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Stimulating private sector extension in Australian agriculture to increase returns from R&D

Research Report K:

The private advisory sector engagement trials:

The co-innovation framework and cross-trial results

University of Melbourne
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Contents

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About the project

Stimulating private sector extension in Australian agriculture to increase returns from R&D is a three-year project to research, develop and test models to build the capacity of the commercial and private sector in delivering R&D extension services to Australian producers.

Led by Dairy Australia, the project is a collaboration involving nine partner organisations including six Research and Development Corporations (RDCs) – Dairy Australia, Meat & Livestock Australia, Cotton Research & Development Corporation, Sugar Research Australia, Australian Pork Limited, Horticulture Innovation Australia – as well as the Victorian and NSW governments, and the University of Melbourne.

The project is funded by the partners and the Australian Government's Department of Agriculture and Water Resources as part of the Australian Government's Rural Research and Development for Profit program.

The project is in response to the trend towards increasing roles for industry and private services in delivering agricultural extension. This represents a shift away from traditional, government-funded extension services over the past 20 years. Currently the extent of private sector involvement in extension varies across industries, depending on product markets, policy settings, regional issues and industry demographics.

The private sector is now a well-used information source for producers, however there is scope to enhance the capability of the private sector in delivering extension. Improving the capacity of private extension service providers will contribute to on-farm productivity gains and profitability.

Companion reports

This report provides a summary of findings and implications for practice from across the four private sector engagement trials. It is one in a series of research reports prepared for the project *Stimulating private sector extension in Australian agriculture to increase returns from R&D*.

- Report A: Farmer demand
- Report B: Advisory services
- Report C: The advisory and extension system
- Report D: Farmer and adviser networks.
- Report E: Research results: Focus groups and surveys of farmers and advisers.
- Report G: Trial 1: The Processor Trial
- Report H: Trial 2: The Precision Agriculture Trial
- Report I: Trial 3: The Advisory Pathways Trial
- Report J: Trial 4: The Knowledge System Trial
- Report K: The four private advisory sector engagement trials: the co-innovation framework and cross-trial results (this report)

Background: Australia's evolving agricultural extension system

Over time, the means and mechanisms by which Australian farmers access and receive their information, advice and support has changed markedly. This is largely because there has been:

- Changes to the role of government and their investment in and coordination of agricultural extension services in each state of Australia.
- Variation in the way Australia's rural Research and Development Corporations have invested in and positioned extension functions.
- Variation in the extent to which a range of private providers have engaged in extension functions and the business models of agricultural service firms.
- Technological change in society, particularly, information and communication technologies.

These and other developments have led to a complex, pluralistic RD&E system in Australia with public and private actors, and different models of engagement between researchers, advisory practitioners and industry-based decision-makers (Hunt et al. 2014).

Collaborative approaches offer the promise of more effective RD&E when applied to such complexity. The increased focus on collaboration in agricultural innovation systems is also due to a greater understanding of the failure of technology transfer models (Ayre and Nettle 2015, Hermans et al. 2015) and has been driven by policy and RD&E funding directives and the increased role of private research and extension actors.

One collaborative approach is co-innovation: Co-innovation is an engagement model that involves all stakeholders, especially end users, early on in the in the innovation process (Botha et al. 2017, Coutts et al. 2017, Turner et al. 2016). It implies that all stakeholders acknowledge that they are unable to achieve certain objectives on their own and need to come together with other actors who offer complementary capabilities and resources required to fully develop and implement the new idea or technology.

The private sector engagement trials were action research interventions that each explored a model of co-innovation to address one agricultural innovation challenge (see companion reports G, H, I, and J). The trials were one of five components of *Stimulating private sector extension in Australian agriculture* and were designed to:

- identify practical proposals to strengthen private advisory sector roles in driving innovation
- improve profit on farm by filling current service gaps
- generate learning about what drives and hinders co-innovation.

