges.

This section outlines how the BRII has evolved its approach to address both objectives.

7.2.1 The BRII has made important changes to enable challenge design but could benefit from new approaches to engage challenge agencies

Challenge design continues to be critical to the success of the BRII.⁶⁴

The post-commencement evaluation identified well defined challenges as crucial to the success of the BRII.⁶⁴ Successful challenges clearly articulate the problem they have been designed to solve but remain open to a range of innovative solutions. The BRII team were reminded of the importance of the challenge design phase at the 2019 Challenge-Based Innovation Forum that they hosted in Canberra. At the forum international peers from the UK, USA and Canada reiterated the importance of designing fit-for-purpose challenges that require genuine innovation and solve an important government problem.

Both challenge agencies and SMEs reiterated this when they identified bad challenge design as a driver of poor program outcomes. Specifically, some stakeholders identified challenge design was a key driver of why some of the round two challenges did not progress to the proof of concept stage.

The introduction of the challenge agency EOI application is seen as a positive step to improve challenge design.⁶⁵

The BRII team introduced an EOI phase for challenge selection for round three. The EOI phase provides DISER and the EPC the opportunity to work with challenge agencies at an early stage to refine their challenge. The early results of this approach have been positive. Three of the five round three challenge agencies had a positive experience with the new process. Each of these challenge agencies also provided positive feedback on the progress that the SMEs have made during the feasibility stage towards solving their challenge.

The lack of buy-in for the BRII beyond the executive sponsor and the responsible teams within government agencies remains a challenge.⁶⁵

This was especially true for round two challenge agencies. The movement of executive level sponsors away from the responsible divisions often reduced the focus on the BRII from that challenge agency. This was confirmed from both the SME and challenge agency perspective.

Some agency representatives even went as far to say that teams were pressured to make challenge applications by executive sponsors. This often meant that the challenge agency did not commit the required investment of time and capability to support the success of the BRII when executive sponsors moved on.

Agencies who have embraced the BRII, such as DAWE, reported that the broader visibility of the BRII across their Department is low. For example, one agency representative shared that they

⁶⁴ Nous Group 2018, *BRII Pilot Post-Commencement Evaluation*, <https://www.industry.gov.au/sites/default/files/2019-06/brii-pilot-post-commencement-evaluation-2018-final-report.pdf>

⁶⁵ Sources: Program and policy team interviews, EPC interviews, SME interviews and surveys, challenge agency interviews.

had no previous knowledge of the BRII until they were moved into the team responsible for the specific BRII project.

Themed rounds have improved the BRII's traction with challenge agencies, but the BRII can expand its reach further.⁶⁵

DISER staff members highlighted that the priority sectors focus of round three allowed them to better target communications to potential challenge agencies. This was because round three had a focus on a small number of priority areas. This was also reflected in the highest number of challenge applications (17).

However, there is still substantial opportunity to extend the reach of the BRII across more government departments and agencies. Across the Australian Government there are over 150 potential agencies or departments that could participate in the BRII. A potential area for expansion is to support the Australian Government's national priorities. CBI is inherently flexible and could easily target the national priority areas. This is reflected in the success of COVID-19 related challenges that have been rolled out in other programs around the world.

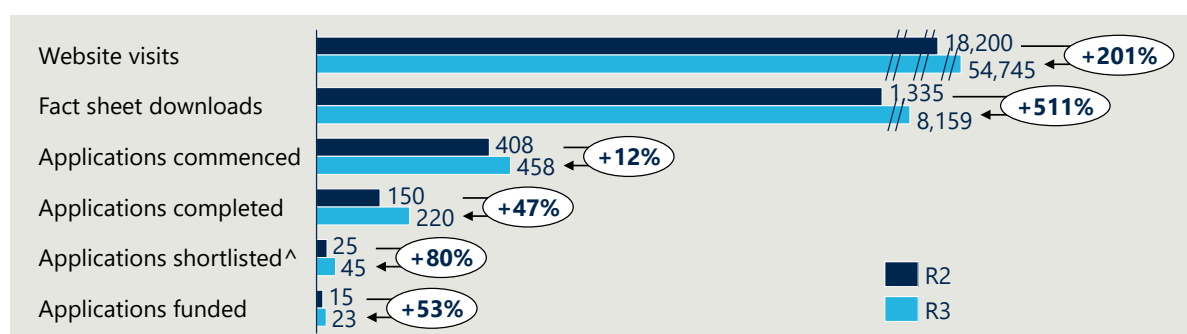
7.2.2 The BRII has greatly improved its marketing to SMEs

While the first two rounds of the BRII were broadly considered successful, DISER felt that the communications approach could be improved to attract a greater weight of applications from quality SME's. An analysis by DISER of the communications approach in rounds one and two found that an improved approach should:

- Focus on identifying the characteristics of target audiences to aid in the targeting of communications.
- Recruit stakeholders that can act as "conduits" to help inform target audiences about the BRII round.

These findings resulted in a shift in the communications approach toward a greater emphasis on targeted outreach. The improved communications approach resulted in a substantial increase in engagement, as demonstrated in Figure 25.

Figure 26 | Shift in engagement from Round two to Round three (Priority Sectors)



Source: BRII Priority Sectors Round Evaluation, December 2020

The communications approach was improved through extensive targeting and early tailoring.

For rounds one and two the communications approach involved integrated activities such as downloadable fact sheets, online videos, digital and social media advertising, promotional videos from previous BRII participants, face-to-face presentations and direct emails. A communications strategy brought coherence to the approach.

DISER engaged Cox Inall Change (CIC) to implement an amended communications approach for round three (Priority Sectors). This approach built from the existing communications strategy, which CIC refined through consultations with each challenge agency. This helped to ensure the messaging was tailored to each agency's context. CIC also developed lists of key stakeholders in conjunction with challenge agencies. Finally, CIC developed unique engagement plans for each challenge.

As demonstrated in Figure 25, the new approach vastly increased engagement and application quality. This increase was attributed to various factors:

- **A large increase in word-of-mouth, online and industry group-led communication** of the BRII program. This reflects the impact of CIC's focus of recruiting industry "influencers", and better tailoring of online marketing materials.
- **A paid search and social media campaign executed alongside a targeted stakeholder relationship program.** This strategy "kept the BRII top of mind" and tripled website traffic.
- **CIC's emphasis on tailoring communications.** This was achieved through consultation with challenge agencies and the EPC.
- **Targeted webinars with interested stakeholders that were identified with challenge agencies.** There were 568 attendees in round three compared to 174 in round two.

In all, this communications activity cost DISER approximately \$150,000.⁶⁶

7.3 SMEs and challenge agencies reflect positively on the BRII but suggested improvements to program design

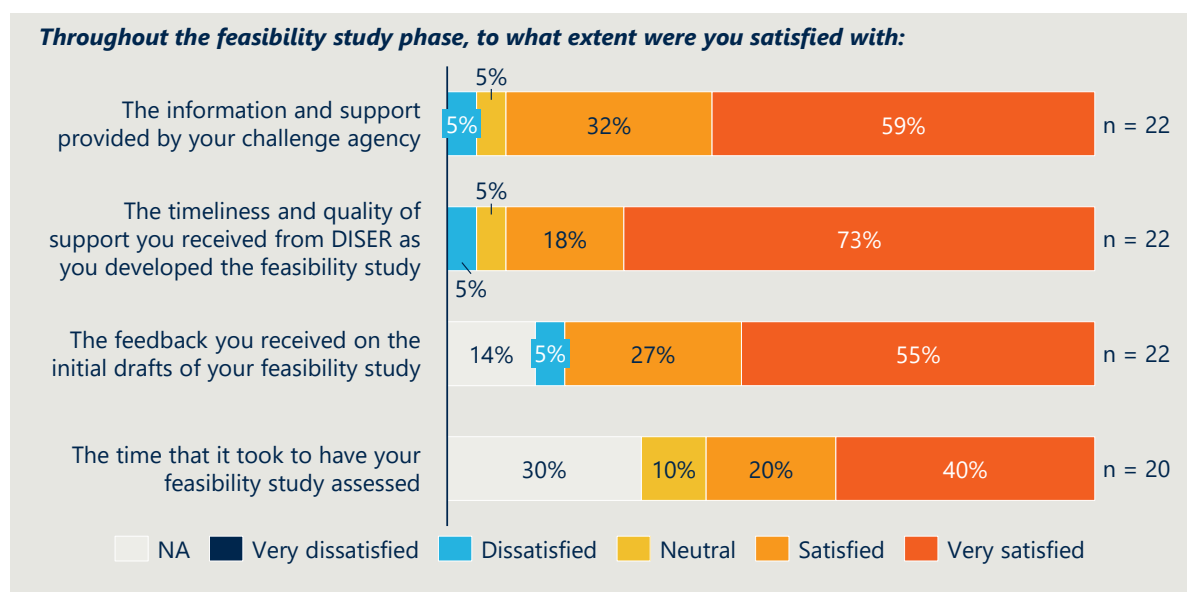
Overall, most SMEs and challenge agencies found their BRII experience rewarding and would recommend the program to other SMEs or agencies. This is true for most SMEs regardless of whether they progressed past the feasibility stage. However, some SMEs reflected that the BRII should put in place mechanisms to improve the buy-in and support from challenge agencies. Agencies also noted that their experience could be improved through better buy-in across their agency, alongside resources dedicated to the BRII projects. Both SMEs and challenge agencies highlighted the importance of some degree of post-proof of concept commercialisation support.

⁶⁶ Source: BRII Priority Sectors Round Evaluation, December 2020.

7.3.1 Most SMEs had a positive experience through the feasibility stage

Survey responses indicate that almost all the respondents (including SMEs that advanced to the proof of concept stage) were satisfied or very satisfied with all aspects of the information and support they received from their challenge agency and DISER. Many SMEs provided feedback that the program was generally well run and that the reporting requirements were clear and manageable. Figure 26 includes survey responses related to the SME experience of the feasibility study phase.

Figure 27 | SME experience throughout the feasibility study phase⁶⁷




Source: Feasibility and proof of concept SME surveys.

In interviews, some SMEs provided more constructive feedback on their experience. Many SMEs reported a lack of transparency and engagement with the EPC, who are a key decision maker on who goes through to the proof of concept stage. One SME also noted confusion as to what objectives had a higher weighting in assessing solutions, the program's public policy objectives or its commercialisation objectives. It is noted that the assessment criteria clearly state an equal weighting for the two objectives.

One suggestion was to provide SMEs the opportunity to engage with the EPC earlier in the feasibility stage, for instance through a mid-feasibility stage report, so they could get feedback from the final decision maker on their progress. This would also give the SMEs a clearer view of how the EPC use the assessment criteria when they judge what solutions should move through to the proof of concept stage.

⁶⁷ 13 feasibility respondents, nine proof of concept respondents for first three questions; 11 feasibility respondents, nine proof of concept respondents for first final question. NA responses refer to Priority Sectors SMEs that had not completed their feasibility stage.

A few SMEs highlighted that the competitive nature of the grant made some challenge agencies hesitant to engage with them. This reflects comments from challenge agencies about conflict of interest concerns that we explore further in Section 7.3.4.

<p>Quotes from respondents</p> 	<p><i>"The support we had was excellent and we could not have asked for more"</i> – Feasibility SME</p>	<p><i>"It would have been good to have the report feedback before the presentation rather than the other way around"</i> – Feasibility SME</p>	<p><i>"So far the team has made themselves available and responded readily to requests for information. If I was to suggest one thing it would be helping to provide better clarity on who the challenge decision makers are"</i> – Feasibility SME</p>
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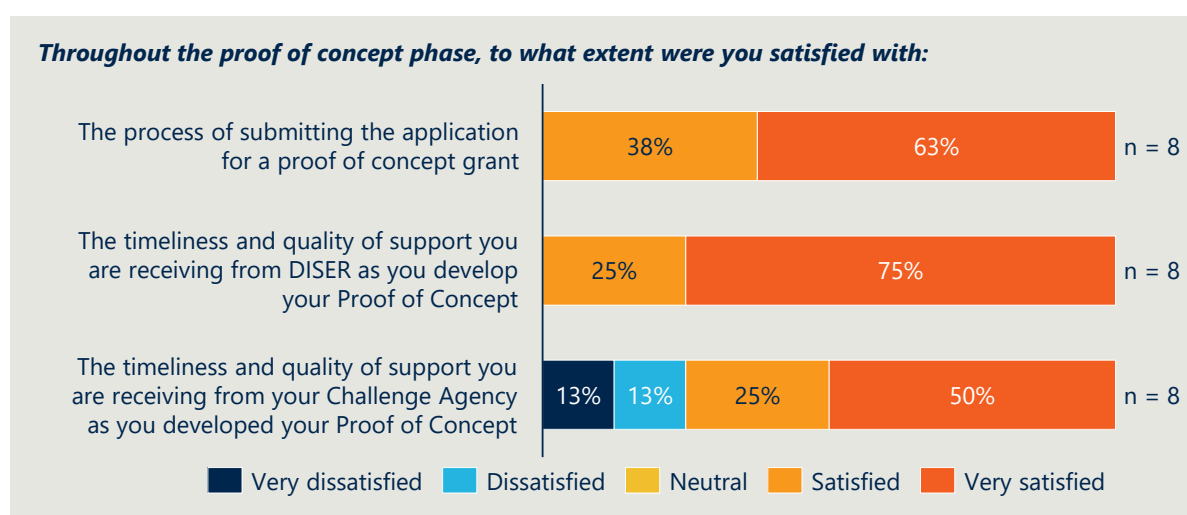
7.3.2 Proof of concept SMEs were generally happy with the program, but some had concerns about challenge agency support

Proof of concept SMEs were particularly positive about the support they received from DISER. Many SMEs called out the support they received from the BRII program manager as particularly valuable. SMEs particularly valued the mediator role DISER played to bridge any gaps in expectations between the SMEs and the challenge agencies. SMEs also appreciated the lengths DISER went to connect them to other programs, such as the Accelerating Commercialisation (AC) program, and potential government clients to support commercialisation beyond the BRII.

Some SMEs from round two did identify that recent changes in the BRII staff affected the quality of program support. This was mainly due to the loss of corporate knowledge that was held by the main BRII manager. One SME noted that it felt like the process became more about ticking boxes than supporting them through the final stages of the proof of concept stage. This highlights the importance of putting systems and processes in place that ensure a continuity of service when there is turnover in staff in the BRII team. Several SMEs also identified the opportunity to receive commercialisation support through a dedicated commercialisation adviser.


SMEs were mixed in their assessment of the support they received from their challenge agency. Although most survey respondents were satisfied or very satisfied, a small number of SMEs through both the survey and interviews highlighted inconsistent engagement during the feasibility and proof of concept stage. The SMEs attributed this to a lack of accountability placed on the challenge agencies. SMEs also highlighted that it was unclear whether agencies were committed to the implementation of their solution. Figure 27 includes survey responses related to the SME experience of the feasibility study phase.

Figure 28 | SME experience throughout the proof of concept phase



Source: Feasibility and proof of concept SME surveys.

