From ideas to impact
A revitalised collaborative innovation model for Australian agriculture

by Andy Lamb, Cameron Turner and Jack Andrews
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Foreword

Australian agriculture is well-served by highly regarded researchers and innovators working on ways to make the sector more profitable and sustainable amid ever-increasing challenges.

Methods to improve yields and water-use efficiency in the face of climate change, technology that enables on-farm automation, and strategies to detect devastating pests and diseases have the potential to be transformative.

But while producers understand the problems they face, the solutions they require can be harder to come by. Key impediments along the agriculture innovation journey have historically prevented a ground-breaking idea from becoming a product available on the market.

Change, however, might be on the horizon. As the world becomes more connected, challenge-led and open innovation is being increasingly used to ensure research delivers impactful results for industry. The need to have solutions at our fingertips, as Australian agriculture builds towards being a $100 billion industry by 2030, cannot be understated.

With this in mind, AgriFutures Australia engaged Innovation Studios to develop a best practice methodology for challenge-led and open innovation for rural industries in Australia. A global scan of innovation models and insights from successful case studies, such as v2food’s plant-based burger patty, informed the suggested approach, which will help Research & Development Corporations (RDCs) bridge the idea-to-innovation chasm. As RDCs continue to work together, there are real benefits in having a thorough understanding of the open innovation methodology to ensure the research they invest in delivers real-world results and value.

As part of the project, a workshop was held with RDCs to showcase the proposed methodology. RDCs remain in a unique position to advance this concept, which could radically increase the translation of research findings into innovations and enable Australian agriculture to grow in a sustainable and collaborative way.

This report has been produced under AgriFutures Australia’s National Rural Issues (NRI) Program, which is part of the National Challenges and Opportunities Arena. NRI focuses on thought-provoking and horizon-scan research to inform debate and policy on issues of importance across rural industries.

Most of AgriFutures Australia’s publications are available for viewing, free download or purchase online at www.agrifutures.com.au.

Michael Beer
General Manager, Business Development
AgriFutures Australia

“As the world becomes more connected, challenge-led and open innovation is being increasingly used to ensure research delivers impactful results for industry.”

Michael Beer
About the authors

Andy Lamb is the Founder and Director of Innovation Studios and one of Australia’s leading voices on entrepreneurship, innovation and creativity. Andy delivers coaching, education and consulting in everything from design thinking, to strategy, to deep tech and corporate accelerators. He has previously been an Honorary Fellow of Innovation at The University of Western Australia, Deputy Chair of Perth Angels and an Entrepreneur in Residence at Tech Hub. He is a member of the Minerals Research Institute of WA College and is a regular keynote speaker.

Over the past 30 years, Cameron Turner has been an applied and basic researcher, entrepreneur, CEO, inventor, management consultant and academic. He has commercialised multiple agricultural technologies, developed extensive research partnerships with RDCs, corporates and industry bodies, and has raised more than $10m in capital with four food and agricultural startup companies, one of which he remains the CEO (Progel). He is the current Entrepreneur in Residence at the University of Queensland Business School.

Jack Andrews has experience as a senior innovation consultant, innovation manager, entrepreneur/ founder, and senior qualitative researcher. He has significant experience in designing and deploying large-scale innovation programs within some of Australia’s largest organisations and regularly mentors early-stage teams from initial idea to market entry.

If you would like further information about anything contained in this report, or would like to speak about deploying the methodology in your organisation, you can contact our team at getintouch@innovationstudios.com.au

Who is this report for?

This report has been prepared for the 15 Australian agriculture Research & Development Corporations (RDCs). Specifically, it was commissioned by AgriFutures Australia, a multi-industry RDC with a vision to “grow the long-term prosperity of Australian rural industries” (AgriFutures Australia, 2020). The RDCs facilitate agriculture R&D co-investment between government and primary producers.

The industry engagement that underpins this report was necessarily broader than the 15 RDCs, and the proposed innovation methodology is collaborative and multi-stakeholder. A holistic innovation model that translates Australia’s world-class research into game-changing products, services and businesses must leverage the unique capabilities of researchers and research organisations, government, venture capital, industry, and startups. Representatives from each of these groups provided support, feedback and guidance to this project.

This report is therefore relevant across the agriculture industry, and especially to those who want to see more of Australia’s world-class research delivering real-world value and impact.

Key objective

The key objective of this project is the design of a collaborative open innovation model that leverages the unique strengths of different types of organisations to take ideas through to value and impact.
**Project methodology**

1. **Engage**
   - 500+ views of project landing page
   - 53 survey responses
   - 37 interviewees
   - 30-person web forum

2. **Review**
   - Global model scan
   - Scientific and management literature review
   - Innovation Studios’ experience deploying open innovation

3. **Design and iterate**
   - Draft model presented and refined at a Canberra workshop

4. **Execution strategy mapped**
   - Next steps developed, and critical success factors identified

To design an innovation model that works for Australian agriculture, it was first requisite to form an understanding of how the industry operates today – the factors that encourage and impede innovation, instructive examples of success and failure, and the structural and cultural features that guide and shape collaborative innovation.

An international open innovation model scan along with a review of relevant scientific and management literature revealed global best practice for the design and implementation of collaborative innovation.

The first draft of the open innovation model was then designed, incorporating global best practice and accounting for the contextual nuances particular to Australian agriculture. This draft methodology was presented at a Canberra workshop, where key stakeholders were asked to provide feedback on the model and assess its feasibility. This feedback informed subsequent iterations.

The models’ critical success factors and implementation runway were then developed, along with an articulation of short-term, medium-term and long-term visions for its use within Australian agriculture.
Of course, the imperative to innovate is not only economic but also environmental and social. Shifting societal expectations around sustainability, environmental impact and animal welfare are redefining the social license to operate. These are systems-level challenges that require system-wide responses, and the agriculture industry, like many others, will need to transcend parochial concerns to tackle complexity through the value chain. Collaboration must also be a hallmark of Australian agriculture’s future.

In commissioning this work, AgriFutures Australia has asked an elegantly simple question: How might we design a collaborative open innovation model that leverages the unique strengths of different types of organisations to take ideas through to value and impact? Answering this question is the focus of this report.

The term innovation, despite its widespread use (or perhaps because of it), is often misunderstood. An idea is not an innovation (Kastelle and Steen, 2011); instead ‘ideas’ and ‘innovations’ bookend a complicated and multi-step process. Ideas must first be ‘made real’ (be proven technically) to be rendered an invention. Inventions must then ‘unlock value’ (be proven commercially) to become an innovation. The ultimate value and return from innovation investment (for both organisations and society) is realised only at the end of this process. The theory of innovation and collaboration within and across organisations is presented in Section 2.

To design a collaborative innovation model that works for Australian agriculture, it was first requisite to understand how the industry operates today; the factors that encourage and impede innovation, instructive examples of success and failure, and the structural and cultural features that guide and shape behaviours.

For 200 years, Australia’s economic prosperity has been built on the back of food, fibre and resources. Australian agriculture’s willingness to adapt and to innovate has allowed it to consistently and profitably generate world-class produce in one of the harshest and most resource-constrained environments on Earth.

However, for Australian agriculture to reach its ambition of becoming a $100 billion industry by 2030, it needs a paradigm shift. As ABARES Executive Director Dr Steve Hatfield-Dodds told the 2020 Outlook Conference, “The future will not be like the past. We will need to anticipate, innovate and collaborate to stay ahead of the curve” (Department of Agriculture, 2020). While operational and incremental pre-farmgate improvements will continue to play a role in agriculture innovation, they won’t deliver the step-changes necessary for a $100 billion industry.

Through extensive engagement with RDCs, industry, government, researchers, investors and startups, this project uncovered three key impediments to innovation within Australian agriculture. Two of these are industry-wide, while the third is specific to the R&D investment stewarded by the RDCs. They are:

1. The commercialisation Valley of Death
   Idea-generating organisations (research providers and higher education institutions) will typically take an idea only to the ‘invention’ stage. Industry, on the other hand, won’t engage until technical, scale-up and market risks have been removed. This discontinuity creates a ‘Valley of Death’ that is exceptionally difficult for discoveries to traverse.

2. An overemphasis on technological solutions
   R&D projects are adept at identifying and solving technical problems, but this alone is not sufficient to deliver value and impact. Technology in isolation fails to adequately account for how a solution creates, captures and delivers value, and neglects entirely the human behavioural changes required to drive and scale adoption.