Executive summary

This report presents the synthesis of findings and implications from across the four private sector engagement trials. It delivers recommendations for nuanced engagement with the private advisory sector, and guidance for practising co-innovation in the agricultural research, development and extension (RD&E) system.

The importance of taking a systemic approach to gaining a better understanding and coordination of innovation needs between industry organisations, and between science and end-users (advisory sector and farmers), has been recognised for a decade (Nettle et al. 2013). The value of a collaborative framework to inform processes of reforming and designing pluralistic agricultural advisory services has been described as the 'best-fit' approach by Birner et al. (2009). However, despite this insight, the Australian agricultural innovation system continues to maintain a science-centric innovation focus (Nettle et al 2013).

The four regional adviser and producer forums conducted in the early project stage present a similar picture. The key findings from the discussions indicate a strong desire for an equal partnership approach in the RD&E system for farmers, researchers and advisers, alongside the need:

- for improved connections, more collaboration and networking with the private sector
- for collaborative knowledge production (research needs identified by clients and advisers, and advisers helping to frame complexity)
- to collaborate and communicate ideas and information and across sectors and industries
- to invest in linking and brokering skills of private advisers (not just technical skills).

The project bridged the apparent gaps between insight and action in the Australian RD&E system by applying an action research approach with clear emphasis on co-innovation principles, involving all relevant actors in the 'plan-do-review' cycle of action learning and developing a 'route to change'. The aim of this approach was to demonstrate how a co-innovation approach can build social processes that facilitate multi-stakeholder interaction, learning and collective action capable of achieving change for a more effective innovation system.

The four trials drew on a common set of key principles adapted from the co-innovation literature (Coutts et al. 2017) that shaped the common design framework guiding the individual trials.

Each trial addressed one innovation challenge and, under the common framework, used an approach tailored to this challenge. For example, Trial 2 (report H) used 'participatory technology assessment' to address how advisers can assess the value of precision agriculture to their businesses; Trial 3 (report I) drew on a mentor-mentee model. Each trial operationalised a 'co-innovation model' in a particular technical and industry context, and generated a set of insights into what shaped (helped or hindered) the collaboration in that context.

The four trials were:

Trial 1: The Processor Trial (report G): Extending R&D within supply chains (dairy and meat processors) involving stakeholders that do not routinely collaborate in the advisory space.

Trial 2: The Precision Agriculture Trial (report H): Increasing the capacity of farm advisers to engage with digital technologies to benefit producers.

Trial 3: The Advisory Pathways Trial (report I): Creating career development pathways for new entrants and professionals in the agricultural advisory and extension sector.

Trial 4: The Knowledge Trial (report J): Developing collaborative processes for improving knowledge flows between researchers, advisers and producers to ensure relevance of R&D to end-user needs.

The four trials, their key results and outcomes are discussed in four companion reports (report G-J).

The insights from the trial interactions confirm the overall value of collaboration/co-innovation when taking a systemic approach to agricultural RD&E. However, the cross-trial findings also show that collaboration needs to be made 'fit for business' in the commercial context of the agricultural RD&E system. Effective co-innovation processes must establish a grounded understanding of the collaborators and their professional realities. This and other 'considerations for co-innovation practice' were synthesised from across the trials to provide a framework for nuanced engagement of private sector advisers in co-innovation.

These considerations include:

- recognising and investing in the role of innovation brokers and networks
- paying attention to market signals
- recognising that transactional relationships shape co-innovation interactions
- recognising that the operational environment of co-innovation is also shaped by competition
- recognising imbalances of power and how they affect the co-innovation
- recognising the importance of trust and social capital
- recognising that establishing collaborations, and building trust and social capital, takes time.

Research methods

The trials were action research interventions designed to co-develop responses to agricultural innovation challenges and a 'route to change' as part of the collaborative interactions. Following key principles of co-innovation, each trial was a partnership between a R&D corporation or state government, a private advisory organisation, a social researcher from the University of Melbourne, and participants representing the diversity of adviser typologies in Australia, including: small to medium businesses/ sole traders, retailers/input suppliers, larger consulting firms and agribusiness firms, and producers. The engagement of the private advisory sector as key contributors to the trials was a central design element to ensure a good fit with the diversity of needs and aspirations in this sector.

