Addressing Australia’s collaboration ‘problem’: Is there a Brave New World of innovation policy post COVID-19?

AJ George | Julie-Anne Tarr

1 School of Business and Law, Central Queensland University, Brisbane, Queensland, Australia
2 School of Business, Queensland University of Technology, Brisbane, Queensland, Australia

Correspondence
Amanda-Jane George, School of Business and Law, Central Queensland University, 160 Ann Street, Brisbane, QLD 4000, Australia.
Email: a.m.george@cqu.edu.au

Funding information
Central Queensland University, Grant/Award Number: HE0385

Abstract
In a post-COVID-19 world, innovation stimuli and well-aligned policies will assume even greater importance as various sectors seek to recover lost ground and to generate new opportunities. Collaborative partnering in innovation research and development (R&D) between private industry and higher education has increasingly emerged over the last decade as a leading key performance indicator for government policy development, and higher education research funding allocations. Recalibration of R&D-related policies and incentivisation will require careful consideration, with constructive lessons to be learned from outcomes over the last four decades. This paper presents findings from a new study of stakeholder perceptions as to the National Innovation and Science Agenda’s impact on innovation partnerships, and synthesises outcomes from two prior studies. It then examines a newly proposed innovation policy framework, Stimulating Business Investment in Innovation (SBII), set against a background of the shifting mix of paradigms that have comprised Australian innovation policy over the last 40 years. It argues that,
following the SBII, any proposed change of policy direction will face significant challenges in its implementation, requiring a fully committed and comprehensive embrace by Government of the new APS engagement framework and greater levels of deliberative democracy.

**KEYWORDS**
innovation policy, non-R&D innovation, R&D collaboration, systems thinking

## 1 | INTRODUCTION

Stimulating collaborative research and development (R&D) has been an important goal over the last decade in policy aimed at enhanced innovation, productivity, and growth. It has also served increasingly as a key performance indicator for research funding allocation in higher education. Post-COVID-19, collaborative R&D will be critical in addressing the disease (Clinical Research Coalition, 2020; Lee & Haupt, 2020; Zhang et al., 2020; IISA, 2021) as well as its economic impacts. Collaboration, at its simplest, is a ‘partnership, alliance or network, aimed at a mutually beneficial clearly defined outcome’ (McGauchie, 2004, p. 1). Multiple forms of collaborative innovation exist, ranging from loose engagement with informal networks, to complex multiparty consortia formed by legally binding contracts. However, the role of collaboration is complex and unsettled, and outcomes are variable, with the result that this collaboration ‘problem’ has been addressed across a plethora of reports and policies (including ACIP, 2012; ACOLA, 2016; Australian Government, 2003, 2004, 2009, 2014a, 2015; Cutler, 2008; DISER, 2010–2017, 2020; Howard, 2017; Innovation & Science Australia, 2016, 2017, 2020; McGauchie, 2004; PC, 2007; Watt, 2015).

In early 2020, Innovation and Science Australia (ISA) released a proposed new innovation policy framework, Stimulating Business Investment in Innovation (SBII). In comparison to the 2015 National Innovation and Science Agenda (NISA), the SBII is remarkable in two respects: it shifts the near-term policy focus to non-R&D innovation as the mechanism to achieve productivity growth, and it introduces a clear emphasis on targeted measures (ISA, 2020, p. 22). Taken against successive governments’ flight over the last 40 years away from the interventionist industrial policy/innovation framework of the 1980s (Dalitz, 2016; Dodgson et al., 2011; Marsh & Edwards, 2008, 2009), recasting this strategy heralds a significant turnaround. Under NISA, measures to stimulate more collaborative R&D were the main policy plank in a principally neoclassical market failure-based framework. But its ‘ideas boom’ failed to materialise. A series of reviews and funding changes from 2017 onwards largely removed innovation policy from the national agenda – until the proposed SBII.

This paper synthesises a new study with two others over the last decade; together, they indicate that one of NISA’s measures to incentivise collaborative R&D may be starting to impact positively. Following release of the SBII, however, these findings risk relegation to the ‘too little, too late’ policy bin. The SBII’s signalled paradigm shift to more openly interventionist measures and its focus on non-R&D innovation has significant appeal in the austerity of a post-COVID-19 world. However, the devastating global impact of COVID-19 itself demonstrates the importance of R&D, and a clear policy recommitment to collaborative innovation would bolster the promising trend found
by the studies. In addition, the SBII’s targeted policy approach raises legitimacy issues canvassed three decades ago by Arup (1993): susceptibility to capture, and favouritism. If the government adopts the SBII’s targeted approach, it will be necessary for policymakers to more enthusiastically embrace openness and deliberative democracy in policy development – an area in which the government has yet to perform convincingly.

2 | AIMS AND METHODS

The aims of this research were fourfold: (i) to map the changing mix of paradigms inherent in Australian innovation policy over the past 40 years; (ii) to determine stakeholder sentiment and the impact of NISA measures on collaboration, if any; (iii) to examine the proposed change of policy direction in the SBII; and (iv) to highlight the potential challenges in implementing the SBII. A mixed methods approach was taken, given that policy research must be ‘of high technical quality, comprehensive, and jargon-free’; mixed methods satisfy these needs by incorporating both qualitative analyses, as well as quantitative technical data (Creswell, 1999, p. 455).

Discussion of aims (i), (iii), and (iv) rests on a qualitative historical secondary data analysis of policy, reports, and literature to come to an understanding of past policy paradigms leading up to the NISA, and to compare and contrast the proposed new SBII policy and its challenges. This type of analysis is apposite to policy research as ‘much interest’ lies in policy comparison, and exploration of policy intention, interpretation, and implementation (Tight, 2019, p. 65).

Aim (ii) of this paper requires analysis of NISA’s performance on R&D collaboration. Results from a new study, and two other Australian studies, are synthesised in order to ‘crystallize’ (Fetters & Molina-Azorin, 2017) or ‘combine’ their findings on stakeholder sentiment, to arrive at a more significant whole (Bazeley & Kemp, 2012). The first study (‘2008 study’) was co-designed by one of the authors of the present paper, and was funded by the Department of Education, Employment, and Workplace Relations (DEEWR). It was conducted by the Queensland University of Technology (QUT) (full sample \( n = 176 \); participants completing all questions \( n = \) unknown). The results have been published elsewhere (Heffernan & David, 2007; Heffernan & Kiel-Chisholm, 2008; Fitzgerald, 2008).

The second study (‘2018 study’) was conducted to update the 2008 study (full sample \( n = 173 \), participants completing all questions \( n = 90 \); ethics approval ID21006). Recruitment occurred via expert and snowball sampling, links embedded in social media posts, and an online policy forum (George et al., 2018). An online questionnaire was used to collect demographic information, along with semi-structured and open-ended questions modelled largely on the 2008 study. Quantitative data were analysed using SPSS v.23 and Microsoft Excel. Qualitative data were analysed using NVivo12 Pro software. One author conducted the coding, following reflexive thematic methods (Braun et al., 2019, p. 848), but to optimise reliability, the authors regularly debriefed on emergent themes and coding (Corbin & Strauss, 2008, p. 299; Creswell & Miller, 2000, p. 129). The 2018 study is not a repeated cross-sectional study of the 2008 study given some variation in questions and structure, although it drew on the same themes.

The third study (‘Howard study’) was commissioned by ISA, and conducted in 2017 by Howard Partners (full sample \( n = 361 \); participants completing all questions \( n = 132 \)). Its quantitative results were published elsewhere (Howard Partners, 2017). The authors of the present study obtained the qualitative data from ISA/Howard Partners for analysis using NVivo12 Pro software and reflexive thematic methods. Although both the 2008 and 2018 studies were skewed towards
the research sector (>70% research sector, 9–15% industry), the Howard Study was moderately skewed towards business (35% industry, 27% research).