3. Structural short-termism (RDC-specific)
   The requirement to return immediate value to today’s levy payers results in a focus on near-term production problems (for example yield, productivity and pests and diseases). This structural short-termism curbs the scope, ambition, risk profile and acceptable time-to-payout of funded projects and makes it difficult for the RDCs to embrace longer-term transformational projects. This isn’t a commentary on whether this structural feature is right or wrong, but instead an observation on how the impacts it has on innovation, as relayed to us by industry stakeholders.
Executive summary

A full accounting of impediments is provided in Section 3, while an extended list of innovation enablers and disablers is offered in Appendix 1.

Though these impediments present significant challenges, their effects can be largely offset without the need for legislative or structural reform. This report presents the design principles for a revitalised innovation model in Section 4. Chief among the design principles is the need for any new model to span the gamut from idea to impact. Such a model would have execution expertise ‘baked in’, and would consider technical and market risk in parallel — building not only products and technologies, but also their accompanying business models.

Building on a broad understanding of innovation and its impediments, the discussion turns to ‘open innovation’ specifically, an area of increasing interest to AgriFutures Australia and to organisations globally. In an open innovation program, organisations collaborate with external parties (for example other organisations, startups, researchers, government or even individuals) to create greater value than they could on their own. An introduction to open innovation comprises Section 5, while Section 7 provides a global model scan and case study analysis.

Section 8 presents the revitalised collaborative innovation methodology for Australian agriculture. The methodology has been designed to offset the most pernicious impediments to innovation, draws on global best practice for the commercialisation of scientific research, and incorporates the learnings from the early successes of CSIRO and Main Sequence Ventures’ ‘venture science’ model. The open innovation methodology underwent several iterations after being presented to key RDC stakeholders in an open web forum, and in a Canberra workshop in March 2021.

While components of the proposed methodology have been used extensively around the world in best practice innovation programs, their integration and execution in Australian agriculture R&D remains largely untested. Until the model has been piloted, refined and scaled, it will inevitably contain hidden assumptions. Though parts of the methodology can be managed discretely and bottom-up, execution of the ideas (bringing them to life) will require top-down directives. Success will be directly proportional to firm leadership, a collective will to change, and a belief that this change is necessary. Short, medium and long-term visions for the methodology are offered in Section 9.

The RDCs, sitting at the cross-section of government, researchers and producers, are uniquely positioned to pilot this model, to refine it, and to drive its adoption at scale. Doing so will markedly increase the translation of research into game-changing innovations, and will allow Australian agriculture to respond to this decade’s economic, environmental and social imperatives.
Section 2
An introduction to innovation and collaboration

The key objective of this project is the design of a collaborative open innovation model that leverages the unique strengths of different types of organisations to take ideas through to value and impact. Given this starting point, two words are going to recur throughout this report: ‘collaboration’ and ‘innovation’. Open innovation intersects the two, but of course there are ways of innovating without collaborating, and ways to collaborate without innovating.

Collaborative innovation programs present two sets of challenges simultaneously. An organisation must be ‘innovative’, which is counterintuitive, counter-cultural and uncomfortable. At the same time, it must be ‘collaborative’, which represents a posture shift for organisations that are typically internally preoccupied and outwardly competitive. Impactful open innovation requires cultural, systematic and process-level shifts on two continuums simultaneously: the ‘business-as-usual to innovation’ continuum, and the ‘not invented here to collaboration’ continuum.

So what?
Both collaboration and innovation present challenges to organisations. Open innovation requires organisations to overcome two sets of barriers: barriers to collaboration and barriers to innovation.

Collaboration
Inter-organisational collaboration is intuitively understood but, as we will see, difficult to execute. We define inter-organisational collaboration as two or more organisations entering into a mutually beneficial relationship, usually working towards a pre-defined object or goal. Inter-organisational (across/between organisations) collaboration is contrasted with intra-organisational collaboration (within organisations). When we say ‘organisational collaboration’ or ‘collaboration’ we are referring to the former.

Innovation
The term innovation, despite its widespread use (or perhaps because of it), is often misunderstood. The consequences of this misunderstanding aren’t purely semantic; if we want to realise the potential benefits of innovation, we need to understand what it is that creates these benefits.

A robust definition of innovation is given by The University of Queensland’s Director of Entrepreneurship Tim Kastelle and Associate Professor John Steen in their 2011 article ‘Ideas are not innovations’.

“Innovation is the execution of new ideas to create value” (Kastelle and Steen, 2011)

This tripartite definition addresses some of the most common misconceptions in innovation practice.

1. Ideas ≠ innovation
Ideas have to be made real or they remain ideas. Ideas aren’t ‘worthless’, but they aren’t worth much if they aren’t translated into something tangible (often a product, service or business model).

2. Inventions ≠ innovation
Even an idea made real (an invention) isn’t innovation. If the invention is going to have a ‘life’ (and hence create sustainable impact), it needs to unlock value.

3. Innovation requires execution
This relates to 1. and 2. A lot of well-meaning innovation programs end before execution takes place. Without execution, we don’t consider these programs to be ‘innovative’ or to be producers of innovation.

Another advantage of this definition is that it allows one to conceptually plot the ‘journey’ of an idea to an innovation. First, the idea is purely conceptual or theoretical; it is then applied or ‘made real’ as technical possibility is proven (becoming an invention), and then, hopefully, it is executed in a sustainable, scalable and repeatable manner (becoming an innovation).
An introduction to innovation and collaboration

Different types of organisations claim expertise at different parts of this journey, and few attempt to implement internal processes that cover the full gamut from idea to innovation and impact. This is not surprising given the capabilities required to do world-class research are profoundly different from those required to construct a sustainable and profitable business model around the fruits of that research.

So what?

Ideas made technically possible become inventions, inventions made commercially viable become innovations. Different types of organisations claim expertise at different parts of the journey from ‘idea’ to ‘innovation’.
The impediments presented in this section were formulated after the ‘Engage’ stage of the project, and are therefore a summarised rearticulation of the perceptions of key agriculture stakeholders. Through a survey, in-depth qualitative interviews, open webinars and workshops, the project team were able to capture the views of RDC employees, government, industry, startups, research providers and venture capital.

Key impediment to agriculture innovation 1: The Valley of Death

While the idea → invention → innovation model is a useful high-level conceptual framework, it doesn’t describe how an idea is rendered an invention, nor does it allow one to pinpoint exactly where this typically goes awry. In order to do this, and to properly describe the first key innovation impediment, we need to introduce a further model: the Technology Readiness Levels (TRLs).

The TRLs were developed by NASA in the 1970s to estimate the maturity (i.e. ‘readiness’ for deployment) of technology. The TRLs are prescriptive – they let an inventor know the current maturity of their technology and what needs to be done next to mature it. In addition to their use at NASA, the TRLs have been adopted and deployed at the US Department of Defense, the European Association of Research and Technology Organisations (EARTO), and the European Space Agency. In Australia, CSIRO uses the TRLs to organise its Commercialisation Marketplace, thus allowing potential collaborators or investors to find technology at the right ‘stage’ for them. The more an industry engages with novel scientific research and technologies, the more useful the TRLs are.

While researchers typically progress an idea to TRL 3 or 4, commercial organisations, when looking to adopt a new technology, are looking for technologies around TRL 8 or 9. This disconnect creates a ‘technology chasm’ or ‘Valley of Death’ that is exceptionally difficult for ideas to traverse. Transformational ideas that are ‘reduced to practice’ or ‘made real’ by research providers consistently fail to cross the valley and become game-changing innovations. This is largely because the idea generator/research provider’s job ‘finished’ at invention, while industry won’t engage until technical, scale-up and market risks have been removed. The result is that transformational ideas, inventions and discoveries languish as orphans in the Valley of Death.
What we heard

Interview: Why do we struggle with research translation?

“For commercialisation to be successful it needs to be built into the life of the project – otherwise the researchers move on and won’t give you any time, and it’s too underdeveloped to go to market... the idea is dead in the water.”

Interview: What’s your biggest frustration with R&D in Australia?

“Test tubes to tonnes. We have no problem spending millions sorting things out in a test tube, when it comes to scaling everyone runs for the hills. Pilot to mid-scale manufacturing we really have a problem with.”

Survey: When conducting research, what outcomes (if any) are you seeking that consistently aren’t achieved?

“I would like to see good ideas implemented. Instead of lots of research being done and things being trialled that all stop at the 95% mark, the good research and innovation projects need to be enabled for implementation.”

Survey: When it comes to working with RDCs and/or research providers, what outcomes (if any) are you seeking that consistently aren’t achieved?

“Research groups are often affiliated with universities that are profit-driven. Research results are sometimes focused on continuation of research rather than practical outcomes that can provide diversification.”

Interview: Why do we struggle with research translation?

“The classic issue of the RDCs – we get to the point where we’ve done case studies and the ecosystem for investment falls over because it’s no longer classified as research and development. We, if we want to take the idea further, need a new research question at this point.”

So what?