A key driver of a poor SME experience with challenge agencies was high turnover of agency staff. Some SMEs felt that staff turnover acted as a drag on their progress through the proof of concept stage as they were forced to repeat themselves multiple times. One SME noted that it felt like they were starting from scratch each time their agency project manager changed. Staff churn is an inherent element of many government agencies, and the BRII should be designed to help SMEs and challenge agencies navigate this and the resulting uncertainty.

Quotes from respondents 	"Our experience with BRII has been overwhelmingly positive. We have had excellent support and encouragement during an extremely challenging business environment" – Proof of concept SME	What an amazing process this has been. Thank you to all involved!" – Proof of concept SME	"Ultimately, the impression we were left with is that the agencies that sponsored our challenge were not sufficiently committed to seeing through the implementation of the solution" – Proof of concept SME	"The management of the program was good, but the requirement placed on challenge agencies was lacking" – Proof of concept SME

7.3.3 Challenge agencies identified several opportunities to improve the challenge agency experience

Overall challenge agencies were positive about their experience with the BRII. All agency representatives interviewed said they would participate in the BRII again. Challenge agencies particularly valued the support and engagement that the BRII team provided throughout the feasibility and proof of concept stages.

Challenge agencies identified three main opportunities to improve the delivery of the BRII into the future. These are outlined in Figure 28.

Figure 29 | Challenge agency feedback on the BRII experience



Source: Challenge agency interviews

7.3.4 Both SMEs and challenge agencies identified an opportunity to extend the BRII support to a follow-on 'commercialisation' stage

Several proof concept SMEs face a funding and product development chasm at the completion of the BRII.⁶⁸

Across both round one and round two, many proof of concept SMEs described the end of the BRII as a cliff. This related to two main instances:

1. When the solution required further proof of concept support through a funded pilot that challenge agencies were not able to fund through traditional procurement channels.
2. When the challenge agency did not have the funding, capacity or will to procure their solution. This may have been due to poor timing regarding government budget cycles, lengthy government business case and procurement processes, no committed resources to support implementation post the BRII, or the challenge agency not being the primary customer for the solution.

A few SMEs noted that the commercialisation pathway post the BRII was up to 18 to 24 months longer than what it could have been if funding or other mechanisms were available to support further proof of concept pilots.

Proof of concept SMEs have had mixed experiences when referred to other government programs or agencies to support commercialisation.

Three proof of concept SMEs noted that applying to AC was a challenging process post-BRII, potentially because AC has a higher commercial readiness bar than the BRII. This may have resulted in a disconnect between SME expectations and outcomes. On the other hand, programs such as AC may be hesitant to provide post-BRII commercial support due to the novelty of the ideas and relative youth of some SMEs. One SME was told in their feedback that their solution had little commercialisation potential because it was too novel for government. This same SME now has a long-term government client.

Some proof of concept SMEs also spoke about difficulty getting traction with other agencies beyond their challenge agency when they had not secured a direct procurement from the BRII. Although the agencies were interested, they often cited the lack of a track record beyond the BRII as a main reason why they would not procure or pilot the solution. Better challenge design may address some of these issues.

Several SMEs and challenge agencies suggested a follow-on commercialisation stage could add significant value to the BRII. A follow-on commercialisation stage would align with the ISC in Canada and the US SBIR model. ISC has a third phase (Pathway to commercialisation), which is largely a formalisation of the post-proof of concept procurement activities. A similar model is in place in the US SBIR, where agencies provide commercialisation support in Phase III. This may include procurement of the solution developed in Phase II.

⁶⁸ Sources: SME Interview, SME Surveys, Challenge Agency interviews.

DISER could take a similar approach for the BRII to address the funding and product development chasm that some SMEs faced post proof of concept. Some suggestions on how this could work included:

- A similar application process as is required for progress from feasibility to proof of concept.
- The opportunity for the SME or challenge agency to include co-sponsors to support the application for further funding.
- Co-contributions from sponsoring agencies; challenge agencies could be asked to allocate funding for a follow-on commercialisation stage when they apply to the BRII.
- A flexible amount of funding that can be accessed for a time-bound period (e.g., for one year post proof of concept).

7.4 DISER should consider eleven recommendations to improve the current delivery of the BRII.

Irrespective of the BRII's future scale, there are a variety of changes that should be made to the design and delivery of the program. These recommendations are based on the findings outlined in earlier sections and reflect the feedback of challenge agencies, SMEs and DISER stakeholders. They are presented overleaf according to the phase of the BRII to which they relate, or separately where the recommendation cuts across various aspects of the program.



Recommendations

Challenge design	Supporting findings
<p>1. Explore opportunities to streamline and improve the BRII marketing and engagement processes for SMEs and challenge agencies – for example through:</p> <ul style="list-style-type: none">• Embedding challenge communication capabilities within the participating agencies (e.g. through the Portfolio Liaison Officers).• Developing guidance and templates to streamline and quality control the development of marketing and engagement materials.• Expanding the reach and visibility of the BRII across federal government departments and agencies through a targeted communications campaign for government agencies or the use of the BRII challenge agency account managers.	<p>There is still substantial opportunity to extend the reach of the BRII across more government departments and agencies. Across the Australian Government there are over 150 potential agencies or departments that could participate in the BRII. A potential area for expansion is to support the Australian Government's national priorities.</p>
Feasibility	Supporting findings
<p>2. Develop an SME engagement framework and accompanying guidance for challenge agencies. The framework and guidance should support challenge agencies to manage real and perceived probity concerns when working with multiple SMEs.</p>	<p>Several challenge agencies highlighted concerns that the BRII design, which is in effect a competitive grant, created potential perceived conflicts of interest in how the agencies engaged with the SMEs.</p>
<p>3. Provide SMEs the opportunity to engage with the Entrepreneurs' Programme Committee (EPC) (or whichever body oversees future assessments). This could occur through a mid-feasibility stage presentation to increase transparency and allow SMEs to receive feedback from the project's final decision makers.</p>	<p>Many SMEs felt that they had little practical understanding of the criteria the EPC used to assess their feasibility round applications. Some SMEs told us that they would have benefited from early engagement with the</p>

	EPC so they could have adapted their approach to better meet the requirements.
Proof of concept	Supporting findings
<p>4. Consider changes to the design of the BRII to encourage collaboration between complementary feasibility SMEs in the proof of concept phase. Both SMEs and challenge agencies highlighted the opportunity for higher impact solutions through collaboration in certain cases. However, changes will need to carefully consider how collaboration will impact on probity concerns, the development, ownership and commercialisation of any resulting IP. DISER should also test whether collaboration is likely to produce a higher quality solution.</p>	Some challenge agencies and SMEs observed circumstances in which different SMEs had complementary solutions. They remarked that there was an opportunity for the BRII to consider collaborations between SMEs in cases when solutions were complementary and together had a higher likelihood of solving the challenge.
<p>5. Provide participating SMEs with better access to information on government procurement processes - for example through tailored factsheets, briefings, webinars or other resources - to help SMEs navigate procurement with their challenge agency or other government agencies. This could be delivered through the challenge agencies based on guidance from the Department of Finance.</p>	Some SMEs found it difficult and confusing to navigate procurement processes. Many challenge agencies highlighted that government decision-making and procurement processes were areas for participating SMEs to improve their knowledge.
<p>6. Improve support for commercialisation during and after the proof of concept phase through:</p> <ul style="list-style-type: none"> • Offering access to commercialisation coaches during the proof of concept phase to mitigate the risk of SMEs developing bespoke products with limited commercialisation potential post-BRII. The BRII could leverage DISER's broader advisor network or provide incubation style support through an external provider. • Creating a dedicated stream of funding to support post-BRII commercialisation pilots for eligible proof of concept SMEs. 	Across both round one and round two, many proof of concept SMEs described the end of the BRII as a cliff. A few SMEs noted that the commercialisation pathway post-BRII was up to 18 to 24 months longer than it could have been if funding or other mechanisms were available to support further proof of concept pilots.

<ul style="list-style-type: none"> • Providing the opportunity for other government departments and agencies not affiliated with the challenge to apply as co-sponsors for post-BRII commercialisation pilots. DISER could develop guidance materials or play an active role to identify and encourage co-sponsors. 	<p>One SME suggested co-sponsors could be included to support the follow-on commercialisation stage.</p>
Whole of program	Supporting findings
<p>7. Increase the efficiency and effectiveness of governance and administrative arrangements through:</p> <ul style="list-style-type: none"> • Embedding a clear approach and rhythm of information sharing between the BRII policy and program teams to drive continuous improvement. • Clarifying the different roles that the EPC play (e.g. assessing challenges and SME applications vs providing commercialisation advice to DISER) and then updating governance arrangements accordingly. For example, DISER could engage EPC members to provide commercialisation support directly to challenge agencies in addition to their assessment role. 	<p>Stakeholders identified the opportunity for tighter collaboration between the BRII policy team, program team and the EPC across the three stages of the BRII. Stakeholders identified the benefit of faster feedback loops to improve the design and delivery of the BRII. EPC members also identified scope creep as a key concern as the BRII has evolved over time. This included more requests for commercialisation advice separate to their assessment role.</p>

<p>8. Explore avenues to increase challenge agency buy-in to the BRII projects – for example through requirements for financial co-contributions, allocated budgets for implementation or dedicated resources within agency budgets. This should also help mitigate the impact of staff turnover in challenge agencies on the SME experience and program outcomes. Additionally, DISER should consider how it can ensure the effective handover of information and relationships when there is the inevitable staff turnover.</p>	<p>There are currently varying levels of engagement and buy-in across challenge agencies. Both SMEs and challenge agency delivery staff noted that poor engagement and buy-in had negative impacts on their experience.</p>
<p>9. Build on current project related data collection and develop ongoing program related data collection to measure the experience, outcomes and impact of the BRII for participating SMEs and challenge agencies. The ongoing, systematised collection of data will support ongoing program improvements and future evaluations. DISER could use the surveys and interview guides developed to support this evaluation as a starting point.</p>	<p>Throughout the evaluation, it was clear that DISER had not collected formal data from SMEs and challenge agencies on their experience with the BRII program. This evaluation developed bespoke survey and interview data collection tools to fill these data collection gaps. DISER had collected some data on round one SME and challenge agency outcomes, however, this was through ad hoc processes and not a formal monitoring data collection approach.</p>
<p>10. Build a longitudinal dataset of the BRII participants to demonstrate the program’s impact on business performance and their spill over effects. This should include:</p> <ul style="list-style-type: none"> • Maintaining the CBA model (and relevant guidance material) completed for this evaluation and integrating more SMEs into the CBA model across subsequent rounds, starting with round two SMEs. • Exploring the ongoing use of the datasets developed through the evaluation to create a 	<p>There is an opportunity to extend the above methodology so that an increasingly robust evidence base for the costs and benefits of the BRII can be developed over time. The BRII policy and program teams could work closely with the Evaluation and Research Branch of DISER to engage challenge agencies and SMEs to collect the right data to support the CBA model.</p>

<p>synthetic 'control group' for CBAs of future rounds.</p>	
<p>11. Develop a benefits realisation framework to monitor the benefits realised through successful challenge solutions. The benefits realisation framework should be flexible so that it can capture the outcomes of the BRII solutions across the various challenges. DISER should consider providing targeted support to challenge agencies to use the benefits realisation framework to develop approaches to measure the impact of the successful BRII solutions over time.</p>	<p>To measure the impact of the BRII solutions required longitudinal data that shows the benefits and costs of the various solutions. Due to the unavailability of data or the immaturity of some solutions the evaluation could only provide a high-level assessment of the benefits for three of the ten round one solutions. All three of the quantified solutions are also in the early stages of commercialisation. This limited the quantified benefits, which are expected to increase over time if the solutions continue to gain commercial traction.</p>

8. The future of the BRII



Summary of findings

The findings of this evaluation support the scale-up of the BRII to increase its reach and impact

- **The opportunity to scale-up the BRII is large.** Similar programs in the USA, UK and Canada are between 12 and 53 times larger than the BRII in terms of annual spend, relative to GDP. If the BRII were to reach the same size as the Canadian program it could support over 140 SMEs to solve roughly 35 challenges per year.
- **The evaluation has identified four areas for consideration to scale-up the BRII.** The government should focus on the BRII's funding arrangements, the delivery of the program, how challenge agencies are supported and engaged, and how SMEs are supported and engaged.
- **There are different funding options to expand the BRII.** DISER could set broad expenditure targets and support agencies and departments to engage in the BRII to reach the target expenditure, like the approach taken in the UK. However, this approach in the UK has often led to missed targets. A more effective model is to mandate targets as a proportion of a portfolio's annual operating and capital budget. This is like the approach taken in Canada and the USA.
- **The BRII delivery will need to evolve to enable greater scale.** Current governance and management arrangements will need to change, for example through new EPC committee arrangements and a centralised governance, administration and policy unit. The program will also need to increase the frequency and nature of challenges; a rolling challenge model is typical in other comparable programs. Workflows and manual processes will also need to be streamlined and automated. A dedicated online portal, like the one ISC uses, could support this and other efficiencies.
- **Australian Public Service capacity and capability will need to improve to support a scaled-up BRII.** New embedded roles across participating portfolios that support the administration of the BRII can help to address current workload issues and help to deliver more challenges. Similarly, capability uplift in commercialisation assessment to help the assessment and delivery stages is critical to support a scaled-up BRII. Such uplift may involve the use of dedicated commercialisation advisers.

New approaches to SME engagement and support will enable greater scale. A pillar of the BRII's success is the quality of participating SME's. This requires focus on early and effective communication to garner interest from the right businesses. This is even more critical as the BRII will need to reach up to 1000 applicants per annum if it is to achieve similar scale to the ISC.

Maintaining quality alongside growth is challenging and will require an efficient and effective SME engagement approach. Maintaining positive SME outcomes and impact, as shown through this evaluation, will also require greater support for SMEs to understand both government procurement requirements and commercialisation pathways.

8.1 The findings of this evaluation support the scale-up of the BRII to increase its reach and impact

One of the purposes of this evaluation was to inform a decision on whether the Government should scale-up the BRII. This evaluation was also asked to provide views on future models to support scaling up the BRII.

This evaluation found that the BRII has achieved its dual objectives, creating significant value for government agencies and helping Australian SMEs to innovate and grow. This evaluation has also found that the BRII has delivered a substantial net economic benefit to Australia based on the impact of round one SMEs. This evaluation therefore recommends that the Government consider scaling up the BRII to increase its reach and impact.

It is also important to note that the BRII is one of the few demand side levers that Government can use to stimulate business innovation and is therefore an important and unique part of the Government's suite of innovation programs. Industry Innovation Sciences Australia (IISA) recommended in 2020 that, where appropriate, government leverage its procurement of products and services to promote a more innovation-oriented response from business and build business capability. IISA particularly noted the need to focus on procurement policy that can deliver innovative solutions for government and growth opportunities for innovative firms.⁶⁹

This IISA recommendation also aligns with the recent Department of Education, Skills and Employment discussion paper to support the design of the University Research Commercialisation Scheme (URCS).⁷⁰ The consultation paper highlights both challenge-based research and stage gated scheme design as two important factors to support innovation. The BRII has shown itself to be a model that can successfully leverage both factors to deliver significant value. However, any decision to scale-up the BRII must consider how it will augment other focus areas for government, such as the URCS.