3 | AUSTRALIAN INNOVATION POLICY APPROACHES

Over the past four decades, three broad theoretical approaches may be discerned in Australian innovation policy: interventionist, free market, and systems thinking. Policy frameworks have included shifting mixes of both interventionist and free market approaches. Systems thinking narratives, while increasing over the last 10 years, have yet to be utilised as a main policy anchor. Although each approach brings differing nuances and perspectives, sufficiently rough boundaries exist to support a useful heuristic for considering their relative dynamics and tensions (Dodgson et al., 2011, p. 1147). This section briefly traces the changing mix of innovation policy paradigms, and the shift towards a focus on collaborative R&D.

3.1 | Interventionist policy

From 1983 to the mid-1990s, Australia moved away from a tariff system established in the 1930s to protect local industry, towards economic liberalism. Sweeping changes in macroeconomic and industry policy were introduced to open the country up to international competition, with the Hawke Labor government embracing an ‘interventionist’ or ‘targeted’/’selective’/’corporatist’/’coordinated’ policy approach (Arup, 1993; Dalitz, 2016; Dodgson et al., 2011; Emmery, 1999b). The government’s Button Plans (1983–1996) reduced tariff protection and import quotas, restructured major industries, and provided targeted industry assistance. Industry Minister John Button spoke of embracing a ‘culture of innovation’ (Carr, 2008); industry policy was viewed in a broad social context, with economic reforms being supported by additional measures for displaced labour (Capling & Galligan, 1992, p. 210; Emmery, 1999b). These ‘atypically intelligent’ (Jones, 2006) or ‘enlightened’ (Dodgson et al., 2011, p. 1154) policies demonstrated that structural change can be facilitated by ‘establish[ing] closer partnerships between government and industry’ (Emmery, 1999b).

However, critics opined that interventionist policy, pursued in the absence of industry restructuring imperatives, may generate ad hoc incentives that change at the whim of sectoral interests or Budget cost cutters (Emmery, 1999b). Public law scholars raise similar legitimacy concerns, given the cloistered environment of Westminster policy-making, and perceived lack of public engagement in the government and Australian public service (APS) (Australian Government, 2019; George et al., 2020). Ironically, even Button himself cautioned against ‘detailed attempts to “pick winners”’ (Conley, 2017).

3.2 | Rise of free market policy

‘Free market’/’market failure’ policy stands in stark contrast to interventionism. This approach defers to market processes, aligning with the rule of law and its limited, detached role for the public sector (Arup, 1993, p. 30). In this paradigm, economic phenomena are deemed to occur in ‘a succession of static optimal states’ (Dalitz, 2016, p. 203). Policy aims to optimise resource
allocations, intervening to correct market problems such as inefficient allocation of goods and services (market failures).

In this paradigm, innovation is a linear process: invention runs through to commercialisation in a perfectly competitive market. Where innovation-related market failure arises, policy intervention is justified; for example, where R&D produces spillover benefits for third parties that cannot be captured by the innovating firm, thereby disincentivising investment in R&D. Financial instruments are typically used to increase innovation pace – not direction – such as subsidies for R&D, tax relief, and venture capital market (corrective) regulations. (Edquist, 2005; Hekkert et al., 2007; Marsh & Edwards, 2008). Within free market orthodoxy, the rejection of ‘picking winners’ is almost religiously observed (Arup, 1993, p. 31; Marsh & Edwards, 2008, p. 9).

The Howard Liberal government’s embrace of free market policy came in conjunction with several influential reports, including Mortimer’s (1997) wide-ranging inquiry. Innovation policy of this era has been described as a free market approach that ‘strongly opposed sectoral programs’ (Marsh & Edwards, 2009), although this may be overstating the case. While the free market narrative has dominated from Howard’s era onwards, governments cannot afford to be purist – realpolitik dictates that all engage in interventionist strategies of some kind (Emmery, 1999a; Jones, 2006).

Indeed, the Howard government retained the Button Plans (Jones, 2006), and Mortimer himself suggested that industry policy should go further than what the market determines (Richardson, 1997); he ushered in targeted ‘action agendas’ that were criticised by neoclassical pundits such as the Industry Commission (Gibbs & Emery, 1998; Richardson, 1997). Sometimes, calls for interventionist partnerships were infused with the more acceptable free market narrative, positing that ‘[t]he Commonwealth Government must work in partnership with industry to overcome areas of market failure and promote more dynamic economic growth’ (Emmery, 1999a).

3.3 Emergence of systems thinking

The ‘systems’ paradigm also emerged during this time. Proponents emphasise innovation systems as interconnected, profoundly uncertain, and directed often by emergent properties. Systems thinkers eschew free marketeers’ use of an equilibrium-based linear theory, for one that embraces dynamic processes that destroy equilibrium (Dalitz, 2016; Dodgson et al., 2011). Market failure is not only tolerated, but taken as part of the fabric of innovation. Joseph Schumpeter’s (1942, 1934) work advocating ‘industrial mutation’ and ‘creative destruction’ is commonly referenced, but the notion of a national innovation system (NIS) actually dates back to the 19th century (Dekkers et al., 2014; Freeman, 2002; Lundvall, 1992; Marshall, 1890; Nelson, 1993).

For systems thinkers, the principal threat is system failure due to a lack of support for innovation or business model experimentation. Systems-oriented policy thus addresses limiting factors for actors responding to dynamic change, focusing on connection-forging initiatives (Dalitz, 2016; Dodgson et al., 2011, p. 1153; Hekkert et al., 2007) rather than single-firm measures such as R&D tax incentives. Systems policy also considers demand-side activities (such as creating new markets), in contrast to the usual supply-side (science push) free market approach (Dalitz, 2016; Dodgson et al., 2011; Marsh & Edwards, 2008, 2009).

A significant benefit of systems theory is its ability to embrace other forms of innovative activity, such as non-R&D innovation (Dodgson et al., 2011), and transformative innovation, with its focus on social and/or environmental issues (Fagerberg, 2017, 2018; Mazzucato, 2018). In fact, innovation policy is itself viewed as a complex system (Dodgson et al., 2011). Schools of thought are nuanced. For some, innovation policymaking may constitute an intermediary/facilitator role
whereby ‘the government does not just leave things to the “free market” yet it does not “pick winners” either’ (Doddson et al., 2011, p. 1153). For others, it necessarily involves an interventionist approach: ‘where technological development is the object, selective or focused policies are also first best’ (Dalitz, 2016; Marsh & Edwards, 2008, p. 12).

Systems narratives have swelled in the last decade, but policy traction remains limited (Doddson et al., 2011; Marsh & Edwards, 2009). Marsh and Edwards (2008, 2009) traced an early traction fail at the National Innovation Summit, in the lead up to the Backing Australia’s Ability policies in 2001 and 2005. The Summit, they concluded, was a ‘decorative activity’ that failed to exercise ‘any substantive influence’ on policy thinking (Marsh & Edwards, 2009, p. 408); it was constrained by hazards of institutional lock-in with the successful free-market paradigm, multiple veto points, and pressure to maintain fiscal and policy discipline.

The Productivity Commission report on science and innovation (PC, 2007) then articulated a policy theory ‘void’: while conceding that neoclassical policy benchmarks were essentially unattainable, it failed to engage with systems theory as an alternative (Dalitz, 2016, p. 209). The Cutler Review (2008) and Labor government’s Powering Ideas framework (2009) were infused with a systems thinking narrative, and included some selective measures, but also ran the market failure narrative in tandem, creating a ‘confused co-existence’ that dictated policy outcomes (Doddson et al., 2011, p. 1152). In lieu of focusing on ways to cure the lack of collaboration identified by the Cutler Review, two thirds of government support for business innovation were devoted to single-firm support via the R&D tax incentive (Doddson et al., 2011).