The lack of overlap (or continuity) in the concerns and interests of research institutions/organisations (whose interest wanes at TRL 3 or 4) and commercial organisations (whose interest begins at TRL 8 or 9) creates a chasm furnished by technologies that are too mature for novel research and too immature for commercial adoption.

Implications for methodology design

Frameworks and methodologies need to be able to span the idea → invention → innovation journey to ensure research and technologies make it to the marketplace.

Key impediment to agriculture innovation 2: Poor integration between technological innovation and business model innovation

While the first key impediment identified a perilous disconnect in the journey from idea to invention, the second speaks to a tendency to overemphasise the technical development and maturation of ideas without paying due consideration to how a proposed technology will deploy commercially. In other words, we focus on the path from idea to invention without considering how (or even if) this invention can unlock value and become an innovation.

This tendency can (and does) lead to the creation and production of research, technologies, products, services and even businesses that don’t address a commercial need (or, to put it simply, that don’t solve a compelling customer problem). This issue is so entrenched across industries that entire disciplines have emerged to attempt to counteract it. Eric Ries, a founder of one such discipline (the Lean Startup), describes its central concern as follows: “The big question of our time is whether we care to make the business model sustainable. When developing new products, services or businesses, best practice commercialisation dictates that we consider the inseparability of technical innovation with investment or market readiness. Steve Blank from Stanford developed the Investment Readiness Levels (IRLs) to provide a framework for researchers and entrepreneurs to mature the market readiness of their ideas. Technical readiness (can we do it?) helps us make ideas real, while investment readiness (should we do it?) gives us confidence that we are solving the right problem, with the right solution, and that enough people care to make the business model sustainable. When developing new products, services or businesses, best practice commercialisation dictates that we consider the IRLs and TRLs in tandem. There are multiple strategies to ensure that the ‘should’ question receives attention, and these are canvassed within the discussion of global innovation methodologies and frameworks, as well as in the presentation of case studies. All such strategies involve sense-checking that there exists (or is likely to exist) a compelling market need for any new research, product, service or business.

Investment Readiness Levels

- IRL 9: Identify and validate metrics that matter
- IRL 8: Validate value delivery (left side of canvas)
- IRL 7: Prototype high-fidelity min. viable product
- IRL 6: Validate revenue model (right side of canvas)
- IRL 5: Validate product/market fit
- IRL 4: Prototype low-fidelity min. viable product
- IRL 3: Problem/solution validation
- IRL 2: Market size/competitive analysis
- IRL 1: Complete first-pass business model canvas

Source: steveblank.com
Interview: How well does Australian agriculture innovate?

“If you’re not asking questions around customer desirability and business viability early on in the research/ideas stage, you’re doing the wrong thing by your investments.”

Interview: What have you learned from taking technology to producers?

“No farmer or producer gives a rat’s about the technology we’ve got. They want to understand how it fits into solving their life and into solving their problems. I think there’s a disconnect in agriculture between the innovator and the producer where we don’t know quite how to speak to each other. The part of the puzzle that I think is ignored almost completely is the relationship between the innovator and the grower.”

Interview: How well does Australian agriculture innovate?

“We need to go fork to farm, rather than farm to fork. We need to find out what tastes and textures are appealing to people, start from there and move backwards. People come from a grower’s end rather than from the consumer end – they look at what they’ve grown and see who they can sell it to. This is the wrong way around.”

Interview: Why do we struggle with research translation?

“We don’t do enough thinking and planning up front for what the theory of change is for a project, or consider what the value proposition is for the change – we need to build that in upfront, but we focus on the technical problem instead.”

Interview: How well does Australian agriculture innovate?

“We need to go fork to farm, rather than farm to fork. We need to find out what tastes and textures are appealing to people, start from there and move backwards. People come from a grower’s end rather than from the consumer end – they look at what they’ve grown and see who they can sell it to. This is the wrong way around.”

Interview: How well does Australian agriculture innovate?

“Tell me the day in the life of the farmer and show how it’s actually going to affect their day to day. At the moment, the toys don’t link to real-world impact. Don’t worry about the tech, show me the persona or the early adopter and then show me how their life and decision-making, and productivity changes.”

Survey: Is there a game-changing piece of research that you believe could create a massive impact that is yet to be addressed or commercialised? If so, what is it?

“I don’t think this exists. Irrespective of how good a piece of research or IP is, it’s the systems and process that sit around the IP that will enable it to be game-changing. This is the hard part.”

So what?

R&D projects are adept at identifying and solving technical problems, but this alone is not sufficient to deliver value and impact. If Australia’s world-class research is to be translated into game-changing innovations, we need to construct the accompanying business models, and in doing so consider fully the human behaviours that must change to drive adoption.

Implications for methodology design

Frameworks and methodologies need to address both the technological ‘can we?’ question and the commercial ‘should we?’ question. Ideally, these questions are answered not sequentially but in tandem.
Key impediment to agriculture innovation 3: Structural short-termism

Innovation requires established organisations to simultaneously extend and defend their core business while also preparing for a future where the conditions for success may look very different. This requirement for ‘ambidexterity’ is put by James G. March like this: “The basic problem confronting an organisation is to engage in sufficient exploitation to ensure its current viability and, at the same time, devote enough energy to exploration to ensure its future viability.” (March, 1994). Managing across multiple time horizons is exceptionally difficult, and the RDCs have a certain structural feature that makes this more pronounced. The requirement to return immediate value to today’s levy payers imbues a structural short-termism into the operation of the RDCs. It should be noted that this isn’t a commentary on whether this structural feature is right or wrong, but instead an observation on the impacts it has on innovation, as relayed to us by industry stakeholders.

What we heard

Survey: What’s the biggest barrier to innovation?

“[The need to] demonstrate return on investment and time to the farmer rather than the post-farmgate agri sector.”

Survey: What’s the most frustrating thing for you personally about working in Australian agriculture?

“The research that the industry wants is for an immediate issue, rather than things that take time and may solve bigger issues.”

Interview: At an industry level, how well do you think agriculture does innovation?

“If you want to make step-changes you need to look at non-traditional stuff. That’s where academics can really help. At the moment, it’s all about incremental things – new pesticides, new herbicides, the same old things … There’s a bit of miscommunication around the industry problems as well – this is where the RDCs could come in.”

Interview: At an industry level, how well do you think agriculture does innovation?

“Trying to find a supply chain that shares the brunt of a problem can be tricky. We are always having to invest in innovation that’s going to have a [short-term] return – we’re not able to do innovation to ‘learn’. In other countries, there seem to be ideas and networks where you’re trying to learn – it’s risky, may not deliver a long-term return. We always have to ask people if they’re willing to invest in projects.”

Interview: What frustrates you most about your job?

“I don’t think we’re answering the right questions – the process that we use asks people to identify problems that they know they know (for example fuel, yield, pests). The system leads us to focus on the things that are predictable, front of mind.”

Interview: Is there a tension between RDCs and industry?

“We have to be strongly responsive to the declared needs of stakeholders – if they’re not saying they want x, we can’t focus on x, even if x is going to affect them in the future.”

Interview: What is wrong with the way we do R&D in agriculture today?

“Something the RDCs can help with is to allow the system to emerge rather than protecting their own terrain. The Australian meat industry could be twice as big as it is today if it opened up its mind to what ‘meat’ is. But it can’t really, as there’s different RDCs for the different commodities (e.g. MLA, Australian Pork Limited, AgriFutures Australia).”

So what?

Operational and incremental pre-farmgate improvements will continue to play a role in agriculture innovation, but they won’t deliver the step-changes required for a $100 billion industry or move the needle on systems-level issues like sustainability or animal welfare. The RDCs, and the agriculture industry as a whole, need mechanisms for tackling more strategic challenges.

Implications for methodology design

Frameworks and methodologies need to be designed to offset short-termism, incentivising both industry and RDCs to tackle more complex, valuable and transformational challenges.
Additional impediments

These three impediments are by no means an exhaustive list. In our interviews, in workshops, and in the analysis of survey results, we came up against other factors that are likely to hamper innovation efforts. As with previous impediments, these are not fatal but need to be accounted for in the design of frameworks and methodologies.

It will be beneficial for any agriculture organisation designing an innovation program (and especially for RDCs) to consider the effects of the following:

Lack of system-wide leadership and vision

The ‘National Approach to Grow Australia’s Future’ report (EY, 2019) had as its first recommendation ‘Strengthening ecosystem leadership, cohesion and culture’. The need for stronger leadership was repeatedly highlighted by survey respondents, interviewees and workshop participants.

While certain parts of the collaborative innovation process can be managed discretely and bottom-up (namely idea generation and prioritisation), execution of the ideas (bringing them to life) requires firm top-down directives.