This section first looks to the experience of the BRII's international comparators to clearly understand the substantial opportunity at hand. It then outlines important scale-up considerations to support DISER and its partners across four key areas of focus: funding, program delivery, APS agency engagement and support and SME engagement and support.

⁶⁹ Industry Innovation and Science Australia, 2021, Driving effective Government investment in innovation, science and research.

⁷⁰ Department of Education, Employment and Skills, 2021, University Research Commercialisation consultation paper.

8.1.1 The opportunity to scale-up the BRII is large

Comparative international programs are many times larger than the BRII.

The three main comparison programs are the SBIR program in the USA, the SBRI in the UK and ISC in Canada. The US SBIR is the oldest and largest program. Although much younger, the ISC has a larger budget than the older UK SBRI when scaled to GDP size. A comparison of the scale of the three international programs is provided in Table 10 overleaf. More detail on each program is provided in Appendix A.

Table 11 | Comparison of BRII funding size with international CBI schemes

	US - SBIR	UK - SBRI	Canada - ISC	BRII
Year established	1982	2009	2017	2016
Program size p.a. (AUD)⁷¹	\$4.5 billion ⁷² (2019)	\$145 million ⁷³ (2015)	\$120 million ⁷⁴ (2020)	\$4 million (average) ⁷⁵
Program size scaled to AUD GDP⁷⁶	\$316 million	\$72.8 million	\$100 million	N/A
Comparative size to BRII based on GDP	52.7x larger	12.1x larger	16.7x larger	N/A

In its third year of operation the ISC awarded \$20.6 million of a total budget of ~\$120 million AUD to Canadian SMEs through the challenge stream. According to DISER stakeholders, ISC achieved this scale by taking the best features of each of the current programs, including the BRII. A unique aspect of the ISC is the inclusion of a testing stream, which prequalifies late stage (pre-commercial) prototypes with government agencies willing to test the prototypes and provide feedback to the SMEs. SMEs that complete the challenge stream have streamlined access to the testing stream, effectively extending support to a third stage.

⁷¹ Exchange rates as of 4 June September 2020: A\$1.38 to US\$1; A\$1.05 to CAD\$1; and A\$1.79 to £1.

⁷² Source: <https://www.sbir.gov/sites/default/files/Eastern%20Road%20Tour%20Combined.pdf>

⁷³ Source: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/669605/Leveraging_Public_Procurement_David_Connell_report.pdf.

⁷⁴ Source: [https://www1.ic.gc.ca/eic/site/101.nsf/vwapj/00129_en.pdf/\\$FILE/00129_en.pdf](https://www1.ic.gc.ca/eic/site/101.nsf/vwapj/00129_en.pdf/$FILE/00129_en.pdf). This figure only includes the funding allocated to the Challenge Stream, which is directly comparable to the BRII. The ISC also includes a testing stream that prequalifies late-stage (pre-commercial) prototypes developed by Canadian companies of all sizes and then matches them with federal government organizations willing to test them and provide feedback to these firms. The testing stream has an additional budget of \$33.5 million CAD.

⁷⁵ This figure is averaged out, based on approximately \$12m per round of BRII every second year. This calculation is repeated based on *A demand side approach to stimulate business innovation in Australia*.

⁷⁶ 2018 figures used; Australia GDP = US\$1.434 trillion; US GDP = US\$20.54 trillion; Canada GDP = \$US1.713 trillion; and UK GDP = \$US2.855 trillion. Based on analysis conducted in *A demand side approach to stimulate business innovation in Australia*.

The BRII will need to significantly expand if it is to reach a similar scale to comparative international programs.

A major focus of this evaluation is to consider how the design of the BRII might change if it were scaled up. The ISC is a good case study against which to compare the future scale-up of the BRII as it has the same program design yet is both younger and larger than the BRII. In just over two years between December 2017 when it launched and March 2020 the ISC:

- Launched **70 challenges** (42 challenges in year 1 and 28 challenges in year 2); this is considerably more than the **15 challenges** the BRII has completed or started since 2016.⁷⁷
- Assessed **~1,082 applications** (717 applications in year 1 and 365 in year 2); both figures are considerably higher than the **221 applications** the BRII team processed for round three.
- Has engaged **17 challenge agencies**, with 11 agencies releasing three or more challenges; this compares favourably with the **fourteen challenge agencies** that have participated across the first three rounds of the BRII.
- Has engaged over **140 SMEs**, that have received 154 phase 1 (feasibility) grants and 24 phase 2 (proof of concept) grants; this compares with **55 SMEs** that have received 58 feasibility grants and 15 proof of concept grants in the BRII to date.





These numbers highlight the significant increase in capacity that the BRII will need to undertake to achieve comparable scale with the ISC.

8.1.2 The evaluation has identified four areas for consideration to scale-up the BRII

The four focus areas, described briefly in Table 11, will be discussed in greater detail in this section. Each area has its own considerations and potential solutions as outlined by participating SME's, challenge agencies and government stakeholders, as well as research on international schemes. It is important to note that during the evaluation, the RegTech round (round four) was launched with a different design to the other BRII rounds. Of particular importance is the "sponsored" nature of the round. The other policy team within DISER has provided the funding for the round.

⁷⁷ Each round is currently conducted approximately every 18 months to two years.

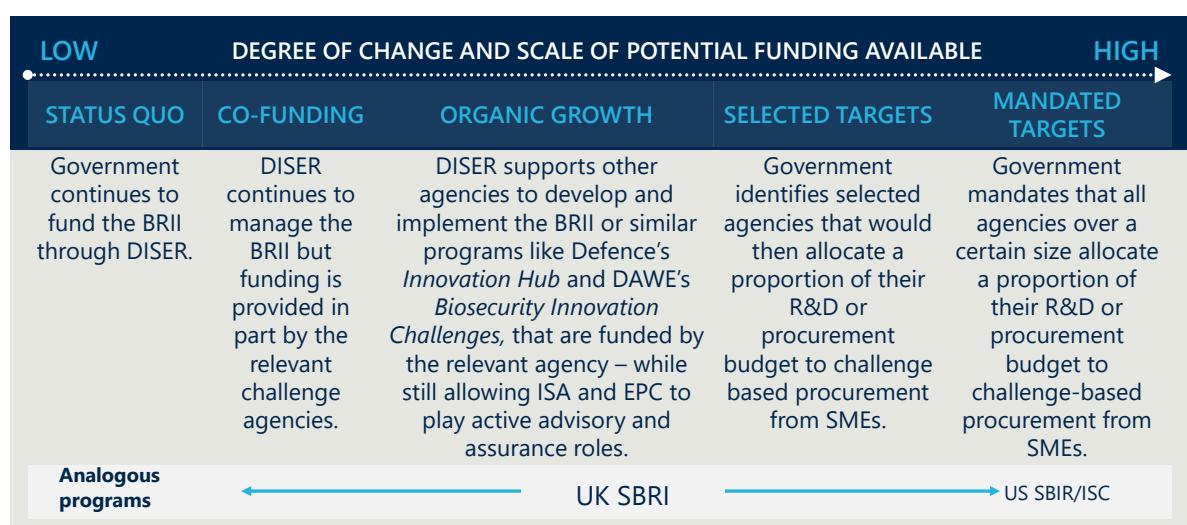
Table 12 | Four areas for consideration to scale-up the BRII

 <p>There are different funding options to scale-up the BRII.</p>	<p>Section 8.1.3 outlines the various options that DISER can consider to fund the scale-up of the BRII, using lessons from international experience. This ranges from models with a low degree of change and scale of potential funding available (the status quo) to a high degree (mandated targets). It also includes analysis of the potential expansion pathways for the BRII, using the experience of the ISC and US SBIR as benchmarks.</p>
 <p>BRII program delivery will need to evolve to enable greater scale.</p>	<p>Section 8.1.4 outlines considerations for changes to the BRII program delivery across three critical areas:</p> <ul style="list-style-type: none"> • Governance arrangements • The frequency and nature of challenges • End-to-end workflow
 <p>APS capacity and capability will need to improve to support a scaled-up BRII.</p>	<p>Section 8.1.5 outlines two opportunities to facilitate challenge agency success in a scaled-up BRII:</p> <ul style="list-style-type: none"> • Increase challenge agency capacity through dedicated portfolio resources • Improve challenge agency capability through tailored support roles
 <p>New approaches to SME engagement and support will enable greater scale.</p>	<p>Section 8.1.6 outlines three opportunities to scale-up SME engagement and enhance support:</p> <ul style="list-style-type: none"> • A streamlined and distributed SME marketing and engagement approach • Support SMEs to understand government procurement and commercialisation pathways • Create a follow-on commercialisation stage for proof of concept SMEs

8.1.3 There are different funding options to expand the BRII

Options for funding a potential expansion of the BRII range from the Australian Government continuing to fund the program through DISER to the introduction of whole-of-government targets – as per the US SBIR and ISC models. A high level summary of potential models is provided in Figure 29 – ordered by degree of change from the status quo and scale of the potential funding that would be available to the BRII.

Figure 30 | Continuum of CBI program funding models



The 2018 post-commencement evaluation focused on lessons from the UK's experience managing the SBRI. Since then, Innovate Canada has rapidly launched ISC, which has achieved significant scale in a very short timeframe. A key driver of its success has been a mandated one per cent R&D spend from the 20 participating agencies, effectively guaranteeing available funding of \$120 million AUD p.a. This mandate was based on the collective experience of the US SBIR approach, which has successfully mandated agency funding contributions, and the UK SBRI approach, which had poor uptake when it first launched due to limited mechanisms to achieve agency buy-in. The UK SBRI was re-launched in 2009 with non-mandatory agency expenditure targets, which on the one hand increased agency participation but on the other hand have been missed on multiple occasions.⁷⁸

In other jurisdictions, targets are typically set based on departmental or portfolio R&D budgets – but these do not exist in the same way for Australian Government bodies. The BRII targets could instead be based on annual operating and capital budgets, procurement budgets or a weighting based on the agency's R&D intensiveness.

International comparators provide benchmarks against which to plan the expansion of the BRII.

The BRII has not grown significantly since its inception, awarding \$20.4 million in funding across the first three rounds. This amounts to an average annual spend of \$4.08 million across the last five years. In comparison, the SBIR grew rapidly from its inception (1983) over the next ten years, with a compound annual growth rate (CAGR) of 34 per cent.^{79,80} Although only two full years into its existence, the ISC has dispersed \$6.6 million AUD⁸¹ to SMEs in year one and \$14.7

⁷⁸ Sources: DISER (2020), A Demand Side Approach to Stimulate Business Innovation in Australia; Program and policy team interviews; EPC interviews; desktop research into international comparison programs.

⁷⁹ The CAGR has been calculated after converting SBIR grant allocations from US dollars to Australian dollars and then normalising the annual spend according to GDP. 2020 estimated GDP figures used from International Monetary Fund: USA = \$30.6T AUD, AUS = \$2.1T AUD, CAN = \$2.5T AUD. Source: <https://bit.ly/37vfiGd>

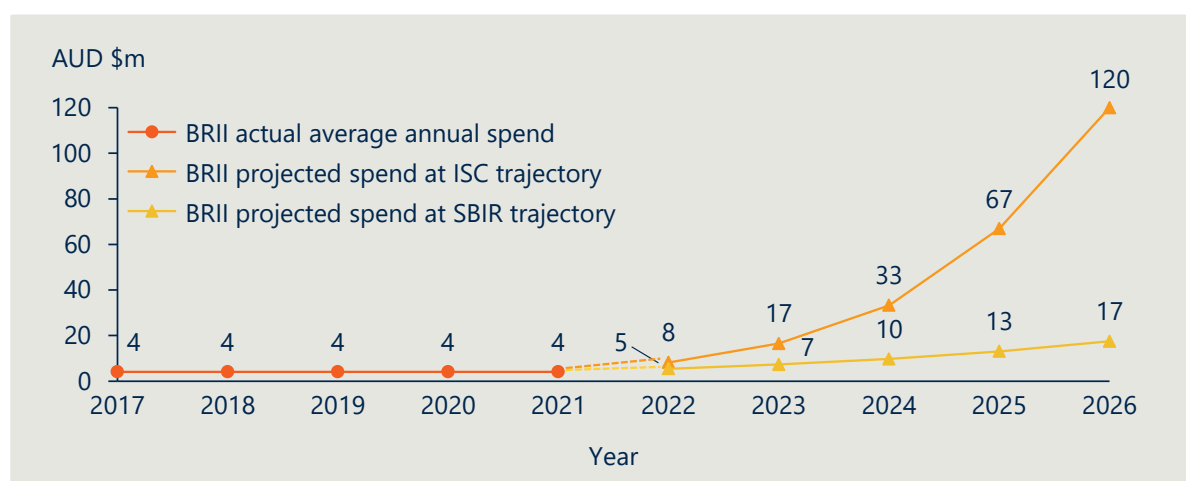
⁸⁰ SBIR data source: SBIR Analytics Dashboard, <https://www.sbir.gov/analytics-dashboard>

⁸¹ 9 August 2021 conversion rates used: 1 CAD = 1.08 AUD, 1 AUD = 0.74 USD.

million AUD to SMEs in year two⁸². This amounts to a growth rate of over 120 per cent between year one and year two. The long-term goal is to scale the ISC to its mandated spend target of \$120 million AUD per annum. If the ISC maintains a similar growth rate it could reach the mandated spend target within five years.

Figure 30 shows the average yearly spend for the BRII across the first five years of operation. It then plots two potential expansion pathways: the first is in line with the projected growth trajectory of ISC; the second is in line with the actual growth trajectory of the SBIR across its first ten years of operation.

Figure 31 | Expansion pathways of the BRII based on other CBI programs



As shown above, the potential expansion pathways of the BRII are significantly different based on the varying experience of the ISC and SBIR. Using these examples as benchmarks, the BRII could follow one of three potential expansion pathways: the ambitious expansion pathway of the ISC; the moderate but steady expansion pathway of the SBIR; or a middle ground. Following the aggressive growth plan of the ISC would result in annual spend of \$100 million by 2026. Following the moderate trajectory experienced by the SBIR would see the BRII reach \$17.5 million in annual spend by 2026.

Table 12 explores these expansion pathways in more detail, including the addition of administrative costs equal to 17% of grant funding. This is based on the approximate spend of \$0.86 million per annum of program administration in each of the first four⁸³ years of the BRII. The sum of the administrative cost over the five-year period is shown at the bottom of the table.

Table 13 | Expansion pathways for the BRII based on international comparators

Year	Annual grant spend at ISC rate (\$AUD)	Annual grant spend at SBIR rate (\$AUD)
2022	\$8m	\$5m

⁸² Source: ISC Annual Report, 2019-20, <https://www.ic.gc.ca/eic/site/101.nsf/eng/00129.html>

⁸³ Program administration data was only available for the first four years. This average spend was calculated based on the first four years of the BRII's operation and extrapolated to the fifth year.