3.4 Swing back to free market policy

The Abbott Liberal government’s policy from 2013 to 2015 represented a ‘rejection of an innovation systems [approach] … and a recommitment to market mechanisms’ (Howard & Green, 2019, p. 37). The Industry Innovation and Competitiveness Agenda (IICA) expressly advocated a neoclassical framework to address market gaps and deficiencies. Set against Liberal austerity imperatives, the IICA contended that prior policy frameworks had ‘overreached’ their role, spending, regulating, and borrowing too much, whereas subsidies had ‘distorted’ business decision-making without addressing the problems, undermining productivity (Australian Government, 2014b, p. 21). Despite strong recommendations for greater incentivisation of R&D collaboration in prior reports, including by the IICA itself (pp. 16, 47, 75–76), the ‘imbalanced’ level of single-firm R&D support increased from 66% (Doddson et al., 2011, p. 1153) to around 92% of programs encouraging business investment in innovation (George et al., 2020).

3.5 Innovation policy loses its way

The NISA was then launched in 2015 under the Turnbull Liberal government. It employed the usual free market narratives, positioning its role as investing in enablers (education, science, research, and infrastructure), incentivising business investment (remediating underinvestment), and removing regulatory obstacles. More than 60% of total spend was devoted to incentivising R&D collaboration, given that Australia had placed lowest in the Organisation for Economic Co-operation and Development (OECD) rankings (Australian Government, 2015, p. 10). However, the NISA’s 24 ‘disparate’ measures (Auditor-General, 2017, p. 27) seemed to gain little traction. Following a damaging performance audit of its design and implementation in 2017, the agencies
conceded that little impact would likely be registered from the $1.1 billion spent (Auditor-General, 2017; George et al., 2020).

ISA then proposed a new innovation plan (‘2030 Plan’) (ISA, 2017). The 2030 Plan, following on from its Innovation Systems Review (ISA, 2016), adopted a systems thinking narrative. It identified ‘critical gaps’ in the innovation system, lagging commercialisation and export performance, and ‘a tendency towards incremental rather than new-to-world innovation’ (ISA, 2017, p. 20). Recommendations included more interventionist measures such as national missions to ‘catalyse novel and new, rather than incremental, innovations’ (ISA, 2017, p. 91), as well as direct grants. A mix of R&D-focused free market-style initiatives was also included, such as reforming the R&D tax incentive and a collaboration premium. Reactions to the 2030 Plan ranged from it being ‘[one of the] more serious efforts at strategy development’ (Howard, 2020, p. 9); to ‘wildly ambitious’ but with modest recommendations – which, post-NISA, were tailored for a risk averse, disinterested, cost-cutting government (Riley, 2019).

However, governmental response was ambivalent, with just 17 of the 30 recommendations receiving support (Australian Government, 2018). Innovation effectively departed the political agenda, with the newly appointed Minister for the Industry portfolio, Karen Andrews, observing innovation to be ‘political poison’ after the 2016 election (Redrup, 2020). By 2019, ‘Innovation’ had been deleted from the Industry portfolio title, and the R&D tax incentive program had undergone reform and successive cuts (Ferris et al., 2016). Commentators – depending on perspective – viewed the government as either having ‘left innovation for dead’ (Powell, 2019), or putting innovation policy into mothballs for a ‘reset’ period (Howard & Green, 2019, p. 40). Figure 1 sets out a timeline of the shifting innovation policy approaches from 1983 to 2020.

The 2018–2019 reset period presented an opportunity to study stakeholder sentiment regarding R&D collaboration which, as noted, was a central concern of NISA and the 2030 Plan. Although a formal review of measures targeting collaboration is not scheduled until 2022, the studies discussed in Section 4 suggest NISA’s measures may be shifting stakeholder sentiment. These studies provide context for the most recent move to change policy direction (SBII), discussed in Section 5.

4 | THE R&D COLLABORATION CONUNDRUM

4.1 | The policy challenge

Many studies have found that collaboration enhances innovation and productivity (Blomqvist et al., 2005; Cin et al., 2017; Katz & Martin, 1997; Perkmann & Salter, 2012; Yasar & Paul, 2012). An oft-cited policy statistic is that innovative firms are ‘three times’ as likely to grow productivity (ISA, 2016, p. 81; Australian Government, 2015, p. 10; Watt, 2015, p. iii). Although others have argued that evidence is ‘not always convincing’ (Dickinson & Sullivan, 2014; Glasby & Dickson, 2008; Sullivan et al., 2013, p. 123), there is a pervasive neoclassical belief in the ‘direct link’ between R&D and economic growth (Dalitz, 2016, p. 202). Reports and policy frameworks for more than 20 years have embraced the notion that policy must boost R&D collaboration to drive innovation, commercialisation, and thus productivity (ACIP, 2012; ACOLA, 2016; Australian Government, 2003, 2004, 2009, 2014a, 2015; Cutler, 2008; DISER, 2010–2017, 2020; Howard, 2017; ISA, 2016, 2017; McGauchie, 2004; PC, 2007; Watt, 2015). Policymakers have been ‘desperately seeking innovation nirvana’ (Noble et al., 2019), but with little success on metrics such as OECD rankings (OECD, 2018), or the Global Innovation Index, as shown in Figure 2.
This is perhaps unsurprising, as the innovation triple helix (government, research, and industry) involves significant collaboration challenges for all stakeholders (Bruneel, D’Este, & Salter, 2010; Dodgson et al., 2011; Howard, 2011, 2017; McBratney & McGregor-Lowndes, 2010). The Australian experience is illustrative. In 1993, Australia was described as having a relatively low level of science and technology expenditure, a high level of government financed research, low level of private sector R&D, and high dependence on foreign technology (Dodgson et al., 2011; Gregory, 1993). The situation may have ‘improved somewhat’ (Department of Industry, 2015, p. 13), but Australia remains predominantly a technology taker rather than maker (Green & Logue, 2013, p. 99). Relational and cultural issues dividing the research and industry sectors pose ongoing challenges (Howard, 2017, 2020).
The NISA introduced two measures aimed at the research sector in a kind of ‘carrot and stick’ arrangement: realignment of block grant funding towards industry-focused outcomes, and engagement and impact reporting (Watt, 2015). Three studies provide new insights into how NISA performed in terms of encouraging collaborative R&D, before what may be a step-change in innovation policy focus with the proposed new SBII policy framework.

4.2 The 2008, 2018, and Howard studies

As discussed above in our aims and methods, in this section we gather results from a new study, plus two earlier Australian studies. The 2008 study included a survey to investigate stakeholder sentiment on collaboration, its challenges (particularly legal and contracting), success factors, and policy options. The 2018 study was designed to update the 2008 results. The authors also obtained data from the Howard study that supported the ISA 2030 Plan. The ‘crystallized’ (Fetters & Molina-Azorin, 2017) or ‘combined’ findings on stakeholder sentiment present a more significant whole (Bazeley & Kemp, 2012).