IP restrictions and collaboration friction

One commercialisation expert described his experience working with research and development organisations and cooperative research centres across multiple industries as follows: “From our point of view, [they] are generally too hard to work with. If you want to spin something out or start a new company, you have to go through 12 months of incredible pain dealing with different bodies all claiming governance and oversight. Rarely do you see people go through that and say ‘that was fun, let’s do that again’.”

While the need to return immediate value to today’s levy payers imbues short-termism into RDC operations, there are other systems and processes that RDC staff have identified as impeding innovation efforts. Specifically, they identified the strategy, budgeting and procurement cycles as largely inflexible and intolerant of uncertainty and risk.

Some verbatim commentary from RDC employees: “if we are going to be serious about open innovation, we need to change the architecture of the business to be able to do this.”; “We love the idea of innovation programs and systems – but how on Earth are we supposed to contract for that when we need to be explicit about milestones and what’s being delivered when?”

Additional structural elements

The ‘National Approach to Grow Australia’s Future’ report (EY, 2019) had as its first recommendation ‘Strengthening ecosystem leadership, cohesion and culture’. The need for stronger leadership was repeatedly highlighted by survey respondents, interviewees and workshop participants.

While certain parts of the collaborative innovation process can be managed discretely and bottom-up (namely idea generation and prioritisation), execution of the ideas (bringing them to life) requires firm top-down directives.
Section 4

Design principles for a revitalised agriculture innovation model

The interviews, surveys and workshops unearthed impediments to innovation in Australian agriculture.

While presenting undeniable challenges, the effects of these impediments can be largely offset without the need for structural or legislative reform. To this end, each impediment was converted into a ‘design principle’. These design principles underpinned the development of the open innovation methodology.

The eight design principles are:

01 To ensure ideas get to market, the frameworks and methodologies need to span the idea → invention → innovation journey, with execution expertise ‘baked in’ from the beginning.

02 To ensure ideas have the best chance of success in the ‘real world’, the frameworks and methodologies need to address both the ‘can we?’ and ‘should we?’ questions in tandem.

03 To ensure frameworks and methodologies don’t fall victim to short-termism, funding and success metrics should not be dictated solely by levy payers.

04 To ensure collaborative innovation efforts are able to transcend instinctual patch protection and competition, the cultural and behavioural change implications of any program must be strongly considered.

05 To ensure organisational agility through execution, sponsorship of the program should come from the highest-possible leadership level.

06 To avoid duplication and fragmentation, as many of the RDCs as possible should place their energy and efforts into a single framework/methodology.

07 To reduce the IP friction in collaborative efforts, the methodology should make use of creative incentive and equity structures to propel research towards the marketplace.

08 To ensure innovation doesn’t fall prey to business-as-usual systems and processes, a compelling case needs to be made as to why it should operate independently of them.
Section 5

What is open innovation?

Open innovation, sometimes called collaborative innovation, is “a distributed innovation process based on purposively managed knowledge flows across organisational boundaries” (Chesbrough and Bogers, 2014).

At a very basic level, the difference between ‘open’ innovation and ‘closed’ innovation is represented below:

The closed innovation model

The open innovation model

The potential benefits of open innovation are broad: “Open innovation has the potential to widen the space for value creation: It allows for many more ways to create value, be it through new partners with complementary skills or by unlocking hidden potential in long-lasting relationships” (Chesbrough and Bogers, 2014). A recent A. T. Kearney survey on collaborative innovation in Europe revealed that “71% of respondents expected more than a quarter of revenues to be generated through collaborative innovation by 2030” (World Economic Forum, 2015). In Australia, 2014-15 analysis revealed that businesses collaborating on innovation were twice as likely to produce 10 or more innovations than those organisations that went it alone (Department of Industry, Science, Energy and Resources, 2016).
The rise of open innovation platforms has led to a phenomenon we define as ‘platform-centric open innovation’. This is the tendency for well-intentioned organisations to believe that simply deploying an open innovation platform will allow them to realise the full promises of innovation. This belief leads to disappointment as organisations realise (often at the conclusion of a deployment cycle) that what they’ve purchased is a small part of the innovation puzzle (and by far the simplest piece of this puzzle). As we know, innovation is a complicated and multi-step process, with value and return from investments delivered only at the end.

At this point, it’s worth unpacking exactly what open innovation platforms can (and can’t) do against our understanding of innovation:

Open innovation platforms are excellent at processes that can be systemised, scaled and managed by technology. Namely:

- Crowdsourcing ideas/responses to challenges from geographically dispersed participants who can be employees, externals, or a mixture of the two.
- Allowing participants to comment and vote on ideas, and to work together to refine them.
- Offering a preliminary prioritisation mechanism that enables administrators to sort and prioritise ideas and to identify those with the most hypothetical promise.

What open innovation platforms can’t do is systematise and productise the steps required to turn ideas into inventions, and inventions into innovations. This is for the very simple reason that it is not clear that such a thing is possible. At the conclusion of a platform-centric open innovation challenge, the outcome is invariably a report; taking this report and converting its contents into value-creating impact is beyond the remit of these platforms.

At its worst, platform-centric open innovation is an exercise of ‘innovation theatre’, a term coined by Steve Blank to describe activities that result in innovation theatre. While these activities shape and build culture, they don’t win wars, and they rarely deliver shippable/deployable products (Blank, 2010). As innovation practitioners, the authors of this report have observed that while there may be short-term cultural benefits to such activities, the long-term effect (once staff perceive the activities to be shallow) is harmful.

In his Harvard Business Review article on innovation theatre, Steve Blank writes: "Companies and government agencies typically adopt innovation activities (hackathons, design-thinking classes, innovation workshops, et al) that result in innovation theatre. While these activities shape and build culture, they don’t win wars, and they rarely deliver shippable/deployable products." (Blank, 2010). As innovation practitioners, the authors of this report have observed that while there may be short-term cultural benefits to such activities, the long-term effect (once staff perceive the activities to be shallow) is harmful.

If idea management platforms are used in isolation, and are relied upon as an organisation’s only innovation lever, they inevitably fail to deliver impact and value.

In his Harvard Business Review article on innovation theatre, Steve Blank writes: "Companies and government agencies typically adopt innovation activities (hackathons, design-thinking classes, innovation workshops, et al) that result in innovation theatre. While these activities shape and build culture, they don’t win wars, and they rarely deliver shippable/deployable products." (Blank, 2010). As innovation practitioners, the authors of this report have observed that while there may be short-term cultural benefits to such activities, the long-term effect (once staff perceive the activities to be shallow) is harmful.

Rita McGrath, Professor of Management at the Columbia Business School, describes innovation theatre as "an excessive focus on ideation (and all that goes with that), with little capability or commitment to follow the process through to actual results" (McGrath, 2019). While the ‘idea’ phase of the innovation process is necessary, it is not in itself sufficient to deliver value and impact.
### Global model scan