Year	Annual grant spend at ISC rate (\$AUD)	Annual grant spend at SBIR rate (\$AUD)
2023	\$17m	\$7m
2024	\$33m	\$10m
2025	\$67m	\$13m
2026	\$120m ⁸⁴	\$17m
Total estimated administration cost over five years	\$42m	\$10m

8.1.4 The BRII delivery will need to evolve to enable greater scale

Although the BRII has achieved its objectives across the first three rounds, this has been at a much smaller scale than international comparison programs. No matter what expansion pathway the BRII takes, DISER will need to consider several changes to program delivery. The main areas for consideration are outlined below.⁷⁸

Governance arrangements should be modified to allow for the assessment of more applications and challenges.

The role of IISA and the EPC will need to change considerably. Options flagged in section three include:

- Creating a new, dedicated subcommittee or forming “teams” of committee members to run expert review panels.
- De-centralising assessments to challenge agencies with support from individual EPC members.
- Professionalising the role through dedicated commercialisation advisers.

An expanded BRII will require a centralised governance, administration and policy unit to ensure a consistent approach across portfolios. This could be a BRII delivery unit formed within DISER that effectively combines what is the current BRII policy and BRII program teams. For comparison, the US SBIR, UK SBRI and ISC all have central administrative teams. The exact role and responsibility of a BRII delivery unit will depend on the final model.

The frequency and nature of challenges must change to reach comparable scale to international programs.

The frequency of challenges will need to increase considerably. To manage the increased frequency of challenges the comparison international programs release challenges on a rolling

⁸⁴ Spend based on ISC trajectory was capped at \$120m AUD, in line with ISC’s \$113m CAD cap.

basis across the year. This is different to the current approach of four to five challenges per round on a biannual basis. DISER may also consider changes to make the amount of grant funding more flexible to the specific nature of a challenge. To justify increased reach and scale of the BRII, challenges themselves should also continue to be carefully chosen and designed to produce high quality outcomes for agencies.

End-to-end workflow will need to be efficient and fit for purpose.

To support the volume of applications and the management of grant funding DISER will need to consider how it can streamline and automate current processes. Critical to this will be an online portal and end to end workflow system that simplifies and reduces any manual handling. According to DISER stakeholders, the ISC platform is best practice. The ISC platform manages the whole challenge process, including developing challenges, assessment, and managing grant agreements and reporting requirements. The ISC platform was custom built. From discussion with DISER staff, current systems, such as the DISER Business Grants Management System and the Ask the Market platform on the Australian Government Digital Marketplace, do not provide the full suite of functions to realise the benefits of a custom-built system.

8.1.5 Australian Public Service capacity and capability will need to improve to support a scaled-up BRII

Stakeholders across DISER, IISA and challenge agencies identified the need to embed an innovative culture across Australian Government departments and agencies to ensure the success of a scaled-up BRII. Specifically, stakeholders identified the need to increase the capacity of agencies to deliver the program and to improve the capability of agencies to implement CBI. Stakeholders suggested two important approaches to achieve this. Each is explored below.⁸⁵

Increase Australian Public Service (APS) capacity through dedicated portfolio resources.

As outlined in Section 7.3.3, one of the key challenges for challenge agencies was the lack of allocated resources to deliver the BRII activities. A scaled-up version will need to include design features that ensure challenge agencies provide the right amount of time and effort throughout the challenge period.

One suggestion was the use of Portfolio Liaison Officers that provide dedicated administrative support and act as a point of contact between the challenge agency teams participating in a challenge and the central BRII team. This is like other international programs. The US SBIR mandates that each participating agency has an SBIR lead and a supporting team to run the program. The UK SBRI and ISC provide greater flexibility for agencies to choose the best approach, but still expect dedicated portfolio resources to implement their programs from within the respective government agencies and other agencies.

⁸⁵

Improve APS capability through tailored support roles.

Challenge agencies valued the role that the EPC played to build their capability when it came to the commercialisation lens of the BRII. A scaled-up program will need to create new roles so that this support can scale across a larger number of challenge agencies and challenge rounds.

One approach that other international programs have used successfully is through dedicated account managers. The ISC team have 'account managers' who work with each portfolio on iterating the challenge statements. The SBRI team within Innovate UK also uses 'account managers' to work with agencies on the uptake of SBRI and CBI approaches more broadly. The type of support mirrors that of the ISC account managers with the addition of support to release and promote challenge statements and assess grant applications.

Some stakeholders also identified the opportunity to use dedicated commercialisation advisers (highlighted on page 44) to support capability uplift in challenge agencies (and the APS more broadly). One suggestion was to look at the AC Facilitator role as an example, but with a focus on supporting challenge agencies better understand the commercial potential of solutions across each stage of the BRII.

8.1.6 New approaches to SME engagement and support will enable greater scale

Attracting and then supporting high quality, innovative SMEs is central to the success of the BRII. As outlined in Section 8.1.1, a scaled-up BRII equivalent to the current Canadian ISC program size will need to reach roughly 550 applicant SMEs across 35 challenges and engage over 150 SMEs through feasibility and into proof of concept across every year. DISER will need to build on the lessons learned from the first three rounds to ensure any changes will need to both meet higher demand and maintain strong program outcomes. There are three things that DISER should consider to scale-up SME engagement and enhance SME support.⁷⁸

Develop streamlined and distributed SME marketing and engagement approach.

The successful marketing and engagement approach used for round three was resource intensive, costing close to \$150,000 across direct advertising costs (such as paid search and social media advertising) and professional services costs. Most of the spend related to engagement between challenge agencies and the contracted marketing firm to tailor materials. A scaled-up BRII should consider the following opportunities to streamline and distribute the marketing and engagement approach:

- Embed challenge communication capabilities within the participating agencies (e.g. through the Portfolio Liaison Officers) or the central BRII team (e.g. through account managers).
- Develop guidance and templates to streamline and quality control the development of marketing and engagement materials.
- Use a central online platform for SMEs to create a database of potential applicants and deliver direct communications for relevant challenges. For example, the ISC platform

includes a section for 'innovators' where SMEs can register their interest in the overall program and specific challenges.

Support SMEs to understand government procurement and commercialisation pathways.

Some SMEs identified that they had a knowledge gap regarding government procurement processes. For example, more than one SME highlighted that they were unaware of panel requirements until late in the proof of concept stage. One suggestion was to provide government procurement FAQs, information packages or webinars to BRII participants early in their participation.

Other SMEs that had limited commercialisation experience, particularly with government clients, identified an opportunity to get dedicated support from commercialisation advisors. The BRII could leverage DISER's broader advisory network to support BRII participants. DISER could also consider incubation style support through an external provider. For example, DAWE partnered with the Canberra Innovation Network to support the Biosecurity Industry Innovation Challenge. A scaled-up version would need to carefully consider the most efficient way to provide commercialisation support.

Create a follow-on commercialisation stage for proof of concept SMEs.

Section 7.3.4 highlighted that SMEs and challenge agencies identified the opportunity to extend support for proof of concept SMEs into a post-BRII commercialisation pilot. This is consistent with similar but larger programs such as the ISC, which includes a testing stream that provides funding to support pre-commercial pilots. The ISC has adapted its processes and reporting requirements for the challenge stream to support relevant SMEs to access funding through the testing stream. The US SBIR also includes optional non-SBIR funding for further development and commercialisation.

Access to post-BRII commercialisation funding for eligible SMEs can help to amplify the impact of the BRII as it scales. Implementing recommendation 6, which identifies options to improve support for commercialisation during and after the proof of concept, is also important as the BRII scales.

8.2 DISER should consider three recommendations to scale-up the BRII

The three recommendations cover funding and changes to program design and implementation. These recommendations are based on the proven experience of comparable international programs and the context of the BRII (see overleaf).



Recommendations

Scale-up	Supporting findings
<p>12. Consider expanding the scale of the BRII and the potential impact of a larger BRII program. The Australian Government can use the ISC example to provide a yardstick on the potential size and pace of the scale-up. If the Australian Government chooses to scale the BRII it should identify a clear target within a defined period that allows for a steady scale-up of the program.</p>	<p>The BRII has achieved strong outcomes that are comparable to the larger US SBIR and a return on investment comparable to the larger UK SBRI. This shows the potential for the BRII to achieve the same outcomes it has so far but at a much larger scale. The ISC program should be used as a good benchmark to consider how much larger the BRII could become as it has reached a much larger scale than the BRII in a short timeframe.</p>

13. Identify the right funding model to scale-up the BRII and support agency buy-in. The Australian Government should consider several funding approaches, including but not limited to:

- Setting aside a small percentage of each portfolio's annual operating and capital budget for CBI. The percentage of allocated budget could start low and increase over time based on an agreed process to review the scale and timing of the funding.
- Setting portfolio specific targets for either expenditure or number of challenges. In both cases the targets could again start low and increase over time.
- Increasing the funding currently available and administered through DISER for other agencies to access through the BRII challenge application process.

The chosen funding model should support a defined expansion pathway. The Australian Government could consider three potential expansion pathways:

- An ambitious pathway modelled off the experience and ambitions of the ISC.
- A moderate and steady pathway modelled off the early expansion of the US SBIR.
- A middle ground expansion that sits between the moderate and ambitious pathways.

There are a range of potential funding approaches for the BRII. The experience of the US SBIR and the ISC program from Canada support mandated targets. Both programs have achieved broad agency buy-in and substantial funding commitments through this funding model. However, the chosen funding model needs to support the Australian context.

The US SBIR and the ISC also offer good benchmarks for the Australian Government to consider what expansion pathway is possible for the BRII. This ranges from a moderate scale up through to a fast paced and ambitious scale up.

14. Develop the systems, processes, capability and capacity to scale-up the BRII. This should include:

- Using an online platform that can act as a database of potential applicants, deliver direct communications for relevant challenges and streamline and automate the end-to-end workflow from challenge application and SME application through to the delivery of the feasibility and proof of concept stages. The online platform could be modelled on the ISC platform that has enabled rapid scale-up in a small amount of time.
- Transitioning to a rolling challenge model to increase the frequency of challenges and the flexibility for challenge agencies.
- Creating new program delivery roles – including Portfolio Liaison Officers embedded in challenge agencies and DISER central BRII program account managers - to increase challenge agency capacity and capability.
- Implementing a new model to engage the EPC (or equivalent) across a larger number of challenges. The new model should leverage the online platform to streamline the assessment process.

Critical to scale-up will be an online portal and end to end workflow system that simplifies and reduces any manual handling. According to DISER stakeholders, the ISC platform is best practice. The ISC platform manages the whole challenge process, including developing challenges, assessment, and managing grant agreements and reporting requirements.

Further, to manage the increased frequency of challenges the comparison international programs release challenges on a rolling basis across the year.

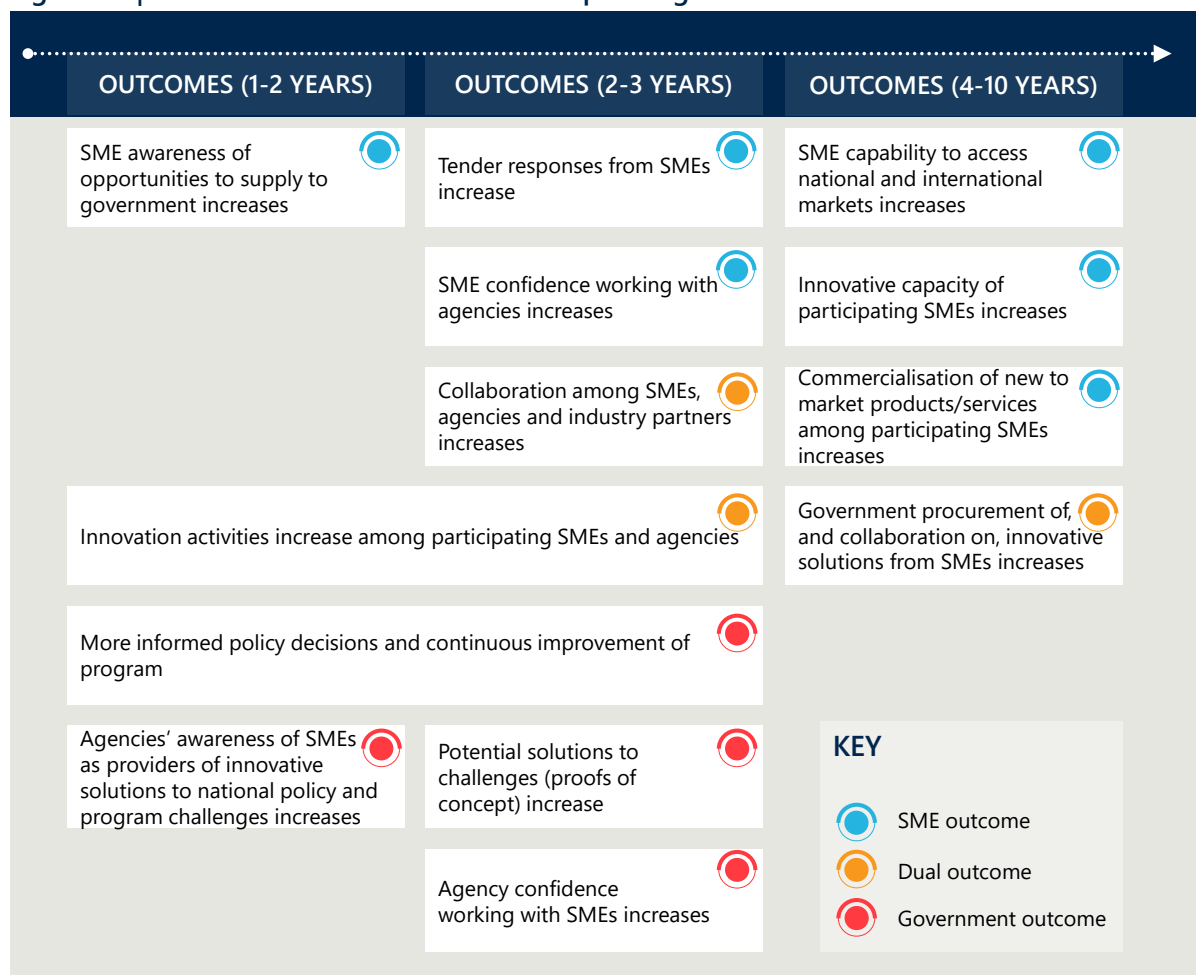
Lastly, stakeholders across DISER, IISA and challenge agencies identified the need to embed an innovative culture across the APS to ensure the success of a scaled-up the BRII.

Appendix A Program overview

A.1 The intended outcomes of the BRII are expected to be realised over the next decade

The BRII pilot logic outlines that the intended outcomes for SMEs and government from participating in the BRII are expected to be realised over the next decade. This evaluation has found strong and emerging evidence that some of the long-term outcomes have already begun to be realised, particularly for the nine SMEs that have progressed to the second stage of the BRII pilot and received proof of concept funding.

Figure 32 | Intended outcomes from the BRII pilot logic model



A.2 The BRII has been modelled on similar programs in the UK and the US.

The BRII has been modelled on the US's SBIR program and the UK's SBRI program. The BRII awards grants to a smaller number of SMEs than the SBIR and SBRI. However, the monetary value of the BRII's feasibility and proof of concept grants is similar to those awarded through both the SBIR and SBRI. The table below compares key elements across each of these programs.