The 2008 study confirmed the research sector’s reluctance to collaborate: universities were less likely than government, or industry, to be involved with industry (Heffernan & David, 2007, p. 23). In the 2018 study, participants selected their most important partners, rather than frequency of partner collaboration. However, a similar divide in research sector/industry focus was found. Non-small to medium enterprise (non-SME) participants most frequently selected universities as an important collaborating partner (22.4%), then large industry (19.6%), government (16.8%), and SMEs (15.9%), $\chi^2(8) = 4.06, p = .852$. Conversely, SMEs were over three times more likely to report large industry, government, or other SMEs as important collaborators, rather than the research sector, as depicted in the shaded section in Table 1.
TABLE 1  Respondent’s most important collaborative partner (n = 107)

|                  | Total Frequency | Total % | Non-SME % | SME % |
|------------------|-----------------|---------|-----------|-------|
| University/College | 24              | 22.4%   | 24.2%     | 8.3%  |
| Industry/Large enterprise | 21              | 19.6%   | 18.9%     | 25.0% |
| Government      | 18              | 16.8%   | 15.8%     | 25.0% |
| Industry/SME    | 17              | 15.9%   | 14.7%     | 25.0% |
| Other research institution | 12              | 11.2%   | 11.6%     | 8.3%  |
| Non-government institution | 6               | 5.6%    | 5.3%      | 8.3%  |
| Health service  | 3               | 2.8%    | 3.2%      | 0.0%  |
| Client          | 3               | 2.8%    | 3.2%      | 0.0%  |
| Other           | 3               | 2.8%    | 3.2%      | 0.0%  |

These findings are supported by the Howard survey. Few (31%) agreed or strongly agreed ‘businesses are actively seeking to engage more effectively with universities over innovation’ (Howard, 2017, p. 89). Less than half (48%) of participants agreed or strongly agreed that ‘there have been major improvements over the last 10 years in how effectively universities engage with business over innovation’ (Howard, 2017, p. 102). However, there was some optimism: 65% of participants agreed or strongly agreed that ‘universities are actively seeking to engage more effectively with business over innovation’ (Howard, 2017, p. 101). This may be significant in light of further results in the 2008 and 2018 studies.

In the 2008 study, participants rated the importance of collaboration outcomes. The survey was conducted prior to NISA, so there was no option for ‘industry impact’. Given the strong research sector bias in the sample, unsurprisingly the most important outcome was co-authored publications (62%). Publications, sharing knowledge, and student exchanges were more important for researchers than government/industry, and entering formal research agreements, intellectual property, licensing, royalties, and product development were more important for government/industry (Heffernan & David, 2007, p. 35). These divided interests have given rise to many of the cultural and relational difficulties inherent in R&D collaborations.

The 2018 study asked participants to make selections from the same 13 ‘important outcomes’ as the 2008 study, as depicted in Figure 3. However, ‘improved research practices’ was replaced with ‘to create industry or community impact for my research’, to test the effect of NISA initiatives. The ‘industry or community impact’ outcome was most frequently selected (62%). Further, ‘product development or solutions for industry’ ranked as the sixth most important outcome, moving up from 10th in 2008.

Again, the most important outcomes varied by organisation type. Figure 4 shows that research organisations, as compared to non-research, were more likely to report creating industry or community impact as a most important outcome, $\chi^2(1) = 4.86$, $p = .027$, followed by sharing knowledge, $\chi^2(1) = 9.34$, $p = .002$, and co-authored publications, $\chi^2(1) = 14.80$, $p < .001$.

Conversely, respondents from industry, when compared to research, were more likely to select product development, $\chi^2(1) = 9.88$, $p = .002$, followed by entering formal agreements, $\chi^2(1) = 0.00$, $p = .977$, and enhanced research infrastructure, $\chi^2(1) = 0.80$, $p = .3$, as depicted in Figure 5.

These results suggest that while sectoral divisions remain, there has been a shift in research sector focus towards industry impact. The positive Howard results on universities ‘actively seeking to
engage more effectively with industry’ support this finding. However, there are some limitations: the ‘impact’ outcome was not included in the 2008 study; the 2018 outcome incorporates both industry and community impact; and the 2018 study measured frequency of selection rather than rated importance. Nevertheless, the 2018 study shows a clear research sector focus on impact and suggests an increased focus on ‘product development’.
The 2018 survey also asked participants to indicate their level of agreement with ways to grow a stronger culture of collaborative research. As shown in Figure 6, the mechanism most agreed and strongly agreed was ‘aligning block grant funding towards collaboration’ (78%). This is significant, given recent suggestions to include similar requirements for business grant funding (Nous, 2019, p. 31). In contrast, only 45.6% of participants agreed or strongly agreed that ‘engagement and
impact reporting’ would assist; thus, it may not be as effective in driving cultural change as anticipated.

Although these results signal a new research sector focus on impact, they have not yet translated to an increase in collaborative innovation. As shown in Figure 2, Australia’s ranking on collaboration slipped from 32 to 35 in 2019, then down to 39 in 2020. And any success seems to have come ‘too little, too late’. The latest policy advice seeks solace in different metrics, and a change in focus from collaborative R&D to non-R&D innovation, as discussed in the following section.

5 FROM THE 2030 PLAN TO STIMULATING BUSINESS INVESTMENT IN INNOVATION

The 2030 Plan’s recommended innovation metrics review was conducted during 2018–2019. Its consultation paper signals a shift in innovation focus – away from R&D (DISER, 2019a). It speculates that Australia’s innovation metrics require recalibration, given that Australia has had years of economic growth and excellent recovery from the global financial crisis, but has slipped in global comparative innovation measures. Proceedings indicate there is an ‘urgent’ need for metrics capturing ‘hidden’ innovation, such as in the services and resources sectors, where innovation does not involve R&D, or occurs informally (DISER, 2019b, p. 11). Key messages include that ‘innovation is not just about new-to-world innovation, but is also about innovation adoption and diffusion’ (DISER, 2019a, p. 13). This echoes the long-held view of some economists that ‘R&D is no longer the total sum of innovation performance, if it ever was’, and that non-R&D innovation must be better integrated in the policy narrative, with a greater systems thinking focus, incorporating targeted measures (Green & Logue, 2013, p. 94).

The innovation metrics workshop presaged the release of two supporting reports for ISA’s new policy framework (AlphaBeta, 2020; Nous, 2019), which also emphasise the importance of non-R&D innovation. In the clearest of calls to a paradigm shift, the Nous report argues that the ‘timing is right’ for a policy move – ‘away from the Washington Consensus to a more proactive approach’ (Nous, 2019, p. 9). The term ‘Washington Consensus’ is often used pejoratively as shorthand for free market policies. In endorsing a ‘proactive’ approach, the report notes a ‘reluctance to pick winners’ (Nous, 2019, p. 6), but offers the classic ‘critical mass’ response: Australia should concentrate its resources in areas of comparative advantage in the global market – because (a) this is what others are doing: ‘[o]verseas governments have long picked winners’ (Nous, 2019, p. 21); and (b) the current wide range of low-budget generalist support measures do not seem to be working (Nous, 2019, p. 6). ISA’s 2030 Plan ran a similar argument (ISA, 2017, p. 18); its most recent report does the same (IISA, 2021, p. 20). It should be noted that free marketeers have long rejected this argument, because Australia is ‘too small to pretend to world domination’, and in any event, strategic trade theory does not provide guidance on what winners to pick, or how (Emmery, 1999a).

The SBII report was then launched in February 2020 by incumbent ISA chair Andrew Stevens. The SBII relies on the Nous and Alpha Beta reports to recommend a major strategy change: a ‘rebalancing’ of initiatives towards non-R&D innovation, via targeted policy measures. While the SBII cautiously notes ISA’s past emphasis on R&D, and acknowledges R&D’s importance in ‘the overall innovation system’, it observes what economists knew: Australian business invests significantly in non-R&D innovation: new or improved business models, organisation and marketing practices (ISA, 2020, p. 5). Business expenditure on R&D (BERD) is not a strong predictor of this broader innovation spend, and even where firms invest in R&D, 80% spent more than half of their innovation budget on non-R&D activity (ISA, 2020, p. 14). Accordingly, a different policy mix is
suggested: measures stimulating R&D should be complemented by medium term (5–10 year) 'significant additional' support for non-R&D innovation, predominantly software/digital technology (ISA, 2020, pp. 7, 17). Funding could come from new investment or 'streamlining' current innovation programs, hinting at possible further cuts to the R&D tax incentive (ISA, 2020, pp. 10, 17). IISA’s latest report also observes that '[i]nvestments made through the R&DTI are agnostic to the priority growth sectors due to the indirect design of the initiative’ (IISA, 2021, p. 17), and that this measure now comprises 96% of broad-based business support for business (IISA, 2021, p. 35).