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fishing expedition</strong></td>
<td>Using externally facing idea generation platforms to crowdsource specific technologies that plug an identified capability gap.</td>
<td>Unilever has an ambition to “achieve €1 billion annual sales of plant-based meat and dairy alternatives within the next five to seven years”. They are conducting a fishing expedition for technologies that improve taste, texture, sustainability and affordability of alternatives (<a href="https://futurefoodtechsf.com/innovation-challenge-2021/">https://futurefoodtechsf.com/innovation-challenge-2021/</a>).</td>
</tr>
<tr>
<td><strong>Plug and Play</strong></td>
<td>A Silicon Valley-based platform that connects the world’s largest companies with technology startups.</td>
<td>Colgate-Palmolive uses Plug and Play to fill product technology gaps, and to modernise their market research, sales, and marketing capabilities (<a href="https://youtu.be/SIWjyWntMsA">https://youtu.be/SIWjyWntMsA</a>).</td>
</tr>
<tr>
<td><strong>Innovation-led joint venture (JV)</strong></td>
<td>Two or more organisations form a partnership to explore a new product, service or business model, with each contributing their core competencies.</td>
<td>PepsiCo and Beyond Meat combined for the PLANeT partnership, a joint venture that “unites the tremendous depth and breadth of PepsiCo’s distribution and marketing capabilities with [Beyond Meat’s] innovation in plant-based protein”.</td>
</tr>
<tr>
<td><strong>Venture science</strong></td>
<td>A partnership between venture capital, researchers and a corporate distribution partner, formalised in the creation of a new entity.</td>
<td>V2food, a collaboration between CSIRO, Hungry Jack’s and Main Sequence Ventures, went from zero to half-a-million plant-based burgers in 18 months. This is explored in detail in the case study section.</td>
</tr>
<tr>
<td><strong>Moonshot</strong></td>
<td>An open and well-advertised call for transformational technology without a firmly defined execution strategy.</td>
<td>Elon Musk’s sponsorship of a US$100m prize purse for carbon removal technology (<a href="https://bit.ly/3StQ6e8">https://bit.ly/3StQ6e8</a>).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key steps/activities</th>
<th>Necessary ingredients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trend analysis and organisational strategy identify areas of future growth → fishing expedition is conducted to fill gaps in the organisation’s portfolio → organisation uses world-class execution capability to take to market.</td>
<td>Fishing expeditions work only when the company doing the fishing has strong (often market-leading) execution capabilities (i.e. they have best-in-class commercialisation, marketing, and distribution, and access to capital).</td>
</tr>
<tr>
<td>Trend analysis and organisational strategy identify areas of future growth → Plug and Play used to identify startups with technology that fills gaps → organisation uses world-class execution capability to commercialise and scale.</td>
<td>Critical to Plug and Play’s success is its meticulous curation of both problem statements and the relevant startups, organisations, or researchers to address the problem.</td>
</tr>
<tr>
<td>Trend analysis and organisational strategy identify areas of future growth → mutually beneficial partnerships are identified that leverage partner’s core competencies → partnership terms established and agreed → partnership commences.</td>
<td>Combined, the organisations need to have all the requisite capabilities to both innovate and to execute, i.e. to bring the innovation to market and to scale.</td>
</tr>
<tr>
<td>Venture identifies a high-growth area → curated team marries research expertise with commercialisation/distribution capability → new company created to bring a new product to market.</td>
<td>Capital is injected upfront by venture to de-risk the engagement for the corporate partner, corporate partner has market leading execution capability.</td>
</tr>
<tr>
<td>Identification of a global and existential technology need → define challenge parameters → global marketing and public relations campaign. It remains to be seen what the next steps are, and whether or not this approach will be successful.</td>
<td>Eye-watering and headline-grabbing capital, and the involvement of parties with legendary execution track records, such as Elon Musk.</td>
</tr>
<tr>
<td>Multidisciplinary team interviews humans to uncover ‘pain points’ and customer problems → team rapidly prototypes minimum viable product solutions to address this problem → team develops a desirable, viable and feasible business model to bring solution to life.</td>
<td>Lean LaunchPad methodological expertise, a viable pathway for validated or semi-validated business models to be executed and scaled.</td>
</tr>
</tbody>
</table>
Case studies

The purpose of these case studies is to demonstrate how open innovation unfolds in practice, highlighting in particular those models that show the most promise for deployment in Australian agriculture.

1 Execution expertise to be ‘baked in’

Whatever model of open innovation is pursued, it must rest on a partnership with an organisation that has demonstrated execution expertise. This organisation should have a track record of taking products to market and scaling them using an established and sophisticated distribution network. Without an experienced execution partner, the chance of ideas moving beyond the ‘invention’ stage diminishes significantly.

2 Addresses the ‘can we’ and ‘should we’ questions in tandem

The open innovation methodology needs to address market risk along with technological risk. Methodologies such as Lean LaunchPad (which revolves around the IRL tables) provide a structured way to achieve this.

3 Avoids a narrow focus on idea management

Idea management (idea sourcing, refining and prioritisation) needs to be properly understood as a small part of the open innovation puzzle.

If an idea management platform is deployed, it’s recommended that the processes that will take the outputs of this platform and translate them into value and impact are clearly defined and articulated before deployment, with an appropriate execution partner onboard for every step of the journey.

4 Proactively manages IP concerns

IP red tape can cripple open innovation efforts before they get off the ground, but this doesn’t have to be the case. When used strategically, IP is an asset to OI activity, and can even enhance returns (Alexy, Criscuolo and Salter, 2009).
Case studies

Overview

The venture science model "brings together a research organisation, industry and venture capital to facilitate rapid innovation" (Augustin et al, 2021). The vehicle that houses the innovation and brings it to market is a new startup company. Equity in this startup is shared between venture capital, the research organisation and the execution/distribution industry partner in a vested arrangement that ensures all three groups are heavily invested in the startup achieving long-term success.

In the v2food example, Main Sequence Ventures (venture capital) provided the R&D funding, CSIRO (the research organisation) leveraged existing IP and R&D expertise to develop new "texturised protein-based ingredients and flavour systems", and distribution through Hungry Jack’s was facilitated by Competitive Foods (the industry execution/distribution partner) (Augustin et al, 2021).

V2food, though still in its infancy, has achieved remarkable initial success, going from ‘nothing’ to half-a-million burgers in less than 18 months, and raising $33m in its Series A funding round.

While complex equity structures may initially appear unappealing, these are crucial to the model (they may indeed be its most important feature) for they properly incentivise the correct behaviour and offset some of the most entrenched barriers to collaborative/open innovation. As Charlie Munger famously says: “Show me the incentive and I’ll show you the outcome”.

The success of v2food has allowed Main Sequence Ventures to raise a $250m fund that will focus on expanding the venture science model.

Collaboration challenges between industry and research organisations – current issues and potential solutions

<table>
<thead>
<tr>
<th>Collaboration challenge</th>
<th>Current Issues</th>
<th>Potential solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity of funding for technology development</td>
<td>Uncertainty in industry R&amp;D investment subject to:</td>
<td>Funds from external investors enable:</td>
</tr>
<tr>
<td></td>
<td>• Annual funding cycle</td>
<td>• Early-stage company creation</td>
</tr>
<tr>
<td></td>
<td>• Changes in company strategy</td>
<td>• Continuity of funding for growth</td>
</tr>
<tr>
<td></td>
<td>• External market forces</td>
<td>• Equity for partner services</td>
</tr>
<tr>
<td>Corporate champions</td>
<td>Risks with internal organisation champions:</td>
<td>Appointment of entrepreneur and board:</td>
</tr>
<tr>
<td></td>
<td>• Lack of focus – competing priorities</td>
<td>• Provides continuity of leadership</td>
</tr>
<tr>
<td></td>
<td>• Organisational restructurings</td>
<td>• Facilitates technology delivery</td>
</tr>
<tr>
<td></td>
<td>• ‘Flight risk’ of champion</td>
<td>• Increases executive engagement and commitment</td>
</tr>
<tr>
<td>Collaboration management capacity</td>
<td>Organisation-company partnership suffers:</td>
<td>Appointment of CEO:</td>
</tr>
<tr>
<td></td>
<td>• Lack of focus – competing priorities</td>
<td>• Enables dedicated and focused role</td>
</tr>
<tr>
<td></td>
<td>• Lack of interface management</td>
<td>• Supports better-managed interface</td>
</tr>
<tr>
<td></td>
<td>• Project delivery timeliness delays</td>
<td>• Drives research for commercial outcomes</td>
</tr>
<tr>
<td>IP ownership and rights complexity</td>
<td>Competing demands drive complex IP deals:</td>
<td>Startup develops the technology platform:</td>
</tr>
<tr>
<td></td>
<td>• Maximum impact required by research organisations</td>
<td>• Industry partner provided first mover advantage</td>
</tr>
<tr>
<td></td>
<td>• Industry company delivery capacity in narrower field than total opportunity</td>
<td>• Full opportunity capitalised in market (potential period of exclusivity)</td>
</tr>
<tr>
<td></td>
<td>• Slowed innovation delivery</td>
<td>• Stake in a larger successful business</td>
</tr>
</tbody>
</table>

Alignment with critical success factors

<table>
<thead>
<tr>
<th>Critical success factor</th>
<th>Aligns?</th>
<th>Commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has execution expertise &quot;baked in&quot;</td>
<td>Y</td>
<td>Execution expertise baked in through the partnership with Hungry Jack’s. Hungry Jack’s has a nation-wide distribution network and a demonstrated ability to take products to scale.</td>
</tr>
<tr>
<td>Addresses both the ‘can we?’ and ‘should we?’ questions in tandem</td>
<td>Y</td>
<td>Rapid iteration, prototyping and market-testing throughout the process ensured the end product was able to meet consumer expectations.</td>
</tr>
<tr>
<td>Avoids a narrow focus on idea management</td>
<td>Y</td>
<td>The entire venture science model is geared towards execution.</td>
</tr>
<tr>
<td>Proactively manages IP concerns</td>
<td>Y</td>
<td>Research is exchanged for equity in the startup, opening up a new revenue stream for the research organisation. Emphasis is placed on “building and growing the opportunity, over spending a long time negotiating value that was developed before the venture” (Augustin et al, 2021).</td>
</tr>
</tbody>
</table>

Source: ‘Towards a new venture science model for transforming food systems’ in Global Food Security, 2021

From ideas to impact August 2021

v2food – From nothing to ½ million burgers in <18 months

Source: ‘Towards a new venture science model for transforming food systems’ in Global Food Security, 2021
Case studies

Lean LaunchPad programs
(I-Corps, Hacking for... and CSIRO ON-Prime)

Overview

Lean LaunchPad (LLP) was developed in 2011 by Steve Blank and the Stanford Technology Ventures Program. In its initial formulation, LLP was taught as a capstone at the Stanford Graduate School of Business and was designed to increase an entrepreneur’s chances of success by having them engage with potential customers before building their product or service.