Table 14 | Comparison of the BRII with similar international programs



	BRII	US SBIR	UK SBRI	ISC
Year established	2016	1982	2009	2017
Administration	Centralised	Decentralised	Innovate UK partners with agencies to help them set up their own competitions	Managed centrally by Innovate Canada
Funding source	DISER administered funds	3.2 per cent of agencies' extramural budgets over \$100 million	Agencies' procurement budgets, with co-funding from Innovate UK	Minimum 1 per cent of procurement and intramural R&D spend of participating agencies
Targets	No	Yes – percentage of agencies' procurement spend	Yes – £200m across government for FY14-15, with individual targets set for six departments	Yes - \$100 million per annum, made up by a percentage of agencies' procurement spend
Funding per grant phases	<ul style="list-style-type: none"> • \$100,000 AUD feasibility study (three months) • \$1 million AUD proof of 	<ul style="list-style-type: none"> • \$150,000 USD feasibility study (six months) • \$1 million USD R&D work (two years) 	<ul style="list-style-type: none"> • £50 – 100,000 feasibility study (two - six months) • £250,000 - £1 million proof 	<ul style="list-style-type: none"> • Feasibility (\$150,000 CAD, six months) • Prototyping (\$1 million)




	concept (18 months)	<ul style="list-style-type: none"> Optional non-SBIR funding for further development and commercialisation 	of concept (18 – 24 months)	CAD, two years) <ul style="list-style-type: none"> Pathway to commercialisation support
Total grant funding/yr	\$6 million AUD ⁷⁵	\$3.28 billion USD (2019) ⁷²	~£81m (2015) ⁷³	\$113 million CAD (FY20) ⁷⁴
Number of grants	20 feasibility study grants 10 proof of concept grants	2,500 – 4,500 feasibility study awards p.a. 1,000 – 2,000 R&D awards p.a.	2,164 projects (as of 2016)	70 projects
Number of agencies	7	11	22	20
Business eligibility	SMEs	<500 employees	Business or research organisation of any size	<500 FTE, majority of business operations in Canada

A.3 There were five challenges in round one

The average grant value at the feasibility study stage was \$92,446. The average grant value at the proof of concept stage was \$971,977.

Table 15 | Summary of the BRII challenges in round one




	Challenge	Brief Description	Challenge Agency	Feasibility study SMEs	Average Feasibility Grant Value	Proof of concept SMEs	Average proof of concept grant value
	Digitally enabled community engagement in policy and program design	Digitally enabled process to provide a faster, lower cost and broader based consultation and co-design processes to enable business and community organisations to participate in the design of policies and programs by Australian Government agencies.	Department of Industry, Innovation and Science and Department of Social Services	<ul style="list-style-type: none"> • Crawford Kaye • Likely Theory • Futuregov • Collabforge 	\$89,117	<ul style="list-style-type: none"> • Collabforge • Likely Theory 	\$998,675
	Improving transparency and reliability of water market information	Improve transparency and reliability of water market information to increase market participation by water licence holders and enhance consumer confidence in Australia's water markets.	Department of Agriculture and Water Resources	<ul style="list-style-type: none"> • Civic Ledger • Aither • NGIS • Marsden Jacob Unit Trust 	\$94,456	<ul style="list-style-type: none"> • Marsden Jacob 	\$1,000,000



	Challenge	Brief Description	Challenge Agency	Feasibility study SMEs	Average Feasibility Grant Value	Proof of concept SMEs	Average proof of concept grant value
	On-the-spot technology for measuring pyrethroid surface residue	On-the-spot measurement technology to determine whether pyrethroid residues on interior aircraft surfaces are high enough to kill mosquitoes and other insects.	Department of Agriculture and Water Resources	<ul style="list-style-type: none"> • Atamo • AUSSI Systems • Panorama Synergy • Micropace • Iugotec 	\$91,542	<ul style="list-style-type: none"> • Atamo • Iugotec 	\$998,893
	Sharing of information nationally to ensure child safety	Innovative technology that allows child protection authorities to identify when a child at risk, or an adult of interest, is known to child protection authorities in other jurisdictions.	Department of Social Services	<ul style="list-style-type: none"> • Factil • Itree • Leading Directions 	\$99,730	<ul style="list-style-type: none"> • Factil • Itree 	\$895, 831
	Tracking the effect and value of information products	Using "smart information products" to track the effect and value of information products through the life of the information.	Austrac	<ul style="list-style-type: none"> • Avinium • Gosource • Houston Kemp • Atraxium 	\$90,419	<ul style="list-style-type: none"> • Atraxium • Houston Kemp 	\$980,500

A.4 There were five challenges in round two.

The average grant value at the feasibility study stage was \$97,404. The average grant value at the proof of concept stage was \$1 million.

Table 16 | Summary of the BRII challenges in round two


	Challenge	Brief Description	Challenge Agency	Feasibility study SMEs	Average Feasibility Grant Value	Proof of concept SMEs	Average proof of concept grant value
	Automating complex determinations for Australian Government Information	Develop an accurate and scalable way to decide the value of government digital information and data and to determine whether it should be preserved or destroyed.	National Archives of Australia	<ul style="list-style-type: none"> Automated Reasoning Alliance Surround Australia Lenticular PWC Indigenous Consulting 	\$99,353	<ul style="list-style-type: none"> Surround Australia Lenticular 	\$1 million
	Fast and secure digital identity verification for people experiencing family and domestic violence	Develop a secure and scalable technological solution that will enable people experiencing family and domestic violence to access support quickly.	Department of Human Services	<ul style="list-style-type: none"> Factil Avatas Consulting (Mawson ACT) Development 	\$100,000	<ul style="list-style-type: none"> None 	N/A
	Intelligent data to transform tourism service delivery	Unlock and integrate new data sources to better measure tourism and better inform decisionmakers.	Austrade	<ul style="list-style-type: none"> Wejugo NEM Australasia Geografia Metrix Consulting 	\$92,500	<ul style="list-style-type: none"> Wejugo NEM Australasia 	\$1 million





	Managing the biosecurity of hitchhiking pests and contaminants on shipping containers	Develop new innovative and technical solutions to detect and manage hitchhiking pests, organisms, diseases, weeds and other contaminants on or in shipping containers.	Department of Agriculture and Water Resources	<ul style="list-style-type: none"> • Trellis Data • Silverpond • Iugotec • Industry Spec Drones 	\$99,547	<ul style="list-style-type: none"> • Trellis Data • Industry Spec Drones 	\$1 million
	Uplifting government capability to help deliver world-leading digital services	Develop new innovative and technical solutions to uplift capability for digital transformation in service delivery, digital sourcing, technology and governance across government agencies.	Digital Transformation Agency	<ul style="list-style-type: none"> • Tezet (Next Paradigm) 	\$100,000	<ul style="list-style-type: none"> • None 	N/A

A.5 There are five challenges in round three (priority sectors round).

The average grant value at the feasibility study stage was \$98,893. This round has not yet reached the proof of concept stage.

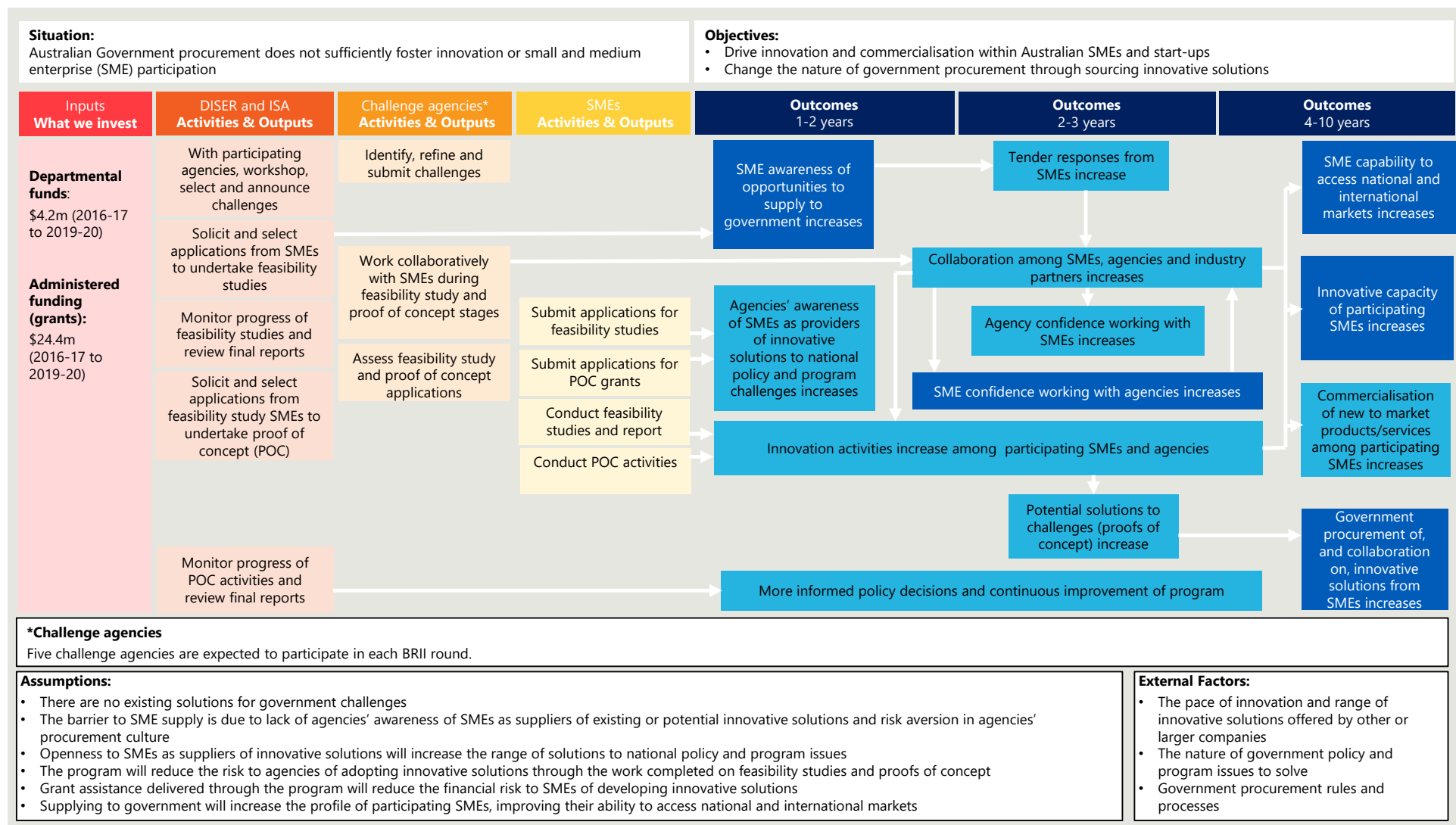
Table 17 | Summary of the BRII challenges in round three

	Challenge	Brief Description	Challenge Agency	Feasibility study SMEs	Average Feasibility Grant Value
	Counting fish using advanced technologies	Create an innovative and flexible fish survey (video) data processing solution. This would harness advanced technologies, such as the power of machine learning and artificial intelligence techniques.	Australian Institute of Marine Science	<ul style="list-style-type: none"> • Harrier Project Management • Mapizy • Silverpond 	\$99,898

				<ul style="list-style-type: none"> • Tekno 	
	Turning office trash into energy treasure	Develop a way to conduct an analysis of waste streams from an office building in order to design and build an energy recovery pilot facility. The critical innovation is to demonstrate a step-change in resource recovery rates by combining innovations in technology and onsite waste management.	Australian Renewable Energy Agency	<ul style="list-style-type: none"> • Finn Biogas • Jet Technology Corporation • Nilwaste Energy • Pyrocal • ReGround 	\$98,657
	Revolutionising agricultural spray application	Develop innovative technology solutions to reduce spray drift - the off-target movement of agricultural chemicals such as pesticides.	Cotton Research and Development Corporation	<ul style="list-style-type: none"> • Advanced Agricultural Systems • Bard AI • Interlate Management Services • LX Design House • Spray Safe and Save • Teknomika 	\$97,882
	Turning farm crops into a renewable hydrogen source	Create an environmentally-friendly way to produce fertilisers that are critical to the success of Australia's grains industry. This will require an innovative solution that will enable Australia to recycle biomass to generate hydrogen for renewable fertiliser production.	Grain Research and Development Corporation	<ul style="list-style-type: none"> • HydGene Renewables • ITP Thermal • Mollongghip & District Enterprises • Wildfire Energy 	\$99,928
	Automating the detection of whales at sea	Develop new and innovative technologies that could be deployed to improve the efficiency and effectiveness of marine fauna detection. The challenge also involves	National Offshore Petroleum Safety and Environmental	<ul style="list-style-type: none"> • Earth Ocean and Space • Industrial Monitoring and Control • Thaum 	\$98,664

		finding ways to effectively collate and report automated marine fauna data and associated vessel responses.	Management Authority	<ul style="list-style-type: none"> • Vimana Tech 	
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Appendix B BRII Program Logic (2018)



Appendix C Evaluation methodology (excluding CBA)

C.1 Key Evaluation Questions (KEQs)

Table 18 | Key evaluation questions mapped to the relevant report section

Evaluation question	Relevant report section
1. Design	
a. How does the current BRII model compare to international best practice for similar programs, such as the Small Business Innovation Research (SBIR) program (United States), the Small Business Research Initiative (SBRI) (United Kingdom) and the Innovative Solutions program (Canada)?	Section 8.1.1 Appendix A.2
b. How has the design of the BRII enabled or inhibited its ability to achieve its intended outcomes?	Section 7
c. How would program design and implementation need to change if it was scaled-up? i. What are possible options for a sustainable, ongoing program? ii. What could possible expansion pathways look like? iii. How much funding would be required on an ongoing basis? iv. What would be the role of the EPC?	Section 8
2. Efficiency	
a. Have the pilot rounds of the program been administered and delivered efficiently? d. How satisfied have participating SMEs and agencies been with the administration of the program? e. Could any of the program's operations and procedures be improved? f. How well has the program been able to identify and address emerging issues or concerns and support its participants? g. Have any changes been made to the program since launch? How effective were they?	Section 7
i. How effective have the joint working arrangements with other agencies and committees involved in the program been?	Section 7.1.2
j. How effective has been the role of the EPC?	Section 7.1.2
k. What have been the major risks with the program (if any)? How well have they been anticipated, managed and mitigated? l. What impact has the COVID-19 pandemic had on the program and participating SMEs?	Section 7.1.3
3. Outcomes and Impact	

Evaluation question	Relevant report section
a. What longer-term impacts has the program achieved? To what extent has there been an increase in: <ul style="list-style-type: none"> i. The commercialisation of new to market products/services among participating SMEs? ii. Collaboration among SMEs, agencies and industry partners? iii. Agencies' and SMEs' confidence working with each other? iv. Innovation and collaboration activities among participating SMEs and agencies? 	Section 5 Section 7
b. To what extent has the program generated value to participating SMEs and Challenge agencies, and the Australian government? <ul style="list-style-type: none"> i. Have the benefits outweighed the costs in light of expected outcomes and program impacts? 	Section 6
c. Has the program exhibited any spillovers or other unexpected consequences, positive or negative?	Section 6
d. How do the outcomes of the program compare with similar programs elsewhere (such as SBRI in the UK), or with alternative program designs for achieving the same objectives?	Section 5.3 Section 6.5

C.2 Administrative data

This evaluation was conducted using data from DISER's Lighthouse Data Warehouse. The administrative data used to identify insights about applicant and successful SME characteristics was sourced from this Warehouse. Specifically, the evaluation utilised:

- **Application information:** This included data from both successful and unsuccessful applicants. It showed business characteristics and proposed solutions to the relevant challenge.
- **Reports:** Feasibility study reports were reviewed to determine the nature of solutions developed by SMEs.
- **Challenge applications:** These applications from government agencies were used to measure the number of proposed challenges per round and how many were successful.