Taking a co-innovation design approach

The four private sector engagement trials contributed to the overall project aims of: increasing private sector engagement in driving innovation; making research more accessible to farmers through a more integrated and co-operative extension system; identifying barriers to private sector involvement in delivering R&D; stimulating further growth of a capable private sector through training and retention of professionals; and building a stronger connection between end-users and researchers by trialling different approaches to increase engagement.

The trials took a co-innovation design approach, involving diverse groups of actors from agricultural industry bodies, public and private advisory sectors, and primary producers (Botha et al. 2017, Turner et al. 2016, Vereijssen et al. 2017) in all stages of developing the intervention to:

- facilitate collaborative identification of shared interests and desired change
- identify opportunities for the advisory service sector to expand its role in the system by:
  - identifying the need for and developing new capacities at different levels of the system
  - creating networks and initiate partnering with other orgs/ levels and sectors
  - developing roles/ functions capable of addressing specific technical issues
  - sharing information and learning, in order to enable ongoing adaptation, and hence
  - building capacity to collaborate.

Coutts et al. (2017) identified that academics are yet to agree on specific characteristics of co-innovation (as a form of collaboration) and use of innovation platforms. The design of the action research engagement trials in this project was informed by a set of core collaborative principles, adapted from the literature on co-innovation (Botha et al. 2014, Coutts et al. 2017, Nederlof et al. 2011), cooperative inquiry (Blackmore 2010, De Jaegher et al. 2016, Heron and Reason 2001, Ison 2008, Kemmis et al. 2013), and the research team's prior experience with designing co-productive research for policy and the agricultural RD&E system (Ayre et al. 2018, Klerkx and Nettle 2013, Nettle et al. 2013, Paine and Nettle 2008, Paschen and Ison 2014). These principles (Text Box) shaped the design each of the trials' action components, from the initial conception of the trial contexts through to the various phases of their operationalisation.

Text Box 1 - Core principles of the collaborative action research trial intervention

1. **Inclusivity** – emphasises experiential learning from social interaction and supports multiple sources and 'forms' of knowledge.
2. **Diversity** – diversity and inclusion are important values in co-production.
   - all stakeholders are involved in and able to contribute to the definition of the problem
   - differences between stakeholders are accepted
   - all are involved in joint processes of defining the problem and a solution.
3. **Equality** – co-production starts from a partnership approach in which everyone is equal and everyone has assets to bring to the process
   - recognition of skills complementarity
   - mutual decision making
   - all participants are fully involved in research decisions as co-researchers.
4. **Accessibility** – access is a fundamental principle of co-production if everyone is going to take part on an equal basis.
5. **Reciprocity** – 'reciprocity' is a key concept in co-production. It ensures that people receive something back for putting something in; it builds on people's desire to feel needed and valued; and it means sharing responsibility for shared outcomes.

Additionally, the collaborative action pursued by this project drew on the complementary principles of co-innovation as described by Coutts et al. (2017) (Text Box 2).

Text Box 2 - Nine principles of co-innovation (Coutts et al. 2017)

1. Take time to understand the problem from many different views: By taking the time to understand the complex nature of a problem, and building a shared vision (or ambition for change), solutions will be more likely to succeed. Be prepared to consider a variety of solutions.
2. Be inclusive – ensure everybody is present who needs to be there in order to understand the problem, its causes and to develop workable solutions.
3. Engage with and value all sources of knowledge – seek new insights and take the time to listen to all the different perspectives – everyone brings something to the table.
4. Strive to learn from each other by actively listening and understanding – be open to new ideas by being willing to let your own understanding and perspectives evolve.
5. Keep sight of the shared vision or 'ambition for change': Agree on the nature of the problem, its causes and the desired outcome of the project.
6. Be honest, open and constructive in your interactions with other participants.
7. **Be aware of the wider context** of the problem and any changes that may occur.
8. Be flexible and adaptable: How we work together and the roles we have may change over time.
9. Stick with the co-innovation process despite its frustrations: Setbacks occur; working through historical or current tensions, and negotiating shared and workable solutions, are part of the process and will pay off.