A review of all SBII's recommendations is beyond the scope of this paper; for present purposes, Imperatives 1 and 2 are of interest as they detail the new interventionist/systems approach. Imperative 1 calls for a policy 'rebalance' towards non-R&D innovation, including levers such as procurement and missions, as well as selective funding for high-potential firms (ISA, 2020, p. 6, 7). Imperative 2 recommends a targeted prioritisation of key growth sectors (from the IICA in 2014). Here, the SBII relies on the same ‘critical mass’ argument as the Nous report (SBII, 2020, p. 20). However, the SBII adds a compelling rejoinder to the free marketeers’ rejection of strategic trade theory. Although Australia may have been too small for world market domination, the scalability of intangibles in the digital environment means that rapid, global growth is possible and may in fact pave the way for “‘winner takes all’ scenarios’ (ISA, 2020, p. 5). Yet the vexed question of how to pick the winners and mechanisms to fund them requires ‘more detailed analysis’ (ISA, 2020, p. 17). The most recent report is a first step along this path (IISA, 2021), although detailed analysis of this report is beyond the scope of this paper.

Interestingly, although the SBII openly adopts a systems/interventionist approach, it displays the same ‘confused’ reliance on free market justifications as past policy frameworks (Dodgson et al., 2011, p. 1152). When asking ‘[w]hy should government encourage additional non-R&D business investment? Where is the market failure?’, the answer is not that the paradigm is a poor policy fit, but that market failure does exist, as an underinvestment in non-R&D innovation (ISA, 2020, p. 15). Government intervention is required for all those reasons ‘that have long underpinned government support of R&D’: spillovers can be achieved, but information asymmetries and high-cost legacy ICT systems present problems; ‘all these market failures … result in a sub-optimal investment in innovation’ (ISA, 2020, p. 16).

The SBII then switches back to a systems narrative, stating government’s role is to ‘coordinate, facilitate, and act as a catalyst for innovation and develop new markets for businesses’ (ISA, 2020, p. 16). However, as its name implies, the SBII’s focus is clearly on ‘industry ecosystems’ (used 13 times) rather than ‘innovation systems’ (used five times). The need for industry–research collaboration is reimagined as the need to facilitate industry’s ‘access to capabilities’ via contract research (ISA, 2020, p. 23) – what others call ‘merchandising knowledge products’ (Howard, 2020, p. 42). Otherwise, ‘industry–government’ collaboration is to be funnelled through Industry Growth Centres (ISA, 2020, p. 24). Subsequently, ISA was renamed Industry, Innovation and Science Australia (IISA) in October 2020.

As the above discussion shows, the trajectory back to interventionist policy was signalled by ISA for some time pre-COVID-19, although the new systems narrative is industry-focused, and the confused reliance on free market justifications has lingered. The Howard study also found that stakeholders would support an interventionist approach. In the final open-ended question, ‘[p]lease feel free to provide any additional points you would like to stress in your feedback’ (n = 132), the largest node (coded theme) to emerge was ‘policy, political issues’. Almost two thirds of the participants were coded for this node (n = 84; 63.6%). Within this node, child nodes were created to capture sub-themes within the data. The largest child nodes were ‘lack credible govt
support’ (22.6%), ‘bipartisan approach needed’ (19%), and ‘focus on “winning” sectors’ (13%). Figure 7A depicts all parent nodes, and Figure 7B depicts the ‘policy’ parent and child nodes.

NVivo cluster analysis was then performed. Nodes with similar words cluster more closely, suggesting similar themes. Pearson correlation coefficient was applied. As shown in Figure 8, there were very strong correlations between parent node ‘policy, political issues’ and its child nodes ‘lack credible govt support’ (0.86), ‘bipartisan approach’ (0.82), and ‘focus on “winning” sectors’ (0.80).

Both node sizes and cluster analysis suggest that although there is ambivalence about innovation policy performance, stakeholders want to see a bipartisan, more interventionist approach moving forward. Comments included reference to non-R&D innovation (such as business model innovation), as well as targeted policy –

There is too much attention paid to Technology based innovation and not enough on the humanities or human-centred aspects such as Business Model Innovation … (Respondent 200).

The issue of government having an obsession with not picking winners was not addressed in the survey except in one question relating to risk. Other countries with successful innovation systems do not have such constraints (Respondent 275).
Howard’s latest study urges that ‘[w]e must dispense with the idea that an active industrial strategy is about “picking winners”’ (Howard, 2020, p. 1). On the SBII, he dismisses ISA as ‘sidelined’ and relegated to producing ‘safe information papers’ (Howard, 2020, p. 40). He calls for a ‘major investment commitment’ to research, development, and innovation in new technology areas (Howard, 2020, p. 59). Minister Karen Andrews has indicated that the government will continue to support R&D collaboration, but this does not mean a ‘Spend-A-Thon’ of new initiatives (Riley, 2020a).

The SBII’s focus on non-R&D innovation aligns with emerging research on COVID-19-related business activity. The Australian Bureau of Statistics’ (ABS) Business Impacts of COVID-19 survey in March 2020 found that 38% of businesses responded to the impact of COVID-19 by engaging in non-R&D innovations, changing their method of delivery of products and services, including shifting to online. Only 10% introduced new products (ABS, 2020a). As Stevens noted of this COVID-19 data, ‘leaders … are shifting their business models … investing in technology and systems and investing or changing their marketing and branding strategies’ (Stevens, 2020). IISA suggests that five years of progress was made in consumer and business digital adoption in just eight weeks (IISA, 2021, p. 8). The COVID-19 pandemic may thus lend unexpected impetus for the government to accept the SBII’s push for a policy ‘rebalance’ toward non-R&D innovation, given its more incremental nature compared to collaborative R&D: 73% of businesses reported no intentions of capital expenditure for 2020–2021 (ABS, 2020b). No doubt, the SBII’s recommended ‘streamlining’/cost-cutting will also be front of mind for a government that has expended around $320 billion to date on COVID-related economic measures (Carnon, 2020).

Whether government accepts the SBII’s recommendations remains to be seen, although early indications suggest it will receive a warmer embrace than the 2030 Report (Andrews, 2020; Riley, 2020b). IISA’s latest report reinforces the SBII’s call to interventionism, asserting that ‘Government’s traditional ISR [innovation, science and research] role of stepping in only to address market failures and asymmetries is being challenged internationally’ (IISA, 2021, p. 10). It recommends ‘a progressive shift toward direct investment mechanisms to achieve targeted outcomes for business- and higher education-performed ISR’ (IISA, 2021, p. 47). If a more openly interventionist style is adopted, legitimacy concerns will demand an increased focus on openness in innovation policymaking, as discussed in the next section.

6 INTERVENTIONIST POLICY: THE NEED FOR OPENNESS, DELIBERATIVE DEMOCRACY

As free marketeers have observed, there is an ‘old’ and ‘new’ push for interventionist innovation policy. The ‘new’ push, freed from the Hawke-Keating era wider economic reform agenda, brings with it heightened concerns. The ‘picking winners’ dilemma remains. Policy may be ad hoc, and subject to capture (Emery, 1999a). Howard suggests the problem is that funding decisions are made ‘under a wide range of public administration and political processes’, including opaque criteria, ministerial discretion, and ‘informal one-off grants arising from advocacy and lobbying’ (Howard, 2020, p. 50). He suggests a new commission and suite of new councils to provide accountability.