C.3 Program and policy documents

This evaluation involved a review of extensive program documentation. Australia-specific⁸⁶ documents reviewed and used to inform the findings of this evaluation include:

- Challenge agency applications

⁸⁶ International comparator research was also conducted. These documents are referenced throughout the report where relevant.

- Challenge factsheets (all rounds)
- BRII Evaluation Strategy
- BRII New Policy Proposal
- BRII Program Logic 2018
- BRII Communications and Marketing Strategy Evaluation
- BRII Post-Commencement Evaluation
- *A demand-side approach to stimulate business innovation in Australia*, drafted by DISER
- Feasibility study reports.

This documentation was used to understand BRII challenges, the SMEs involved and their solutions. It also informed the background and context sections of this report, which cover the objectives of the BRII. Where relevant, past evaluations or reviews of the BRII were also used to inform the recommendations in this report.

C.4 Interviews with DISER stakeholders

Policy and program partners

In the early stages of the evaluation, key policy and program stakeholders were engaged to understand their views on the program, what has changed since its inception and what could still be improved. They were presented with the following questions:

1. Could any of the program's operations and procedures be improved?
2. How well has the program been able to identify and address emerging issues or concerns and support its participants?
3. Have any changes been made to the program since launch? How effective were they?
4. How effective have the joint working arrangements with other agencies and committees involved in the program been?
5. What have been the major risks with the program (if any)? How well have they been anticipated, managed and mitigated?
6. What impact has the COVID-19 pandemic had on the program and participating SMEs?
7. Has the program exhibited any spillovers or other unexpected consequences, positive or negative?

Industry Innovation and Science Australia board

Members of the IISA board were interviewed to understand their experience as a key stakeholder in the BRII program and discuss the program's achievements. The interview also sought to understand their views regarding potential improvements to the program. They were presented with the following questions:

1. How has the role of the ISA Board in the BRII program evolved?
2. What have been the BRII program's most notable achievements?
3. How does the current BRII model compare to international best practice for similar programs?
4. How did you select agencies that would deliver the best possible products? Were the policy rationale and program objectives useful? Could they be improved to assist in the selection task?
5. Has the engagement between the Department and ISA been sufficient? Is there any way to make it more effective in possible future rounds of the BRII?
6. Are you satisfied with the information and advice that you received from the Department throughout all stages of the program to date?
7. How could current governance arrangements be improved?
8. How could the BRII program better complement supply-side programs like the Entrepreneurs' Programme and Research and Development Tax Incentive?

Entrepreneurs' Programme Committee

Members of the EPC were interviewed to understand their experience as a key stakeholder in the BRII program and discuss their relationship with the program and other stakeholders. The interview also sought to understand their views regarding potential improvements to the program. They were presented with the following questions:

1. How has the role of the Entrepreneurs' Programme Committee in the BRII evolved?
2. How effective has its role been relative to the originally stated objectives?
3. How could current governance arrangements be improved?
4. How might the committee and EP more broadly support a scaling up of the BRII?
5. How could the BRII program better complement supply-side programs like the Entrepreneurs' Programme and Research and Development Tax Incentive?

C.5 Interviews with BRII recipients

A series of interviews were conducted with proof of concept and feasibility SMEs. These sought to understand their experience as a grant recipient of the BRII program and the impact of the grant funding, both on their business and more broadly. The interview also touched on ways in which the program can improve.

1. Can you describe the support provided to you by DISER?
2. Has participating in the BRII changed your willingness and capacity to innovate?
3. To what extent has participating in the BRII increased your confidence in working with government agencies?

4. Where you able to commercialise any of the outputs from your work under the BRII grants? How and what commercial and financial outcomes where you able to achieve? Over what timeframe?
5. Do you have plans to commercialise any (or other) outputs from your work under the BRII grants? How and over what timeframe?
6. How satisfied are you with the support the Department and your challenge agency, have provided you across each phase of the BRII?
7. What has your business been able to achieve as a result of participating in the BRII?
8. What were main lessons have you and your company learned at the Feasibility Study and Proof of Concept stages?
9. Did the BRII enable you to develop collaborative partnerships with other companies? If so, do you have further plans to continue this partnership post-BRII?
10. What are the outcomes that you expected to but was not able to achieve through the BRII? Why?
11. What advice would you give a company who is entering the BRII program?

C.6 Interviews with challenge agencies

Challenge agencies are among the most important stakeholders in the BRII program. They were interviewed to understand their experience as a key decision maker and stakeholder in the BRII, discuss potential improvements to the program and the lessons and impact for their agency that eventuated through the BRII. They were presented with the following interview questions:

Challenge Scoping

1. Can you describe the process you went through to identify and scope a potential challenge? What would you do differently next time?
2. How could this process be improved?

Feasibility Study

3. How did you engage with the participating SMEs? Did your engagement differ between them? How? Why?
4. What advice would you give SME's on how to best engage with you over the challenge?
5. What lessons did you learn by working with SMEs during the Feasibility Study stage?

Proof of Concept

6. What have you learnt so far from the Proof of Concept stage?
7. Are there notable differences between the two SMEs you are currently working with?
8. Have there been benefits with having two different SMEs working on your challenge?

Solutions (round one only)

9. Did your agency eventually procure the solution from one or both of the POC SMEs?
10. If so, how have you used the solution and what benefits has it generated?

General

11. What do you see as the main benefits of participating in the BRII?
12. What direct and indirect costs did your agency incur through participating in BRII and did these outweigh the expected benefits?
13. How satisfied are you with the support DISER has provided throughout the BRII?
14. How realistic have the BRII's timeframes been?
15. How well known across your wider Department is the BRII?
16. To what extent has participating in the BRII encouraged your agency to consider procuring from an SME in the future?
17. Would you participate in any future BRII round?

C.7 Surveys

C.7.1 Proof of concept SME survey

About your company

1. In what year was your business first established (i.e. started first trading)?
1. How many full-time equivalent staff do you currently employ (including self-employment)?
2. How many full-time equivalent staff were employed by your business at the beginning of the BRII program?
3. What percentage of your competitors are based in Australia?
4. What percentage of your business ownership is Australian?

About your commercial activities

12. In which financial year did you first receive the BRII funding for a feasibility study?
13. What has been the annual turnover of your business in each Financial Year since your first engagement with the BRII, including the year in which you first received funding?
14. What percentage of your current sales income comes from Australian markets?
15. Approximately how much of your current sales income is attributed to government?
16. What proportion of the goods and services your business purchases are sourced from within Australia?
17. Other than the support received from the BRII for this project, has your company received any support for technological development for other projects over the last five years either from the Australian government or State governments?

18. If yes, how much support was received in total (not including the BRII)?

Management of the BRII program

19. Throughout the initial application phase, to what extent were you satisfied with:

- a. The information provided about the BRII program prior to your application?
- b. The information provided about the details of the challenge you applied for?
- c. The process of submitting your initial application?
- d. The communication from DISER after your application was submitted?
- e. The time that it took until you heard about the result of your application?

20. Throughout the feasibility study phase, to what extent were you satisfied with:

- a. The information and support provided by your challenge agency?
- b. The timeliness and quality of support you received from DISER as you developed the Feasibility Study?
- c. The feedback you received on the initial drafts of your Feasibility Study?
- d. The time that it took to have your Feasibility Study assessed?

21. Throughout the proof of concept phase, to what extent were you satisfied with:

- a. The process of submitting the application for a proof of concept grant?
- b. The timeliness and quality of support you are receiving from DISER as you develop your Proof of Concept?
- c. The timeliness and quality of support you are receiving from your Challenge Agency as you develop your Proof of Concept?

22. Do you wish to make any further comments about your responses to the above?

Your engagement with government

23. How frequently did your company engage with Government clients prior to the BRII program?

24. How many Australian Government tenders did your organisation respond to in the financial year in which you first engaged with the BRII, through platforms such as AusTender or Digital Marketplace, and government panel arrangements?

25. How many Australian Government tenders did your organisation respond to in the most recent full financial year, through platforms such as AusTender or Digital Marketplace, and government panel arrangements?

26. To what extent do you agree with the following statements?

- a. Our company's knowledge of how government operates has increased post participation in the BRII.
- b. We are more actively monitoring potential business opportunities with government agencies post participation in the BRII.

- c. We feel that we are more likely to win work with government agencies post participation in the BRII.
- d. We are more proactively pitching business ideas to government agencies post participation in the BRII.

27. Do you wish to make any further comments about your responses to the above?

Your R&D and commercialisation pipeline

28. Would your company have pursued this R&D without the BRII funding?

29. Has participating in the BRII acted as a catalyst for you to develop or expand collaborative relationships with other companies or researchers?

- a. Please provide any further details you would like to share relating to the previous question.

30. Have you started to commercialise any of the IP that you have developed under the BRII, where IP includes but is not limited to, patents, trade secrets, memoranda of understanding and licensing agreements?

- a. Please provide any further details you would like to share relating to the previous question.
- b. If no, are you likely to in the near future?
 - i. Please provide any further details you would like to share relating to the previous question.

31. Has your company considered applications of the IP beyond the context of the BRII challenge?

- a. Please provide any further details you would like to share relating to the previous question.

32. Has the BRII improved the capability of your business to access national and international markets?

- a. Please provide any further details you would like to share relating to the previous question.

Your business outcomes

33. Thinking about the financial impact of the BRII, as a result of the support received from the BRII is your current turnover:

- a. Higher than it would have been without involvement in the BRII
- b. Lower than it would have been without involvement in the BRII
- c. About the same

34. Approximately how much higher / lower is your turnover as a result of receiving the BRII support?

35. For how many years do you expect that the BRII program will have (or has had) an impact on turnover?

36. Still thinking again about the change to your turnover as a result of your involvement with the BRII, what proportion of this change would you attribute to the Proof of Concept stage?
37. Are there any final comments that you would like to make about the design and management of the BRII program?

C.7.2 Feasibility SME survey

About your company

1. In what year was your business first established (i.e. started first trading)?
2. How many full-time equivalent staff do you currently employ (including self-employment)?
3. How many full-time equivalent staff were employed by your business at the beginning of the BRII program?
4. What percentage of your competitors are based in Australia?
5. What percentage of your business ownership is Australian?

About your commercial activities

6. In which financial year did you first receive the BRII funding for a feasibility study?
7. What has been the annual turnover of your business in each Financial Year since your first engagement with the BRII, including the year in which you first received funding?
8. What percentage of your current sales income comes from Australian markets?
9. Approximately how much of your current sales income is attributed to government?
10. What proportion of the goods and services your business purchases are sourced from within Australia?
11. Other than the support received from the BRII for this project, has your company received any support for technological development for other projects over the last five years either from the Australian government or State governments?
12. If yes, how much support was received in total (not including the BRII)?

Management of the BRII program

13. Throughout the initial application phase, to what extent were you satisfied with:
 - a. The information provided about the BRII program prior to your application?
 - b. The information provided about the details of the challenge you applied for?
 - c. The process of submitting your initial application?
 - d. The communication from DISER after your application was submitted?
 - e. The time that it took until you heard about the result of your application?
14. Throughout the feasibility study phase, to what extent were you satisfied with:
 - a. The information and support provided by your challenge agency?

- b. The timeliness and quality of support you received from DISER as you developed the Feasibility Study?
- c. The feedback you received on the initial drafts of your Feasibility Study?
- d. The time that it took to have your Feasibility Study assessed?
- e. The feedback that you received about why you did not progress to the Proof of Concept stage?

15. Do you wish to make any further comments about your responses to the above?

Your engagement with government

16. How frequently did your company engage with Government clients prior to the BRIL program?

17. How many Australian Government tenders did your organisation respond to in the financial year in which you first engaged with the BRIL, through platforms such as AusTender or Digital Marketplace, and government panel arrangements?

18. How many Australian Government tenders did your organisation respond to in the most recent full financial year, through platforms such as AusTender or Digital Marketplace, and government panel arrangements?

19. To what extent do you agree with the following statements?

- a. Our company's knowledge of how government operates has increased post participation in the BRIL.
- b. We are more actively monitoring potential business opportunities with government agencies post participation in the BRIL.
- c. We feel that we are more likely to win work with government agencies post participation in the BRIL.
- d. We are more proactively pitching business ideas to government agencies post participation in the BRIL.

20. How could DISER have provided support so you were better placed to progress to the proof of concept phase?

21. Is there anything that you would do differently if you participated in the BRIL again?

22. Do you wish to make any further comments about your responses to the above?

Your R&D and commercialisation pipeline

23. Would your company have pursued this R&D without the BRIL funding?

24. Has participating in the BRIL acted as a catalyst for you to develop or expand collaborative relationships with other companies or researchers?

- a. Please provide any further details you would like to share relating to the previous question.

25. Have you started to commercialise any of the IP that you have developed under the BRII, where IP includes but is not limited to, patents, trade secrets, memoranda of understanding and licensing agreements?
- b. Please provide any further details you would like to share relating to the previous question.
 - c. If no, are you likely to in the near future?
 - i. Please provide any further details you would like to share relating to the previous question.
26. Has your company considered applications of the IP beyond the context of the BRII challenge?
- a. Please provide any further details you would like to share relating to the previous question.
27. Has the BRII improved the capability of your business to access national and international markets?
- a. Please provide any further details you would like to share relating to the previous question.

Your business outcomes

28. Thinking about the financial impact of the BRII, as a result of the support received from BRII is your current turnover:
- a. Higher than it would have been without involvement in the BRII
 - b. Lower than it would have been without involvement in the BRII
 - c. About the same
29. Approximately how much higher / lower is your turnover as a result of receiving the BRII support?
30. For how many years do you expect that the BRII program will have (or has had) an impact on turnover?
31. Are there any final comments that you would like to make about the design and management of the BRII program?

C.7.3 Applicant SME survey

About your company

1. In what year was your business first established (i.e. started first trading)?
2. How many full-time equivalent staff do you currently employ (including self-employment)?
3. How many full-time equivalent staff were employed by your business at the beginning of the BRII program?
4. What percentage of your competitors are based in Australia?

5. What percentage of your business ownership is Australian?

About your commercial activities

6. In which financial year did you first receive the BRII funding for a feasibility study?
7. What has been the annual turnover of your business in each Financial Year since your first engagement with the BRII, including the year in which you first received funding?
8. What percentage of your current sales income comes from Australian markets?
9. Approximately how much of your current sales income is attributed to government?
10. What proportion of the goods and services your business purchases are sourced from within Australia?
11. Other than the support received from BRII for this project, has your company received any support for technological development for other projects over the last five years either from the Australian government or State governments?
12. If yes, how much support was received in total (not including the BRII)?