While the first version of LLP was entrepreneur, startup and business-focused, it took just 90 days from the first class being taught at Stanford for Steve Blank and the American National Science Foundation (NSF) to adapt it for the nation’s top scientists (calling this program the Innovation Corps, or I-Corps). I-Corps gears researchers and research projects towards commercialisation and impact, using LLP tools to encourage engagement early and often with industry and other ‘problem owners’ in order to “reduce the time to translate a promising idea from the laboratory to the marketplace” (National Science Foundation, 2012).

All Lean LaunchPad programs have the following key principles:

• **Get out of the building:** The greatest risk to a potential business model’s successful execution is that it fails to meaningfully address a painful enough customer or stakeholder problem. Actionable information about problems doesn’t come from desktop research or brainstorming sessions; it comes from interacting with real people in the real world.

• **Execute early and often:** Business model design is described as an iterative process because you increase your understanding of the problem you are solving through the design and testing of a solution. Deploying minimum viable products (MVPs) early and often only gives you a greater degree of certainty that your proposed solution solves the right problem, it teaches you more about what that problem is.

The University of Michigan, one of the first universities to adopt the program, has shown that research teams that go through I-Corps have a three-fold better chance of obtaining follow-on commercialisation funding, as compared to teams that don’t (Huang-Saad, Fay and Sheridan, 2016).

Locally, CSIRO’s ON Prime Program has trained more than 3,000 researchers, worked with more than 40 universities, supported the creation of 61 new companies, and attracted more than $73m in commercialisation grants and venture funding (CSIRO, 2020).

Alignment with critical success factors

<table>
<thead>
<tr>
<th>Critical success factor</th>
<th>Aligns?</th>
<th>Commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has execution expertise baked in</td>
<td>Depends</td>
<td>Team composition will determine execution capability. Our general guidance is to build multidisciplinary teams that possess execution experience.</td>
</tr>
<tr>
<td>Addresses both the ‘can we?’ and ‘should we?’ questions in tandem</td>
<td>Y</td>
<td>Lean LaunchPad was designed to offset the tendency to consider only the ‘can we?’ question. All its tools ensure both questions are considered in tandem.</td>
</tr>
<tr>
<td>Avoids a narrow focus on idea management</td>
<td>Y</td>
<td>Lean LaunchPad spans the entirety of the idea → invention → innovation journey.</td>
</tr>
<tr>
<td>Proactively manages IP concerns</td>
<td>N</td>
<td>Running a Lean LaunchPad doesn’t in and of itself remove IP friction.</td>
</tr>
</tbody>
</table>

Innovation-led joint ventures
(the PLANeT Partnership)

Overview

PepsiCo and Beyond Meat have embarked on an innovation-led joint venture (JV) through the creation of a new entity, The PLANeT Partnership LLC. This joint venture leverages the core competencies of both organisations and is positioned to capitalise on the explosive growth of plant-based proteins. “The joint venture will leverage Beyond Meat’s leading technology in plant-based protein development and PepsiCo’s world-class marketing and commercial capabilities to create and scale new snack and beverage options” (PepsiCo and Beyond Meat, 2021).

This joint venture allows the combined entity to span the entirety of the idea → invention → innovation journey, with world-class capabilities along the chain, from research through to marketing and distribution. Through the creation of a new entity that will house the necessary IP, the organisations are able to account for IP ownership (and avoid collaboration friction) through equity distribution.

Alignment with critical success factors

<table>
<thead>
<tr>
<th>Critical success factor</th>
<th>Aligns?</th>
<th>Commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has execution expertise baked in</td>
<td>Usually</td>
<td>The most impactful innovation-led JVs are those structured with both product/service innovation and execution expertise. The PepsiCo-Beyond Meat partnership is a good example of this.</td>
</tr>
<tr>
<td>Addresses both the ‘can we?’ and ‘should we?’ questions in tandem</td>
<td>Y</td>
<td>The most impactful innovation-led JVs are structured to exploit a predetermined high-growth opportunity. In the PLANeT Partnership, this opportunity is plant-based proteins.</td>
</tr>
<tr>
<td>Avoids a narrow focus on idea management</td>
<td>Y</td>
<td>The most impactful innovation-led JVs will possess expertise along the entirety of the idea → invention → innovation journey.</td>
</tr>
<tr>
<td>Proactively manages IP concerns</td>
<td>Y</td>
<td>All necessary IP for the venture is housed within the new entity.</td>
</tr>
</tbody>
</table>
Overview

Plug and Play is a large-scale, international matchmaking service that connects some of the world’s largest corporations with strategically relevant startups. Plug and Play is a two-sided marketplace, and as such offers different value propositions to corporates and to startups.

For corporates: Plug and Play offers access to its curated network of 30,000 international startups. If a corporation has a specific technology or capability gap, Plug and Play will find the relevant startups in its network, make introductions, and arrange for technology pitches and demos. If there are no relevant startups in the Plug and Play network, they will identify external startups and attempt to onboard them.

For startups: Plug and Play offers introductions to large corporates, exposure to its extremely active venture capital network (they aim to invest in about 30% of their portfolio startups), as well as access to mentors and regular networking events.

Plug and Play’s attractiveness comes partly from its scale and reach (some key figures below) and partly from the meticulousness of its network curation.

While Plug and Play does not have an Australian footprint and focuses mainly, as the name suggests, on plugging technology gaps, the model demonstrates the power of thoughtful matchmaking between corporations and startups.

Alignment with critical success factors

<table>
<thead>
<tr>
<th>Critical success factor</th>
<th>Aligns?</th>
<th>Commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has execution expertise baked in</td>
<td>Y</td>
<td>Plug and Play identifies and introduces corporations to the right execution expertise.</td>
</tr>
<tr>
<td>Addresses both the ‘can we?’ and ‘should we?’ questions in tandem</td>
<td>N</td>
<td>Not necessarily. Plug and Play is excellent at finding the technology that corporations say they need, but not necessarily skilled at determining whether this technology will deliver impact and value.</td>
</tr>
<tr>
<td>Avoids a narrow focus on idea management</td>
<td>Y</td>
<td>Plug and Play is execution-focused.</td>
</tr>
<tr>
<td>Proactively manages IP concerns</td>
<td>Y</td>
<td>Technology can be licensed in exchange for investment or for a fee.</td>
</tr>
</tbody>
</table>

Source: https://www.plugandplaytechcenter.com/

Case studies

Plug and Play

1450
Startups accelerated in 2019

US$9b
Raised by portfolio companies

250
Global investments in 2019

400+
Major corporate partners

300+
VCs in their ecosystems

AgriFutures Australia
From ideas to impact August 2021

Phil Morle, Main Sequence Ventures.
Photo: Charlie Kinross Photography
The proposed open innovation methodology

Section 8

The proposed methodology is a culmination of the insights derived from the survey, interviews and web-forums, along with an unpacking of global best practice for open innovation. It has been designed to consistently produce sustainable and scalable business models for Australian agriculture. The methodology’s inputs are Australia’s world-class research, and the outputs are new products, services and companies that unlock value and impact from this research.

The first draft of the methodology was presented to key RDC stakeholders at a Canberra workshop in March 2021. The methodology has since been refined based on feedback, though what is presented here should still be viewed as a draft. While this program has been pitched initially to RDCs, there’s no reason why other types of organisations could not deploy this methodology, or one like it.