In the absence of effective mechanisms to sure up governance and accountability issues, interventionist policy also raises complex legal issues around executive power and the cloistered nature of policy-making in the Westminster system, given its conventions of secrecy. More than 25 years ago, Arup (1993) raised legitimacy concerns with the increase in government–industry partnerships and selective innovation policy, given that policymaking is largely beyond parliamentary
or judicial scrutiny. He suggested procedural reforms, and audits, to check policy-making power. However, the audit results on NISA show that neither agency policy guidelines nor the prospect of an audit was sufficient to prevent deficient innovation policymaking (George et al., 2020). Lessons from the audit no doubt factored into Minister Andrews’ request for, and IISA’s recent production of, its further report on ‘the effectiveness of the Commonwealth Government’s investment in, and system performance of, ISR’ (IISA, 2021).

Another checking mechanism is the Freedom of Information (FOI) regime, which was designed to provide the public with some level of oversight of government and agency policymaking. In 1995, the Australian Law Reform Commission (ALRC) noted FOI requests for policy information are the litmus test for increased government accountability and citizen participation – but FOI costs, inconvenience, and frustration resulted in few applications (ALRC, 1995). The regime presently fails to provide the intended level of public scrutiny of policymaking (George et al., 2020). The other means of increasing accountability lies in government engagement initiatives. However, reform initiatives over the past two decades designed to increase levels of openness and deliberative democracy within the government and APS have failed to gain traction (George et al., 2020). The recent independent review of the APS recommended a Charter of Partnerships to set expectations around engagement (Department of the Prime Minister & Cabinet, 2019, p. 119), but the government instead adopted the newly minted APS Framework for Engagement and Participation (Australian Government, 2020). The ‘deliberative’ engagement mechanism in this new framework has a welcome emphasis on policy co-design and is apposite in the innovation portfolio where, if government deliberates alone, this ‘will create winners or losers’ (Australian Government, 2020, p. 15).

The SBII framework is the first step in a potentially significant move to more interventionist policy, and the shift from a largely R&D focus to make way for non-R&D will understandably rattle the nerves of the collaborative R&D sector. IISA’s latest report certainly recommends accelerated support for non-R&D innovation, although not at the expense of ‘effective’ investment in R&D (IISA, 2021, p. 35). A clearer policy recommitment to R&D would bolster the emerging positive trend in stakeholder sentiments around innovation in this sector. Whether the SBII can succeed where the 2030 Plan failed in achieving government acceptance of more interventionist policy remains to be seen. But if it does, there will be clear ‘winners’ and ‘losers’, and policy development will need to adhere closely to the deliberative co-design prescriptions in the new APS Framework, to avoid another disappointing outcome like the NISA. IISA’s latest report does not feature significant narratives around co-design for the government’s ISR investments, apart from the newly emerging space sector program (IISA, 2021, p. 19).

7 | CONCLUSIONS

This paper has mapped the trajectory of Australian innovation policy over the past 40 years, from interventionist policy of the 1980s to a predominantly ‘free market’ paradigm. Policymaking up to the NISA was dominated by supply-push, generalist financial policies, such as the R&D tax incentive. The focus on R&D collaboration has evolved from the free marketeers’ view of innovation as a largely linear process, which government can ‘boost’ by pulling policy levers to drive innovation and hence productivity. However, the systems approach also focuses on collaboration, by driving up the level of connectivity between elements of the system (Dalitz, 2016; Dodgson et al., 2011; Howard, 2020). The failure to increase research–industry collaboration has been called a
fundamental ‘system failure’ (Howard, 2020, p. 18), but although systems thinking has entered policy narratives, there has been little success in implementing systems-oriented policy design. Although the NISA was largely ineffective, our 2018 study, taken together with the 2008 and Howard studies, suggests that its realignment of block grant funding may actually be having an impact on research sector sentiment towards collaboration and industry impact. However, any success in this area may be ‘too little, too late’. The SBII signals a policy paradigm shift on two important fronts: greater adoption of interventionist measures, and a new focus on non-R&D innovation. The SBII has moved to embrace non-R&D innovation at a fortuitous time. ABS data indicate the likely impact of COVID-19 is that firms will gravitate towards more incremental, continuous innovation as a means to secure recovery and growth in the austerity of a post-COVID-19 business environment. Yet collaborative R&D has an important place in the emerging answers to the COVID-19 problem (IISA, 2021), and this factor alone highlights the need for policy balance, and a recommitment to its long-term support. The government has yet to respond to IISA’s call (IISA, 2021, p. 47) to shift business- and higher education-performed ISR toward direct mechanisms to achieve targeted outcomes.

The paper argued that any return to interventionist policy will necessarily encounter the usual objections from free market policy proponents: ‘picking winners’ is a dangerous game, exposing the government to sectoral capture. Finding funds to selectively stimulate non-R&D innovation in the post-COVID austerity will likely involve cost cutting, and losers, in other industry sectors. Interventionism also attracts the public lawyer’s ire, given policymaking in Australia, at this stage, largely remains beyond the scrutiny of parliament, the courts, and the public. If the government accepts the SBII’s challenge, the move will require an enthusiastic embrace of the new APS Framework, and greater levels of deliberative democracy than we have seen hitherto in Australian policymaking.

ACKNOWLEDGEMENT
This study was carried out with funding from CQUniversity under a New Staff Grant.

CONFLICT OF INTEREST
The authors declare no conflict of interest.

ORCID
AJ George @ https://orcid.org/0000-0002-6308-3558

REFERENCES
Advisory Council on Intellectual Property (ACIP). (2012). Collaborations between the public and private sectors: The role of intellectual property. Canberra, Australia: ACIP.
AlphaBeta Advisors. (2020). Australian business investment in innovation: Levels, trends, and drivers. https://www.industry.gov.au/sites/default/files/2020-02/australian-business-investment-in-innovation-levels-trends-and-drivers.pdf
Andrews, K. (2020, May 20). Address to the National Press Club, Canberra (Speech Transcript). https://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22media%2Fpressrel%2F7348359%22
Arup, C. (1993). Innovation, policy and the law. Cambridge, UK: Cambridge University Press.
Auditor-General of Australia. (2017). Design and monitoring of the national innovation and science agenda (Report No. 10 2017–2018). Barton, Australia: Australian National Audit Office (ANAO).
Australian Bureau of Statistics. (2020a). Business impacts of Covid-19 Survey (Report 5676.6.55.003). https://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/6B4215D58C14410CA25855D007F86DA?opendocument
Australian Bureau of Statistics. (2020b). *Business impacts of Covid-19 Survey* (Report 5676.0.55.003). https://www.abs.gov.au/ausstats/abs@.nsf/mf/5676.0.55.003

Australian Council of Learned Academies (ACOLA). (2016). *Review of Australia’s research training system*. Melbourne, Australia: ACOLA.

Australian Government. (2003). *Our universities: Backing Australia’s future*. Canberra, Australia: Australian Government.

Australian Government. (2004). *Backing Australia’s ability – Building our future through science and innovation*. Canberra, Australia: Australian Government.

Australian Government. (2009). *Powering Ideas: An Innovation Agenda for the 21st Century*. Australian Government, Canberra.

Australian Government. (2014a). *Boosting the commercial returns from research*. Canberra, Australia: Australian Government.

Australian Government. (2014b). *Industry innovation and competitiveness agenda*. Canberra, Australia: Australian Government.

Australian Government. (2015). *National innovation and science agenda*. Canberra, Australia: Australian Government.

Australian Government. (2018). *Australian Government response to Innovation and Science Australia’s Australia 2030: Prosperity through innovation*. Canberra, Australia: Australian Government.

Australian Government. (2019). *APS review: Priorities for change*. Canberra, Australia: Australian Government.

Australian Law Reform Commission (ALRC). (1995). Open government: A review of the federal freedom of information Act 1982, Report No. 77. Australian Government.

Bazeley, P. & Kemp, L. (2012). *Mosaics, triangles, and DNA: Metaphors for integrated analysis in mixed methods research*. *Journal of Mixed Methods Research*, 6(1), 55–72.