Management of the BRII program

13. Throughout the initial application phase, to what extent were you satisfied with:
 - a. The information provided about the BRII program prior to your application?
 - b. The information provided about the details of the challenge you applied for?
 - c. The process of submitting your initial application?
 - d. The communication from DISER after your application was submitted?
 - e. The time that it took until you heard about the result of your application?

Your engagement with government

14. How frequently did your company engage with Government clients prior to the BRII program?
15. How many Australian Government tenders did your organisation respond to in the financial year in which you first engaged with the BRII, through platforms such as AusTender or Digital Marketplace, and government panel arrangements?
16. How many Australian Government tenders did your organisation respond to in the most recent full financial year, through platforms such as AusTender or Digital Marketplace, and government panel arrangements?
17. Has your engagement with government agencies changed since you applied to the BRII?
18. Do you wish to make any further comments about your responses to the above?

Your R&D and commercialisation pipeline

19. Did your company pursue this R&D without the BRII funding?
 - a. Please provide any further details you would like to share relating to the previous question.

20. Have you developed or expanded collaborative relationships with other companies or researchers after your application?
- a. Please provide any further details you would like to share relating to the previous question.
21. Have you commercialised any relevant IP to the products/concepts you proposed in your application, where IP includes but is not limited to, patents, trade secrets, memoranda of understanding and licensing agreements?
- a. Please provide any further details you would like to share relating to the previous question.
 - b. If no, are you likely to in the near future?
 - i. Please provide any further details you would like to share relating to the previous question.
22. Have you improved the capability of your business to access national and international markets since your application?
- a. Please provide any further details you would like to share relating to the previous question.
23. Are there any final comments that you would like to make about the design and management of the BRII program?

Appendix D Consultation register

D.1 Stakeholder consultation was one evidence stream for this evaluation.

Over the course of the evaluation, we conducted interviews with representatives from the ISA, the EPC, DISER, challenge agencies, proof of concept SMEs, feasibility study SMEs and one SME that submitted an unsuccessful application. We also distributed a brief survey to all SMEs that reached the feasibility study stage of the BRII. The table below, and continued over-page provides a complete list of stakeholders we consulted.

Table 19 | List of stakeholders consulted

IISA, EPC and Departmental

Organisation	Individual
IISA	<ul style="list-style-type: none">• Kate Cameron• Andrew Stevens
EPC	<ul style="list-style-type: none">• Steve Telburn• Tony Surtees• Bessi Graham
DISER	<ul style="list-style-type: none">• Jane Urquhart, Previous Head of BRII Policy Team• Rachel Roberts, Communications Branch• BRII Program Team: Phillip Cole, Peter Hunter, Debra Robertson• BRII Policy Team: George Makris, Frank Tonkin, Jennifer Muscat

Challenge agencies

Organisation	Individual
Department of Agriculture and Water Resources	<ul style="list-style-type: none">• Gertraud Norton

Organisation	Individual
Department of Agriculture and Water Resources	• David Bouchard
Austrade	• David Smith
Human Services Australia	• Kate Sare
Digital Transformation Agency	• Craig Cowan
Austrac	• Julie Wynn
Department of Industry, Innovation and Science	• Damian Carmichael
Department of Social Services	• Briony Foster, Owen Griffiths, John Andriunas
Australian Renewable Energy Agency	• Amy Philbrook
Cotton Research & Development Corporation	• Susan Mass
National Archives	• Yaso Arumugam
Department of Agriculture and Water Resources	• Angus Sly

Proof of concept SMEs

Organisation	Individual
Atamo	• Peter Barrow
Marsden Jacob Associates	• Rodney Carr
Wejugo	• Mike Welling
Atraxium	• Scott Ceely
HoustonKemp	• Greg Houston
Lenticular	• Trevor Christie-Taylor
Collabforge	• Mark Elliot

Organisation	Individual
Surround Australia	• Brad McCusker
Likely Theory	• Clint Walker
Factil	• Dr Graeme Port
Trellis Data	• Michael Gately
Itree	• Kirsty Dusting

Feasibility study SMEs

Organisation	Individual
Aither	• Chris Olszak
Automated Reasoning Alliance	• Vladimir Videnovic
Tezet	• Eric Jansen
Panorama	• Sanchitha Fernando
GoSource	• Steve Capell
Silverpond	• Edoardo Zambruno

Appendix E List of abbreviations

E.1 List of abbreviations

Abbreviation	Term
AC	Accelerating Commercialisation
ANZSIC	Australian and New Zealand Standard Industrial Classification
APS	Australian Public Service
BCR	Benefit to Cost Ratio
BRII	Business Research and Innovation Initiative
CBA	Cost Benefit Analysis
CBI	Challenge Based Innovation
CGE	Computational General Equilibrium
CAGR	Compared Annual Growth Rate
DISER	Department of Industry, Science, Energy and Resources
EPC	Entrepreneurs' Programme Committee
GVA	Gross Value Add
IP	Intellectual Property
IISA	Industry Innovation and Science Australia
ISC	Innovation Solutions Canada

Abbreviation	Term
NISA	National Innovation and Science Agenda
NPV	Net Present Value
OECD	Organisation for Economic Co-operation and Development
R&D	Research and Development
RUN	Regional Universities Network
SBIR	Small Business Innovation Research program
SBRI	Small Business Research Initiative
SME	Small to Medium Enterprise

Appendix F Post-commencement evaluation recommendations

1. The Department works with each challenge agency to increase the visibility of BRII's outcomes to date across Government and other key stakeholders between now and the conclusion of the pilot, to further enable the program's intended outcomes for Government.
2. The Department maintains an active role in working with agencies to identify, scope and design challenges for any future rounds of BRII to maintain a consistently high quality of challenge scope and design.
3. The Department provides agencies with forewarning about forthcoming rounds and allows at least ten weeks for challenge applications to be developed.
4. The Department reconsiders the timeframes for subsequent rounds of BRII, with a specific focus on streamlining the feasibility study application assessment process.
5. The Department works more actively with challenge agencies to understand and – where possible – measure these benefits ahead of the BRII impact evaluation (which is scheduled for 2020-21). This will also help to communicate the potential benefits of BRII to other agencies that could be involved in future rounds of BRII.
6. The Department investigates the feasibility and potential benefits of more closely linking SMEs that participate in any future rounds of BRII with other relevant government programs including AusIndustry programs.
7. The Department ensures that the knowledge base developed through the BRII pilot is appropriately captured and packaged so that it can be easily accessed by any future BRII participants and potentially used to supplement other related resources for SMEs.
8. The Department clearly articulates the features and rationale of the BRII model, and any key lessons learned at the conclusion of the pilot. This will ensure that any other agencies that may wish to adopt a similar challenge-based model can, while preserving the intent and integrity of the program.

Appendix G CBA Technical Appendix

This CBA Technical Appendix provides a more detailed account of the CBA approach and methodology presented earlier.

G.1 Defining the CBA scope

The BRII has now been active for over four years. The first allocation of funding provided to round one recipients was in FY16/17. Since that time, the BRII costs and benefits has become increasingly well understood as they are demonstrated in the performance of SMEs and the implementation of solutions.

There is now sufficient evidence of costs and some benefits to provide a robust ex-post assessment of the program's impact as a result of funding round one proof of concept SMEs. However, it is still too early to determine the impact of BRII through subsequent rounds. Therefore, the scope of this CBA is focused exclusively on the costs and benefits relating to round one SME's that progressed to the proof of concept funding stage (see Table 19).⁸⁷

Table 20 | Round one proof of concept SMEs in scope for the CBA

Applicant SME	Challenge
Atamo P/L	On-the-spot technology for measuring pyrethroid surface residue
Atraxium P/L	Tracking the effect and value of information products
Collabforge P/L	Digitally enable community engagement in policy and program design
Factil P/L (previously Infinuendo P/L)	Sharing information nationally to ensure child safety
Houston Kemp P/L	Tracking the effect and value of information products
Itree P/L (Objective RegTech)	Sharing information nationally to ensure child safety
Iugotec P/L	On-the-spot technology for measuring pyrethroid surface residue

⁸⁷ Note that when referring to SMEs in the CBA therefore we are talking about this subset only.

Applicant SME	Challenge
Likely Theory P/L	Digitally enable community engagement in policy and program design
The Marsden Jacob Unit Trust	Improve transparency and reliability of water market information

Eight out of the nine round one proof of concept SMEs have provided financial information to enable modelling of business performance. As a result, a non-response factor of 1.13 (or 9 / 8) has been applied to accommodate the missing financial data of one SME.

G.2 Estimating the effects of the BRII on the performance of SMEs that participated

The BRII has a direct impact on the performance of SMEs. Interviews conducted as part of this evaluation indicated that the BRII can improve performance for SMEs through new product development, greater connections to buyers in the market, and growth of an innovative mindset within the organisation.

The impact of the BRII on SME performance is most clearly evidenced through changes in revenue (i.e. turnover) because of solution commercialisation and changes in organisation strategy. The methodology presented below draws on research conducted by the University of Manchester for the United Kingdom's SBRI in 2017.⁸⁸ The research is extended and modified to meet the unique needs of the BRII. The method used includes five steps presented below.

Step one - Design and develop a quasi-experimental control group for isolating the impact of the BRII for SMEs.

A critical objective of a CBA is to understand the net impact of a program, that is, how much of the benefits are related to the program itself. In the case of the BRII it was necessary to design and develop a quasi-experimental control group to compare the performance of BRII SMEs against the market. The CBA included two distinct approaches to develop a control group that isolated the impact of BRII on SME performance over and above underlying trend growth in SMEs (see Table 20).

⁸⁸ Researchers from the University of Manchester were contacted as part of the methodology development for this CBA to inform approach. See A Review of the Small Business Research Initiative: A report commissioned by Innovate UK FINAL REPORT (August 2015), available at: https://www.research.manchester.ac.uk/portal/files/61664793/SBRI_Review_Final_Report_June_2016.pdf.

Table 21 | Two approaches to designing a quasi-experimental control group

Approach one Nearest neighbour matching	<p>A non-parametric nearest neighbour matching approach matches each SME against an anonymised list of businesses sourced from the DISER's 'Lighthouse' data asset. The 'Lighthouse' data set provides longitudinal financial information for over 12,000 SMEs that have engaged with the Department at any point since FY16/17. SMEs were matched to a 'basket' of nearest neighbours based on key business characteristics such as (and in order of priority) ANZSIC division codes, turnover (band), employee count (band) and year of establishment (i.e. ABN registration date). A minimum of four nearest neighbours was needed for each basket. Where the minimum basket could not be achieved, or if the results showed too much volatility year to year, then the search criteria business characteristics were relaxed in order of lowest priority until a suitable mix was achieved.</p>
Approach two Modelling of ABS data	<p>Estimating market growth based on ANSZIC division using ABS data. A continuous distribution is estimated from binned (histogram) data by fitting a log normal distribution to ABS data.⁸⁹ This approximated distribution is then used to estimate the average revenue in a given financial year for each Australian and New Zealand Standard Industrial Classification (ANSZIC) Division.</p>

In both cases, a Compound Annual Growth Rate (CAGR) for the market between FY16/17 and FY19/20 is used to estimate underlying growth, which helped to reduce noise in the data resulting from revenue fluctuations year on year.

Combining the relevant control group estimates in both approaches for each SME provides an overall compound annual growth rate (CAGR) for underlying market growth averaging 4.7 per cent for the group (ranging between 3.4 per cent and 6.4 per cent) (see Table 21). These estimates of underlying growth are broadly in line with nominal GDP growth of 5.1 per cent per annum reported by the ABS over the same period (prior to COVID, three year growth to March 2020).⁹⁰

⁸⁹ ABS dataset 'Counts of Australian Businesses, including Entries and Exits' available at: <https://www.abs.gov.au/statistics/economy/business-indicators/counts-australian-businesses-including-entries-and-exits/latest-release>.

⁹⁰ ABS dataset 'Australian National Accounts: National Income, Expenditure and Product', available at: <https://www.abs.gov.au/statistics/economy/national-accounts/australian-national-accounts-national-income-expenditure-and-product/mar-2021>.

Table 22 | Combined CAGR methods for SMEs in scope

Applicant SME	Estimated underlying growth FY16/17 to FY19/20
Atamo P/L	5.0 per cent
Atraxium P/L	4.8 per cent
Collabforge P/L	5.0 per cent
Factil P/L (previously Infinuendo P/L)	3.4 per cent
Houston Kemp P/L	4.7 per cent
Itree P/L (Objective RegTech)	3.4 per cent
Iugotec P/L	6.4 per cent
Likely Theory P/L	4.8 per cent
The Marsden Jacob Unit Trust	4.8 per cent
Average	4.7 per cent

Step two – Estimate the incremental revenue attributed to the BRII to show SME performance.

Annual turnover for the period FY16/17 to FY19/20 for each of the SMEs in scope is captured as part of the evaluation survey. It should be noted that this information is self-reported and therefore cannot be verified. That noted, annual turnover is not a subjective concept and is readily able to be reported. Other questions about financial performance, business characteristics and the impact of the BRII on business behaviours are also captured.

Actuals of financial performance are then converted to incremental revenue by netting off underlying growth from SME revenue growth according to the control group growth rates presented above. Table 22 shows the combined revenue for round one proof of concept SMEs compared to the estimated market growth without the BRII (i.e. the counterfactual).

Table 23 | Modelled revenue FY16/17 to FY19/20

Revenue type	FY16/17	FY17/18	FY18/19	FY19/20
Total revenue with the BRII (actuals)	\$24,070,977	\$26,144,399	\$27,995,608	\$32,275,293

Revenue type	FY16/17	FY17/18	FY18/19	FY19/20
Total revenue without the BRII (estimated)	\$24,070,977	\$25,050,045	\$26,070,208	\$27,133,243
Total incremental revenue	-	\$1,094,353	\$1,925,399	\$5,142,050

Step three - Forecast the impact of the BRII beyond FY19/20 to account for persistence of impact.

The BRII has a persisting impact on SME performance that lasts beyond the FY16/17 to FY19/20 period. As part of the evaluation survey respondents were asked to self-assess how long they expect increased revenue because of BRII to last. On average SMEs indicated that the BRII would continue to have (or has had) 4.75 years of impact – which is comparable with the UK SBRI result of 3.78 years.⁹¹

It is unknown what the growth trajectory of SMEs will be for the next five years. This is particularly true of the BRII round one proof of concept SME group which includes a diverse mix of start-ups and established businesses. Modelling assumes that the best estimate of future revenue growth year on year will be equal to the average control group CAGR of 4.7 per cent. Future incremental revenue therefore continues to grow for the SME group out until FY24/25 (see Table 21 below).

Table 24 | Modelled revenue FY20/21 to FY24/25

Revenue type	FY20/21	FY21/22	FY22/23	FY23/24	FY24/25
Total revenue with the BRII (estimated)	\$33,792,232	\$35,380,467	\$37,043,349	\$38,784,387	\$40,607,253
Total revenue without the BRII (estimated)	\$28,408,506	\$29,743,705	\$31,141,659	\$32,605,317	\$34,137,767

⁹¹ See A Review of the Small Business Research Initiative: A report commissioned by Innovate UK FINAL REPORT (August 2015), available at: https://www.research.manchester.ac.uk/portal/files/61664793/SBRI_Review_Final_Report_June_2016.pdf.