### Program management

<table>
<thead>
<tr>
<th>Go/No go 1</th>
<th>Go/No go 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Project teams formed</td>
<td>• Product/service/business ready for market</td>
</tr>
<tr>
<td>• Execution capability onboarded</td>
<td>• Funding raised or secured</td>
</tr>
<tr>
<td>• Project IP flow finalised</td>
<td>• 100-day metrics established</td>
</tr>
</tbody>
</table>

### Pipeline management

<table>
<thead>
<tr>
<th>IRL level</th>
<th>Objective</th>
<th>IRL 1-3</th>
<th>Preparation</th>
<th>Problem-solution fit</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>Validate</td>
<td>IRL 4-7</td>
<td>Product-market fit</td>
<td></td>
</tr>
<tr>
<td>IRL 8 and 9</td>
<td>Execute</td>
<td>N/A</td>
<td>Business-model fit</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IRL 8 and 9</th>
<th>BAU</th>
</tr>
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<tbody>
<tr>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

### Science-based Lean LaunchPad

- IRL 4-7
- IRL 8 and 9
- N/A

Indicative # of opportunities considered

- Program management
- Pipeline management

<table>
<thead>
<tr>
<th>IRL level</th>
<th>Preparation</th>
<th>Problem-solution fit</th>
<th>Go/No go 1</th>
<th>Go/No go 2</th>
</tr>
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<tr>
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<tr>
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### Stages, steps, activities and considerations

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<th>Stage</th>
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<th>Who?</th>
<th>Indicative activities</th>
<th>Considerations</th>
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<tr>
<td>1. Prepare</td>
<td>(i) Appoint RDCs and Program Manager</td>
<td>Program Manager and finalise program design</td>
<td>Set light-touch governance structure, secure stage two project funding, develop project plan (including commms plan), complete RACI matrix, engage contractors as necessary.</td>
<td>A ‘steering committee’ rather than a ‘management committee’ is recommended (management committees are often regarded as harmful to innovation efforts). Sponsorship and active endorsement of the program should come from the highest-possible leadership level, as it may at times be necessary to circumvent or augment business-as-usual processes.</td>
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<td>(ii) Pitch the program and onboard participating RDCs</td>
<td>Program Manager</td>
<td>Develop a program pitch and onboarding collateral, pitch program to target RDCs and secure involvement.</td>
<td>For a pilot, it’s recommended that the number of collaborating RDCs be kept to two or three, and that each has ‘early adopter’ traits (highly motivated to try something new, willing to experiment and tolerant of ambiguity).</td>
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<tr>
<td>2. Identify</td>
<td>(iii) Problem scan and selection</td>
<td>Program Manager</td>
<td>Pitch program to potential problem owners, source and prioritise problem sets.</td>
<td>Problems could be sourced from consumer/societal trends, industry, or venture capital theses. Alternatively, the program could consider a known problem that has failed to be solved by traditional methodologies.</td>
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<tr>
<td></td>
<td>(iv) Solution/technology scan and selection</td>
<td>Program Manager</td>
<td>Identify existing maturing (TRL 6+) or market-ready (TRL 9) solutions/technologies that have the potential to solve the chosen problem(s).</td>
<td>It’s recommended that the solution/technology scan be limited to TRL 6 or above; focusing on solutions with reduced technical risk will allow the project team to concentrate on market risk. Solutions/technologies could come from RDCs, research providers, or the growAG platform. Either the problem (iii) or the solution (iv) can come ‘first’.</td>
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<tr>
<td></td>
<td>(v) Team formation and execution capability secured</td>
<td>Program Manager, project team(s), Lean LaunchPad practitioners, steering committee</td>
<td>Problem-solution sets presented to the steering committee for consideration, project teams formed, execution partners embedded, project IP flow finalised.</td>
<td>Project team members will need to be able to dedicate significant time to the project (full-time is highly recommended). Execution partners should be embedded within project teams, as should research expertise and business expertise. For a project to progress past this stage, the IP flow must also be finalised.</td>
</tr>
<tr>
<td>3. Validate</td>
<td>(vi) Map path to product-market fit</td>
<td>Program Manager, project team(s), Lean LaunchPad practitioners</td>
<td>Technical and market risk assessment, preliminary market sizing, assumption mapping and hypothesis formulation, structured qualitative research, project direction fine-tuned.</td>
<td>It's recommended that the Lean LaunchPad practitioners have experience with science-based LLPs/research commercialisation. A program composed of content delivery, practical application and mentoring is the most effective at embedding key concepts. Steering committee to receive monthly updates through the validation stage.</td>
</tr>
<tr>
<td></td>
<td>(vii) MVP validation and iteration</td>
<td>Program Manager, project team(s), Lean LaunchPad practitioners</td>
<td>MVPs formulated, deployed and refined based on learnings.</td>
<td>MVP development time will vary considerably from project to project, consequently teams will progress through this stage at different rates. It will therefore be important to build flexibility into the program delivery.</td>
</tr>
<tr>
<td></td>
<td>(viii) Execution runway mapped</td>
<td>Program Manager, project team(s), Lean LaunchPad practitioners</td>
<td>Updated market sizing and analysis, key partnerships identified and structured, identify metrics that matter, product/service/startup prepared for market entry.</td>
<td>At the end of this step, teams should be at IRL 9 with a product, service or startup that is ready for market entry. Not every team is expected to make it to this stage, with some invalidating their project in earlier steps. This step may in some instances involve capital raising.</td>
</tr>
<tr>
<td></td>
<td>(ix) Pitch for execution support</td>
<td>Program Manager, project team(s), Lean LaunchPad practitioners, steering committee</td>
<td>Execution runway presented to steering committee for endorsement.</td>
<td>The steering committee will here determine whether the product, service or startup is ready for market entry (if capital has been raised, this will likely alter the composition of this committee).</td>
</tr>
<tr>
<td>4. Execute</td>
<td>(x) Launch and scale</td>
<td>Project team(s)</td>
<td>Product/service/startup enters market.</td>
<td>In Stage 4, the team(s) exit the program and begin to operate independently, with ad hoc support provided by the program team if/as required.</td>
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While components of this model have been deployed domestically and internationally in best practice innovation programs, their integration and execution as an end-to-end program in Australian agriculture R&D remains largely untested.

Until the model has been piloted, refined and scaled, it will inevitably contain hidden assumptions. While deploying the methodology fell outside the scope of this project, we have here articulated short, medium and long-term visions for it, as well as the guiding principles for a pilot.

Guiding principles for a pilot
It is highly recommended that any organisation endeavouring to pilot this methodology takes into account the following guiding principles:

1. Obtain executive sponsorship and active endorsement of the program from the highest-possible levels.
2. Keep investment low while uncertainty is high. Start small and scale what works.
3. Collaborate with a close group of highly motivated organisations in the first instance; a working group with a small number of decision-makers can be nimble and responsive.
4. Be prepared to adjust the methodology in-flight.
5. Collect stories and artefacts and share the journey as it unfolds. Outcomes are important, as is communicating new mindsets and ways of working.
6. Capture lessons learned at the conclusion of the program and use these to inform subsequent iterations of the methodology.

The industry-defining challenges confronting Australian agriculture at the dawn of a new decade demand radically new approaches to collaborative innovation. While incremental, single-commodity and pre-farmgate improvements will continue to play a role, they cannot be the whole story. Step-changes are required to achieve a $100 billion industry that is responsive to shifting societal expectations around sustainability, environmental impact and animal welfare.

It is clear from broad engagement with RDCs, industry, research organisations, government, venture capital and startups that there exist today a variety of impediments to innovation. Chief among these are the commercialisation ‘Valley of Death’, an overemphasis on technological solutions, and (in the case of the investment stewarded by the RDCs) a structural short-termism that curbs the scope, ambition, risk profile and acceptable time-to-payoff of funded projects.

While presenting significant challenges, it’s believed that the effects of these impediments can be largely offset through the deployment of a certain kind of collaborative innovation methodology. Crucially, this methodology would span the gamut from idea to impact, would have execution expertise ‘baked in’, and would consider technical and market risk in parallel – building not only products and technologies, but also their accompanying business models.

One such methodology has been proposed in this report. It has been designed to offset the most pernicious impediments to innovation, draws on global best practice for the commercialisation of scientific research, and incorporates the learnings from the early successes of CSIRO and Main Sequence Ventures’ ‘venture science’ model. The methodology has undergone several iterations based on the feedback of key stakeholders, and is ready for small-scale deployment.