Blomqvist, K., Hurmelinna, P., & Seppänen, R. (2005). Playing the collaboration game right – Balancing trust and contracting. *Technovation*, 25(5), 497–504. https://doi.org/10.1016/j.technovation.2004.09.001.

Braun, V., Clarke, V., Hayfield, N., & Terry, G. (2019). Thematic analysis. In P. Laimputong, (Ed.), *Handbook of research methods in health social sciences* (pp. 843–860). Springer.

Bruneel J., D’Este, P. & Salter, A. J. (2010). Investigating the factors that diminish the barriers to university-industry collaboration. *Research Policy*, 39(7), 858–868.

Capling, A., & Galligan, B. (1992). *Beyond the protective state: The political economy of Australia’s manufacturing industry policy*. Cambridge, UK: Cambridge University Press.

Carr, K. J. (2008, April 9). Button and his artful industrial revolution. *Sydney Morning Herald*. https://www.smh.com.au/business/john-button-and-his-artful-industrial-revolution-20080408-2406.html

Cin, B. C., Kim, Y. J., & Vonortas, N. S. (2017). The impact of public R&D subsidy on small firm productivity: Evidence from Korean SMEs. *Small Business Economics*, 48, 345–360.

Corbin, J., & Strauss, A. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. SAGE Publications Inc.

Clinical Research Coalition. (2020). Global coalition to accelerate COVID-19 clinical research in resource-limited settings. *The Lancet*, 395(10233), 1322–1325. https://doi.org/10.1016/S0140-6736(20)30798-4

Conley, T. (2017, April 26). From protectionism to economic liberalism: The managed decline of the Australian automotive industry. *Big P Political Economy*. http://tomjconley.blogspot.com/2017/04/

Creswell, J. W. (1999). Mixed-method research: Introduction and application. In G. J. Cizek (Ed.), *Handbook of educational policy* (pp. 455–472). San Diego, CA: Academic Press.

Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory into Practice*, 39(3), 125–130. https://doi.org/10.1207/s15430421tip3903_2

Cutler, T. (2008). *Venturous Australia: Building strength in innovation*. North Melbourne, Australia: Cutler & Co.
Dalitz, R. (2016). Innovation and growth: The Australian Productivity Commission’s Policy Void? *The Economic and Labour Relations Review*, 27(2), 199–214.

Dekkers, R., Talbot, S., Thomson, J., & Whittam, G. (2014). Does Schumpeter still rule? Reflections on the current epoch. *Journal of Innovation Economics & Management*, 13(1), 7–36.

Department of Industry, Innovation and Science. (2015). *Australian innovation system report*. Australian Government.

Department of Industry, Science, Energy and Resources (DISER). (2019a). *Improving innovation indicators*. Canberra, Australia: Australian Government.

Department of Industry, Science, Energy and Resources. (2019b). *Innovation metrics review*. Canberra, Australia: Australian Government.

Department of Industry, Science, Energy and Resources. (2010–2017). *Australian innovation system report*. Canberra, Australia: Australian Government.

Department of Industry, Science, Energy and Resources. (2020). *Australian innovation system monitor*. Canberra: Australian Government.

Department of the Prime Minister and Cabinet. (2019). *Our public service our future: Independent review of the Australian Public Service*. Canberra, Australia: Australian Government, Department of the Prime Minister and Cabinet.

Dickinson, H., & Sullivan, H. (2014). Towards a general theory of collaborative performance: The importance of efficacy and agency. *Public Administration*, 92(1), 161–177.

Dodgson, M., Hughes, A., Foster, J., & Metcalfe, S. (2011). Systems thinking, market failure, and the development of innovation policy: The case of Australia. *Research Policy*, 40, 1145–1156.

Edquist, C. (2005). *Systems of innovation: Technologies, institutions and organizations*. Abingdon, UK: Routledge.

Emmery, M. (1999a). *Industry Policy in Australia* (Economics, Commerce and Industrial Relations Group Research Paper 3 1999–2000). Australian Government. https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/rp9900/2000RP03

Emmery, M. (1999b). *Australian manufacturing: A brief history of industry policy and trade liberalisation* (Economics, Commerce and Industrial Relations Group Research Paper 7 1999–2000). Australian Government. https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/rp9900/2000RP07

Fagerberg, J. (2017). Innovation policy: Rationales, lessons and challenges. *Journal of Economic Surveys*, 31(2), 497–512.

Fagerberg, J. (2018). Mobilizing innovation for sustainability transitions: A comment on transformative innovation policy. *Research Policy*, 47, 1568–1576. https://doi.org/10.1016/j.respol.2018.08.012.

Ferris, B., Finkel, A., & Fraser, J. (2016). *Review of the R&D tax incentive*. https://www.industry.gov.au/sites/g/files/net3906/f/May%202018/document/other/research-and-development-tax-incentive-review-report.docx

Fetters, M. D. & Molina-Azorin, J. F. (2017). The Journal of mixed methods research starts a new decade: Principles for bringing in the new and divesting of the old language of the field. *Journal of Mixed Methods Research*, 11(3), 291–307.

Fitzgerald, B. (Ed.). (2008). *Legal framework for E-research: Realising the potential*. https://ses.library.usyd.edu.au/bitstream/handle/2123/2682/LegalFramework_Ch14.pdf?sequence=1&isAllowed=y

Freeman, C. (2002). Continental, national and sub-national innovation systems – Complementary and economic growth. *Research Policy*, 31(2), 191–211.

George, A., McEwan, A., & Tarr, J. (2018). *The art of R&D courtship*. https://www.policyforum.net/the-art-of-r-and-d-courtship/

George, A., Tarr, J., & Bird, S. (2020). Forty years of FOI: Accountability, policy-making and the national innovation and science agenda. *Public Law Review*, 31(2), 189–211.

Gibbs, I., & Emery, P. (1998). Reforming Australia’s Commonwealth Business Programs. *Agenda*, 5(1), 3–16.

Glasby, J., & Dickinson, H. (2008). *Partnership working in health and social care*. Bristol, UK: Policy Press.

Green, R., & Logue, D. (2013). *Innovation Australia: How we measure up*. Melbourne, Australia: Committee for Economic Development of Australia (CEDA).

Gregory, R. G. (1993). The Australian Innovation System. In R. R. Nelson (Ed.), *National innovation systems: A comparative analysis* (pp. 324–352). New York: Oxford University Press.
Heffernan, M. E., & David, N. (2007). *Legal and project agreement issues in collaboration and e-research: Survey results* (Report for Legal Framework for e-Research Project). [https://eprints.qut.edu.au/9112/](https://eprints.qut.edu.au/9112/)

Heffernan, M., & Kiel-Chisholm, S. (2008). Australian survey on legal issues facing e-research. In Fitzgerald, B. (Ed.), *Legal framework for e-research: Realising the potential* (pp. 497–524). Sydney, Australia: Sydney University Press. [https://ses.library.usyd.edu.au/bitstream/handle/2123/2682/LegalFramework_Ch14.pdf?sequence=1&isAllowed=y](https://ses.library.usyd.edu.au/bitstream/handle/2123/2682/LegalFramework_Ch14.pdf?sequence=1&isAllowed=y)

Hekkert, M., Suurs, R., Negro, S., Kuhlmann, S., & Smits, R. (2007). Functions of innovation systems: A new approach for analysing technological change. *Technological Forecasting & Social Change, 74*(4), 413–432. [https://doi.org/10.1016/j.techfore.2006.03.002](https://doi.org/10.1016/j.techfore.2006.03.002)

Howard, J. (2011). *Great expectations: Developing “instruments for engagement” in university, business, government, and community relations*. Paper presented at the Conference on Innovation Systems and the New Role of Universities, Bristol, 5–6 September 2011. [https://www/howardpartners.com.au/assets/great-expectations-paper.pdf](https://www/howardpartners.com.au/assets/great-expectations-paper.pdf)

Howard, J. (2017). *Report on the analysis of stakeholder consultations* (Report for Australia 2030: Prosperity through Innovation). [https://www.industry.gov.au/sites/default/files/australia-2030-stakeholder-consultation-report.pdf?acsfc_files_redirect](https://www.industry.gov.au/sites/default/files/australia-2030-stakeholder-consultation-report.pdf?acsfc_files_redirect)

Howard Partners. (2017). Australia 2030 prosperity through innovation: Report on the analysis of stakeholder consultations. Australian Government, Innovation and Science Australia.