Revenue type	FY20/21	FY21/22	FY22/23	FY23/24	FY24/25
Total incremental revenue	\$5,383,727	\$5,636,762	\$5,901,690	\$6,179,069	\$6,469,485

Step four - Estimate GVA created by changes in SMEs performance.

Incremental revenue attributed to the BRIL between FY16/17 and FY24/25 is converted into GVA using a GVA to revenue ratio. ABS Input-Outputs tables are used to estimate weighted average GVA: revenue ratio of 0.5 for BRIL SMEs based on the relevant ANZSIC Division.⁹² That is, for each one additional dollar in SME revenue that is created by BRIL there is approximately 50 cents in GVA after accounting for inputs. These are the 'first round' benefits.

Note that Nous only used Input-Output tables for the purpose of estimating GVA: Revenue by industry, and not for the purpose of using the infamous 'I-O multipliers'.

Step five - Adjust GVA for displacement and 'spill over' effects to estimated value added.

Second round benefits are estimated by adjusting GVA for both displacement and 'spill over' effects:

- Displacement of 25 per cent (downward adjustment) is assumed. SMEs reported that between zero and 100 per cent of current sales revenue comes from Australian markets. This wide range suggests that displacement of other producers vary on a case-by-case basis for each SME. However, the BRIL solutions are intended to solve a problem for which there is no provider in the market already and hence displacement of existing local suppliers should be limited in most cases.
- Spill over of 75 per cent (upward adjustment) is assumed. Most SMEs reported that more than half of their business inputs were sourced locally from within Australia. The BRIL businesses are therefore more likely to generate second round flow on effects from increased production.

Accounting for both the first and second round benefits as described above provides an adjusted GVA: revenue ratio of 77 per cent.

That is, for each one additional dollar in SME revenue that is created by the BRIL, there is approximately 77 cents in value added after all adjustments are considered. This estimate was cross-checked with comparable Computational General Equilibrium (CGE) modelling recently conducted for the Regional Universities Network (RUN) of Australian universities to determine

⁹² ABS (2021), 'Australian National Accounts: Input-Output Tables', accessed at: <https://www.abs.gov.au/statistics/economy/national-accounts/australian-national-accounts-input-output-tables/2018-19>

the flow on value created by increased research spending at regional campuses.⁹³ The resulting 'spill overs' included here are thus much less than an 'I-O multiplier' approach would give.

G.3 Estimating outcomes to government and society more broadly from the implementation of the BRII solutions in different contexts.

The methodology described above is the core CBA component, but it is limited by the 'impact' it captures.

The BRII aims to provide outcomes to wicked problems that have impact beyond a SMEs bottom line alone. With that in mind, this CBA has supplemented the above methodology with a discrete analysis approach for quantifying the benefits from challenge solutions, by estimating the outcomes of the BRII solutions for government and society more broadly. Specifically, asking how the implementation of the BRII solutions have avoided costs, increased outputs or improved outcomes for different stakeholders.

Where possible, high-level modelling of outcomes is conducted using scenarios based on broad estimates provided by government and SME interviewees with demonstrated experience in implementing the BRII solutions.

In most cases, high-level modelling of outcomes is conducted using broad estimates provided by a combination of both government and SME interviewees with demonstrated experience in implementing BRII solutions. Demonstrating the benefit of the BRII in this way requires a set of key assumptions about how solutions have changed the outcomes for users because of the new technology or process innovation. Changes in inputs and outputs for solution users typically came in the form of costs avoided through reduced labour, time or other resources needed to achieve an outcome that is as good (or better) than could be achieved before the BRII solution was implemented. In some cases, unverified best estimates are used to round out a scenario model.

There are three examples which were identified as part of the CBA as having sufficient evidence of implementation to enable quantification.

- A device for on-the-spot technology for measuring pyrethroid surface residue.
- Waterflow digital tool to improve transparency and reliability of water market information.
- Converlens digital tool for digitally enabled community engagement in policy and program design.

⁹³ CGE modelling by Nous for RUN available at:

https://www.run.edu.au/resources/RUN_Findings_Report_final_.pdf.

Implementation of technology solution (Atamo) to address on-the-spot measurement of pyrethroid surface residue is estimated to contribute \$755,508 in avoided costs (cost savings from a much faster method).

This analysis assumes:

- Prior to the BRIL, fly bioassays were the default option for sampling planes for evidence of pyrethroid surface residue.⁹⁴
- Biosecurity officers sample 250 per year for evidence of pyrethroid surface residue. Unverified estimate used for scenario modelling only.
- Fly bioassays cost \$200 per sample and approximately four hours of a biosecurity officer's time (valued at \$140 per hour) to complete.⁹⁵
- The BRIL technology solution requires only 20 minutes of a biosecurity officer's time to run a sample to the same effectiveness as the previous method of fly bioassays.⁹⁶
- The technology costs \$20,000 and has a useful life of 10 years. Unverified estimate used for scenario modelling only.

Implementation of a solution (Converlens) to digitally enable community engagement in policy and program design is estimated to contribute \$129,314 in avoided costs (reduced time to analyse consultation data).

Consultation as part of this evaluation indicated that the solution saves time for government users in the 'back end' working with qualitative data captured through engagement with the public. For example, each time a public servant wants to explore a question using qualitative data then a query of that data is needed. This analysis assumes:

- DISER runs one query per week (i.e. 52 queries per year) to answer a policy question using qualitative consultation data. Unverified estimate used for scenario modelling only. Higher query demands would result in greater savings.
- Manual querying of this data takes four hours of staff time (valued at \$48.63 per hour)⁹⁷ on average using current methods.⁹⁸
- The BRIL solution provides the DISER with an efficiency gain of 90 per cent to produce reports of equal quality (or better) than those produced with a manual search.⁹⁹

Implementation of a solution (Marsden Jacob's Waterflow) to improve transparency and reliability of water market information is estimated to contribute \$179,794 in costs avoided.

⁹⁴ Bioassays are a method of measuring insecticide residues. For more information see 'Aircraft disinfection' at the Department of Agriculture, Water and the Environment, available at: <https://www.agriculture.gov.au/biosecurity/avm/aircraft/disinsection#disinsection-process>.

⁹⁵ Estimates provided in interviews with the Department of Agriculture, Water and Environment.

⁹⁶ Estimates provided in interviews with the Department of Agriculture, Water and Environment.

⁹⁷ Value per person / hour recommended by Transport and Infrastructure Council.

⁹⁸ Estimate provided in interviews with DISER and Converlens.

⁹⁹ Estimate provided in interviews with DISER and Converlens.

This analysis assumes:

- Prior to Marsden Jacobs designing Waterflow, water market users searched multiple different sites for buy and trade opportunities. This process required on average 10 minutes for expert users (e.g. brokers) and as much as 30 minutes for non-expert users (e.g. some farmers).¹⁰⁰
- An hour of user time is valued at \$48.63 per hour.¹⁰¹
- The BRIL solution enables water market users to find buy and trade opportunities in as little as one minute.¹⁰²
- The expert to non-expert user ratio for the solution is 0.75. Unverified estimate used for scenario modelling only.

G.4 Summary of benefits included in CBA

Table 25 | CBA benefits captured, and their future considerations aligned to the BRIL Program Logic

Benefit	Representation in CBA	Considerations
Increased SME awareness of opportunities to supply government	Yes. Benefit captured in improved SME performance as measured by revenue change	Only round one proof of concept SMEs are included. Performance of feasibility SMEs and unsuccessful SMEs could be accounted for in the future
Increased tender responses from SMEs	Yes. Benefit captured in improved SME performance as measured by revenue change	Only round one proof of concept SMEs are included. Performance of feasibility SMEs and unsuccessful SMEs could be accounted for in the future
Increased SME confidence working with agencies	Yes. Benefit captured in improved SME performance as measured by revenue change	Only round one proof of concept SMEs are included. Performance of feasibility SMEs and unsuccessful SMEs could be accounted for in the future

¹⁰⁰ Estimate provided in interview with Marsden Jacobs.

¹⁰¹ The 2016 value of one business hour recommended for modelling by the Transport and Infrastructure Council is \$48.63. See 'Australian Transport Assessment and Planning Guidelines: PV2 Road Parameter Values' (August 2016) by Transport and Infrastructure Council, available at: https://www.atap.gov.au/sites/default/files/pv2_road_parameter_values.pdf.

¹⁰² Estimate provided in interview with Marsden Jacobs.

Benefit	Representation in CBA	Considerations
Increased SME access to national and international markets	Yes. Benefit captured in improved SME performance as measured by revenue change	Benefits may not be fully realised yet. Persistence revenue change included in CBA to account for future impact
Increased innovative capacity of SMEs	Yes. Benefit captured in improved SME performance as measured by revenue change	Benefits may not be fully realised yet. Persistence revenue change included in CBA to account for future impact
Commercialisation of the BRII solutions	Yes. Benefit captured in improved SME performance as measured by revenue change	Benefits may not be fully realised yet. Persistence revenue change included in CBA to account for future impact
Increased innovative capacity of challenge agencies	No. Non-monetary benefit not represented in CBA	Qualitative findings included in the final report. If the BRII were to scale-up the measurement of the BRII's impact on APS innovative capacity will be important
Improved awareness of and collaboration between SMEs and government	No. Non-monetary benefit not represented in CBA	AusTender procurement trends for challenge agencies used as a proxy for descriptive statistics
More informed policy decisions and continuous program improvement	No. Non-monetary benefit not represented in CBA	Longer term impact of policy decisions and program changes may be measurable in the future
Potential solutions to challenges	Yes. Partially captured in CBA through scenario analysis of outcomes (i.e. to user inputs and outputs) for implementation of three BRII solutions	<p>Non-measured benefits for the REACH solution will be measured in the near future. DISER should engage DSS and NSW DCJ to obtain the outcomes of the impact analysis when it is available</p> <p>There may also be other benefits for government and society from the three case study solutions beyond those accounted for in the CBA</p> <p>As solutions from subsequent rounds mature DISER may consider using the method from this evaluation to</p>

Benefit	Representation in CBA	Considerations
		measure the economic impact of those solutions
Agency confidence working with SMEs	No. Non-monetary benefit not represented in CBA	Longer term impact to procurement trends of agency confidence working with SMEs on policy may be measurable in the future

G.5 Costs associated with the delivery of the BRII

The BRII is estimated to cost a total of \$16.4 million over the period FY16/17 to FY24/25.

Most costs for the BRII program accrue to government, specifically the Department of Industry, Science, Energy and Resources (DISER) and the challenge agencies participating in BRII. The main cost components are outlined below:

- Funding costs totalling \$13.2 million for round one are made up of \$2.4 million in feasibility funding and \$10.7 million in proof of concept funding. Note that feasibility costs for all SMEs in round one are included to reflect that the BRII funding model assumes the costs of many to produce the solutions of a few (i.e. the venture capital model).
- Program administration costs for running the BRII at a total of \$3.4 million. Administration costs are made up of:
 - \$1.6 million in DISER labour costs (using an average salary of \$122,021 which is the mid-point between the lower and upper bounds of an Australian Government EL1 remuneration range)¹⁰³
 - \$0.4 million in marketing expenses
 - \$0.1 million in evaluation expenses
 - \$0.7 million in member advisory panel meetings
 - \$0.1 million for an IT upgrade.
- Only those program administration costs needed to support the delivery of the BRII round one are included. To isolate this cost component, 100 per cent of administration costs accrued in years one and two of the BRII, 50 per cent of administration costs in year three (when round two had commenced) and 33 per cent of costs in year four (when both round two and three were in action) are allocated to round one.

¹⁰³ Department of Defence, 'Australian Public Service Act employment salary ranges by classification level 2018-19', available at: <https://www.transparency.gov.au/annual-reports/department-defence/reporting-year/2018-2019-113>.

- Labour costs of \$0.1 million accruing to the BRII challenge agencies reflects the requirement to commit time to guiding SMEs in the development of the solution. Based on interviews with challenge agencies an assumption of two weeks per year of a person's time (again using an average salary of \$122,021) for the FY16/17 to FY19/20 period is used.

Table 26 | Summary of the BRII costs over time (nominal) and presented in NPV

Cost type	NPV (2020/21)	FY16/17	FY17/18	FY18/19	FY19/20
Funding	\$13,159,779	\$1,864,021	\$8,747,797	-	-
Feasibility funding	\$2,443,351	\$1,864,021	-	-	-
Proof of Concept funding	\$10,716,427	-	\$8,747,797	-	-
BRII program costs	\$3,088,014	\$1,107,579	\$707,579	\$453,789	\$233,501
DISER staff	\$1,583,858	\$457,579	\$457,579	\$228,789	\$151,001
Marketing	\$376,649	\$200,000	-	\$100,000	-
Evaluation	\$131,080	\$100,000	-	-	-
Member advisory panel	\$728,658	\$200,000	\$200,000	\$100,000	\$100,000
IT upgrade	\$131,080	\$100,000	-	-	-
Challenge agency costs	\$111,479	\$23,466	\$23,466	\$23,466	\$23,466
Agency staff	\$111,479	\$23,466	\$23,466	\$23,466	\$23,466
TOTAL	\$16,359,271	\$2,995,065	\$9,478,841	\$477,255	\$256,967

It should be noted that there are also costs that accrue to SMEs in the form of opportunities costs for time taken to apply to the BRII. However, these are costs are considered negligible or at least offset by the BRII program funding for both feasibility and proof of concept (remembering the scope of this CBA deals only with successful applicants).

G.6 Sensitivity analysis

The CBA results presented here are sensitive to a few assumptions.

In addition to these assumptions, the discount rate is another key parameter that can change the overall CBA result. In line with Australian Government guidance, the CBA results are presented here at discount rates of 3 per cent, 7 per cent (base case) and 10 per cent.¹⁰⁴ The resulting net benefit range has a lower bound of \$8.2 million and an upper bound of \$13.5 million. However, there are other parameters set in the base case that have the potential to influence the overall outcome. Two of the most significant of these are:

- Years of persistence in impact to SME performance because of the BRII
- Expected future revenue growth for the BRII round one proof of concept SMEs.

A summary of how these parameters can impact the overall results is presented in Table 26 below.

Table 27 | Model parameters sensitivity analysis (holding all else constant)

Characteristic	Lower bound	Base case	Upper bound
Discount rate	3.0%	7.0%	10.0%
Net benefit	\$13.5m	\$10.4m	\$8.2m
BCR	1.93	1.64	1.46
Years of persistence	3 years	5 years ¹⁰⁵	7 years
Net benefit	\$2.7m	\$10.4m	\$17.8m
BCR	1.16	1.64	2.09
Future revenue growth (YoY)	3.0%	4.7% ¹⁰⁶	7.0%
Net benefit	\$4.8m	\$10.4m	\$18.4m
BCR	1.29	1.64	2.13

¹⁰⁴ See 'Cost-benefit analysis guidance note' (March 2020) from the Department of Prime Minister and Cabinet, available at: https://pmc.gov.au/sites/default/files/publications/cost-benefit-analysis_0.pdf.

¹⁰⁵ The persistence of impact is five years per the survey response from BRII round one proof of concept SMEs.

¹⁰⁶ Base case set at 4.7% which is the market growth average for the control group.