The RDCs, sitting at the cross-section of government, researchers and producers, are uniquely positioned to pilot this methodology, to refine it, and to drive its adoption at scale. Doing so will markedly increase the translation of research into game-changing innovations, and will allow Australian agriculture to respond to this decade’s economic, environmental and social imperatives.
References


Huang-Saad, A., Fay, J., & Sheridan, L. (2016, December 1). Closing the divide: accelerating technology commercialisation by catalyzing the university entrepreneurial ecosystem with i-Corps. The Journal of Technology Transfer 42, 1466-1486


Appendix

Extended enablers/disablers for open innovation success

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<th>Item</th>
<th>Type</th>
<th>Description</th>
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<tr>
<td>Executive sponsorship and championing</td>
<td>Enabler</td>
<td>All open innovation methodologies will require AgriFutures Australia to meaningfully reshape (or circumvent) some business-as-usual processes. It’s often unclear to organisations at the beginning of their innovation journey just how subversive innovation is, and the level of change that it demands. Executive willpower will be needed to push through the organisational red tape.</td>
</tr>
<tr>
<td>Firm establishment, articulation and communication of the program ‘why?’</td>
<td>Enabler</td>
<td>The most fundamental question regarding open innovation programs (indeed, innovation programs in general) is often left unaddressed, or is not communicated carefully. This question is: why are we doing this?, and the related questions are: what are we hoping to achieve? and what does success look like?</td>
</tr>
<tr>
<td>Iterative methodology design and deployment</td>
<td>Enabler</td>
<td>AgriFutures Australia should start small and run highly focused and curated experiments with the chosen methodology. These early experiments will provide invaluable learnings from which to iterate the design.</td>
</tr>
<tr>
<td>Leverage existing research</td>
<td>Enabler</td>
<td>RDCs have access to a large amount of high-quality applied research. It’s recommended that projects start with a technology that is well progressed and has a different risk profile to typical investment.</td>
</tr>
<tr>
<td>Secure outside investment</td>
<td>Enabler</td>
<td>Outside investment may allow greater flexibility in program design, enabling something that has the best chance of success rather than something that adheres to all business-as-usual processes and funding requirements.</td>
</tr>
<tr>
<td>Build multidisciplinary teams</td>
<td>Enabler</td>
<td>Multidisciplinary teams that combine research expertise with commercialisation expertise will be best-placed to deliver impact.</td>
</tr>
<tr>
<td>Project success metrics and funding tied to near-term, incremental pre-farmgate improvements</td>
<td>Disabler</td>
<td>Success metrics and funding should reflect open innovation’s ambition to deliver step-change rather than incremental improvements. This ambition has a different risk profile to typical investment.</td>
</tr>
<tr>
<td>Ecosystem duplication and noise</td>
<td>Disabler</td>
<td>There are multiple open innovation efforts occurring across the RDCs (in some instances multiple occurring within a single RDC). We recommend that open innovation attempts be centralised to avoid duplication, and to allow external partners to easily grasp their point of engagement.</td>
</tr>
<tr>
<td>Betting the farm</td>
<td>Disabler</td>
<td>Costs should be kept low while uncertainty remains high, with investment scaled in line with a reduction of market and technological risk.</td>
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Appendix 2

Full survey analysis

Respondents

There were 53 responses to the 'Creating new innovation processes for Australian agriculture' survey deployed on 11 January 2021. The first response was received on 11 January, and the final response was submitted on 7 March.

Respondents belonged to more than 20 different organisation types from across the agriculture industry, including researchers, RDCs, producers, startups, government, investors, consultants and accelerators. The organisation types most strongly represented were:

- Researcher or research providers (n=15, 28.3%)
- RDCs (n=8, 15.1%)
- Producers (n=7, 13.2%)
- Government (n=7, 13.2%)
- Investors (n=7, 13.2%)
- Consultants (n=4, 7.6%)
- Accelerators (n=3, 5.7%)
- Startups (n=3, 5.7%)
- Other (n=18, 33.9%)

Respondents had more than 30 different products as their primary area/s of focus, with the most highly represented products being:

- Emerging industries (n=14, 26.4%)
- Beef (n=12, 22.6%)
- Barley (n=10, 18.9%)
- Wheat (n=10, 18.9%)
- Other (n=15, 28.3%)

To what extent do you agree with the following statements:

Strongly disagree  Somewhat disagree  Neither disagree nor agree  Somewhat agree  Strongly agree

Australian agriculture takes ideas and translates them into impact
Australian agriculture identifies and articulates key industry challenges
Australian agriculture generates novel solutions to key challenges
Australian agriculture tests and implements solutions to key challenges
Australian agriculture spreads/scales the adoption of effective solutions to key challenges

Quantitative question analysis

There were five quantitative questions in the survey; each question asking respondents to what extent they agreed with a top-line statement about Australian agriculture. Respondents could strongly agree, somewhat agree, neither disagree nor agree, somewhat disagree, or strongly disagree.

The statement that generated the most agreement from respondents was Australian agriculture identifies and articulates key industry challenges (8 strongly agreed, 29 somewhat agreed, 8 neither disagreed nor agreed, 5 somewhat disagreed, and 3 strongly disagreed).

The statement that generated the most disagreement from respondents was Australian agriculture spreads/scales the adoption of effective solutions to key challenges (1 strongly agreed, 15 somewhat agreed, 14 neither disagreed nor agreed, 16 somewhat disagreed, and 6 strongly disagreed).

Qualitative question analysis

There were six general qualitative questions that were asked of all respondents. More targeted questions were then asked of respondents representing specific organisation types. The six general questions are unpacked below, with ‘word clouds’ (generated at wordclouds.com) providing a visual overview of respondent sentiment.

In a word cloud, the frequency with which a word appeared in responses dictates its size (with larger words having appeared more frequently). Some words, for example modal verbs like ‘can’, ‘must’, ‘could’ and ‘to’, are removed from the cloud.

Indicative verbatim responses have also been provided.
What’s the biggest barrier to innovation (the execution of new ideas to create impact) in Australian agriculture? (n=53)

01

“The belief that the current practices are working, based on past indicators, so there is little need to take small risks to make new, less familiar improvements; and especially when some of the benefits flow to the greater good.”

02

“Bureaucracy and lack of openness and transparency. Lack of true collaborations and the RDC system is too siloed under the current setup. No measure of the impact and ongoing strategic monitoring to allow effective investment to maximise the benefits to the stakeholders.”

03

“Bureaucracy and too much distance between the decision-makers on funding and priorities (semi-governmental organisations like RDCs, AgriFutures, etc.) and people at the coal face. It’s hard for funding to reach the right projects. Instead of stimulating innovation, (semi-)government organisations often form a barrier to innovation through the way they operate.”

What’s Australian agriculture’s superpower (the thing it does better than anyone else)? (n=52)

01

“Resilience – our producers are the least subsidised in the world, in one of the harshest and unpredictable environments, yet are global leaders in food and fibre production.”

02

“Island nation with variable climates that represent most climates around the world – testing ideas is easy here and we generally have a ‘give it a crack’ attitude.”

03

“Australian farmers and graziers are among the least subsidised in the OECD. Despite this, Australian farmers produce a premium product more efficiently and to higher standards than the rest of the world.”
If Australian agriculture can successfully implement collaborative innovation processes, what could we achieve that we can’t achieve today? (n=52)

"Significant growth in the export of agricultural innovation – we have unique opportunity to develop and deliver technologies with broad global application, but are hampered by deficiencies in cross-supply chain innovation capacity."

"Better understanding of systems approaches and solutions rather than commodity-based."

"If ‘real’ collaboration is implemented, the sector can gain a lot from the different actors of the system. However, collaboration in most of the cases is how to cut the cake in pieces – this is not real collaboration. In other cases, just who knows who is part of the collaboration. There is a lot of good research and groups that do not have access to funding, as they are isolated."

If you were to design a more collaborative and innovative agriculture industry, what would it look like? (n=53)

"It would be underpinned with more accurate information on who potential collaborators are, would be more fluid and flexible, enabling self-organisation, with different tolerances for risk and failure, and a culture that is more accepting of the benefits of collaboration."

"Sufficient farmers involved right at the start of designing a solution and keeping them committed throughout the investment pipeline so that they either help the evolving of the solution or they become the advocates for the solution found."

"The industry requires multi-faceted policy levers (funding, tax incentives, capacity building) to build and support R&D-level innovation across the value chain. Rather than trying to lower the bar on the definition of innovation, efforts should be focused on increasing the innovation capacity across the value chain, which will benefit the entire ecosystem (e.g. industry through increased productivity/efficiency; and technology companies due to the market being primed for adoption)."
What’s the most frustrating thing for you personally about working in Australian agriculture? (n=53)

01

“Lack of cross-collaboration on R&D, duplication of R&D, R&D that sits on the shelf for years and then a new project is created on the exact thing because corporate knowledge has been lost. So many people running projects who are really bad at running projects. The industry not knowing what good results are and settling for second-best, which other industries would just not accept.”

02

“The relative lack of companies/organisations that can take a whole-of-supply-chain approach and thereby maximise value for consumers, producers and processors.”

03

“It is exciting seeing the evolution occurring within the rural innovation system for experimentation and adoption of new innovation practices (agile, lean startup, human-centred design, design thinking, challenge-led) that are seeking more ambitious outcomes and increasingly engaging with the private sector. We need better incentives for public sector researchers (than publication) to work in these new ways and with the private sector.”

If you could wave a magic wand and change one thing about the agriculture industry, what would it be? (n=53)

01

“General lack of long-term strategic planning, with the resultant focus on short-term goals.”

02

“Be more open with challenges and have a longer-term outlook at the operational level. It is challenging because the profit margin is almost non-existent, so understandably the industry wants things that can be implemented now.”

03

“See greater preparedness to look out and beyond with more (well-considered) risk in RD&I, rather than playing safe but with minimal gain or impact; more participative engagement to implementation.”