Howard, J. (2020). *Challenges for Australian research and innovation*. University of Technology Sydney Occasional Paper. [https://www.uts.edu.au/sites/default/files/2020-05/Challenges%20for%20Australian%20Research%20and%20Innovation_web.pdf](https://www.uts.edu.au/sites/default/files/2020-05/Challenges%20for%20Australian%20Research%20and%20Innovation_web.pdf)

Howard, J. H., & Green, R. (2019). *Challenges for Australian research and innovation* (Background paper for UTS Innovation Roundtable). [https://www/howardpartners.com.au/assets/uts-innovation-roundtable-agenda-and-background-paper.pdf](https://www/howardpartners.com.au/assets/uts-innovation-roundtable-agenda-and-background-paper.pdf)

Industry, Innovation and Science Australia. (2021). *Driving effective Government investment in innovation, science and research*. Canberra, Australia: Australian Government.

Innovation and Science Australia. (2016). *Performance review of the Australian innovation, science and research system*. Canberra, Australia: Australian Government.

Innovation and Science Australia. (2017). *Australia 2030: Prosperity through innovation*. Canberra, Australia: Australian Government.

Innovation and Science Australia. (2020). *Stimulating business investment in innovation*. Canberra, Australia: Australian Government.

Jones, E. (2006). *The evolution of industry policy under Howard*. Paper presented at the Symposium: A Decade of Howard Government. [http://www.australianreview.net/digest/2006/02/jones.html](http://www.australianreview.net/digest/2006/02/jones.html)

Katz, J. S., & Martin, B. R. (1997). What is research collaboration? *Research Policy, 26*, 1–18.

Lee, J. J., & Haupt, J. P. (2020). Scientific globalism during a global crisis: research collaboration and open access publications on COVID-19. *Higher Education*. [https://doi.org/10.1007/s10734-020-00589-0](https://doi.org/10.1007/s10734-020-00589-0)

Lundvall, B. (Ed.). (1992). *National systems of innovation: Towards a theory of innovation and interactive learning*. London, UK: Pinter.

Marsh, I., & Edwards, L. (2008). *The development of Australia’s innovation strategy: Can the public sector system assess new policy frameworks?* Australian Business Foundation Occasional Paper. [http://www.nswbusinesschamber.com.au/NSWBC/media/Policy/Thinking%20Business%20Reports/Older%20Reports/The-Development-of-Australias-Innovation-strategy.pdf](http://www.nswbusinesschamber.com.au/NSWBC/media/Policy/Thinking%20Business%20Reports/Older%20Reports/The-Development-of-Australias-Innovation-strategy.pdf)

Marsh, I., & Edwards, L. (2009). Dilemmas of policy innovation in the public sector: A case study of the national innovation summit. *Australian Journal of Public Administration, 68*(4), 399–413. [https://doi.org/10.1111/j.1467-8500.2009.00647.x](https://doi.org/10.1111/j.1467-8500.2009.00647.x)

Marshal, A. (1890). *Principles of economics*. London, UK: MacMillan.

Mazzucato, M. (2018). Mission-oriented innovation policies: Challenges and opportunities. *Industrial and Corporate Change, 27*(5), 787–801.

McBratney, A., & McGregor-Lowndes, M. (2010). *What’s good for the goose? Benchmarking government-nonprofit contracting with the government’s own standards*. Paper presented at the Association for Research on Nonprofit Organisations and Voluntary Action Annual Conference, November 18–20, Alexandria, Virginia.

McGauchie, D. (2004). *Review of closer collaboration between universities and major publicly funded agencies*. Canberra, Australia: Department of Education, Science and Training.
Mortimer, D. (1997). *Going for growth, business programs for investment, innovation and export*. Review of Business Programs (D. Mortimer, Chair, June 1997). Canberra, Australia: Australian Government.

Nelson, R. (Ed.). (1993). *National systems of innovation: A comparative study*. Oxford, UK: Oxford University Press.

Noble, D., Charles, M., Keast, R., & Kivits, R. (2019). Desperately seeking innovation nirvana: Australia’s cooperative research centres. *Policy Design and Practice*, 2(1), 15–34.

Nous Group. (2019). *Policy directions to increase business investment in innovation*. https://www.industry.gov.au/sites/default/files/2020-02/policy-directions-to-increase-business-investment-in-innovation.pdf

Perkmann, M., & Salter, A. (2012). How to create productive partnerships with universities. *MIT Sloan Management Review*, 53(4), 79–88.

Powell, D. (2019). *The government has abandoned Australian startups and left innovation for dead*. Smartcompany. https://www.smartcompany.com.au/startupsmart/op-ed/government-abandoned-australian-startups/

Productivity Commission (PC). (2007). *Public support for science and innovation*. Canberra, Australia: Australian Government, Productivity Commission.

Redrup, Y. (2020). COVID-19 elevates ‘innovation’ off the government black list. *Australian Financial Review*. https://www.afr.com/technology/covid-19-elevates-innovation-off-the-government-black-list-20200529-p54xuy

Richardson, D. (1997). *Industry policy: Mortimer, Goldsworthy and the economic intelligence unit* (Economics, Commerce and Industrial Relations Group Current Issues Brief 4 1997–1998). Australian Government. https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/Publications_Archive/CIB/CIB9798/98CIB04

Riley, J. (2019). *Roy green on NISA’s breakdown*. InnovationAus. https://www.innovationaus.com/roy-green-on-nisas-breakdown/

Riley, J. (2020a). *Karen Andrews on tech supply chains*. InnovationAus. https://www.innovationaus.com/karen-andrews-on-tech-supply-chains/

Riley, J. (2020b). *Andrews drives new Ministerial Tech Council*. InnovationAus. https://www.innovationaus.com/andrews-drives-new-ministerial-tech-council/

Schumpeter, J. (1934). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*. Cambridge, MA, Harvard University Press.

Schumpeter, J. (1942). *Capitalism, socialism and democracy*. New York, NY: Harper.

Stevens, A. (2020). *How SMEs are responding to the COVID-19 crisis*. Company Director Magazine. https://aicd.companydirectors.com.au/membership/company-director-magazine/2020-back-editions/may/how-smes-are-responding-to-the-covid-19-crisis

Sullivan, H., Williams, P., Marchington, M., & Knight, L. (2013). Collaborative futures: Discursive realignments in austere times. *Public Money & Management*, 33(2), 123–130.

Tight, M. (2019). *Documentary research in the social sciences*. London, UK: Sage Publications Ltd.

Watt, I. (2015). *Review of research policy and funding arrangements*. https://docs.education.gov.au/system/files/doc/other/main_report_final_20160112.pdf

Yasar, M., & Morrison Paul, C. J. (2012). Firm performance and knowledge spillovers from academic, industrial and foreign linkages: The case of China. *Journal of Productivity Analysis*, 38, 237–253.

Zhang, L., Zhao, W., Sun, B. et al. (2020). How scientific research reacts to international public health emergencies: A global analysis of response patterns. *Scientometrics*, 124, 747–773. https://doi.org/10.1007/s11192-020-03531-4

---

How to cite this article: George A-J, Tarr J-A. Addressing Australia’s collaboration ‘problem’: Is there a Brave New World of innovation policy post COVID-19? *Aust J Publ Admin*. 2021;80:179–200. https://doi.org/10.1111/1467-8500.12470