As Pain and Francis (2003, 46) observe, "participatory approaches did not originate as a methodology for research, but as a process by which communities can work towards change". In this vein, action research is as much about method as it is about how and to what extent participants engage with each other within and beyond the research.

Social learning research can be seen as a subset of participatory and action research approaches, as it emphasises how opportunities for experiential learning are generated from social interaction and can lead to the development of hybrid forms of knowledge to guide policy and action (Collins and Ison 2009). The principles of diversity, inclusion and equality are key to creating opportunities for social interactions that support the integration of multiple sources of knowledge, as well as the development of shared meanings and collaborative practices as part of the action process.

It was critical to the development of the collaborative trial partnerships that partners and participants were involved early on in the process of developing the trials, from the trial concepts to the design of specific actions, analysis of findings and the presentation of recommendations for future actions at a

final symposium. The trial governance structure and regular meetings, with updates and feedback, ensured all partners had access to ideas and material produced as part of the trial interactions.

Collecting data from the trials

Trial data were collected using a mixed methods approach. Before the trials were established, the project team reviewed the international literature (and current engagement dynamics in the Australian RD&E system (Milestone 1, Reichelt et al. 2015), and ran four regional forums with advisers and farmers in South Australia, Victoria, Queensland and New South Wales (2016). Two national surveys of advisers and farmers were also conducted in 2016/ 2017 and informed aspects of the trials (Nettle et al 2017). The data collection from the operationalisation of the trials consisted of interviews, survey questionnaires and the researchers' participant observations.

Interviews: A first round of interviews with project partners from participating RDCs and state governments (n=12) was conducted by the research team in December 2016 to produce a snapshot of the partners' experiences and expectations of the trial process to date. This was followed up by a second round of interviews at different times of the individual trial processes as well as towards their completion.

Survey questionnaires: Over the course of two years, each trial conducted a number of workshops (4-8 per trial) to work through the stages of the trial process. The research team evaluated these workshops using a short questionnaire at the end of each session, asking participants about the perceived value of the particular workshop session and the collaborative approach more generally.

Participant observation: The researchers' participant observations of meetings and other trial-related interactions, in conjunction with the team's collective reflection on these observations and emerging insights and notes of these conversations, presented a third data source.

Research phases: Developing the four trial contexts

The four trial intervention contexts were developed according to a set of criteria that ensured that all:

- had cross-sectoral significance (i.e. make progress on areas that one industry could achieve or address on its own)
- sought to be of public, industry and private interest/good
- included a professional development/training component not used/available currently
- were able to demonstrate a link between RD&E investments reaching more farms/improving on-farm productivity.

The interventions shared a common structure for their establishment, implementation and analysis phases that ensured that all teams adhered to the core principles of collaborative inquiry and action research. Each trial team adapted the methodological framework to its individual trial contexts and timelines as they emerged from each of the trials' actions (see individual trial reports H, I, J and K).

Phase A – Establishment – Co-defining the opportunity

- Identifying and refining the trial concept
- RDC leads, participating RDCs and RIRG researchers – nominate project officer
- Identifying and engaging with trial partners

- Defining the opportunities for collaboration through the trial
- Identify shared interests, problems and core participants.

Phase B – Intervention Action – co-innovation/ co-designing action

- Developing a co-design process for intervention in the identified area
- Identifying and implementing engagement, development and learning activities
- This is an action-oriented approach that follows a 'plan, do, review' cycle.

Phase C – Analysis

- Analyse the activities with regards to how they have addressed the gap/opportunity identified and what they contribute to answering the overall research questions.

Establishment – Co-defining the opportunity – step 1

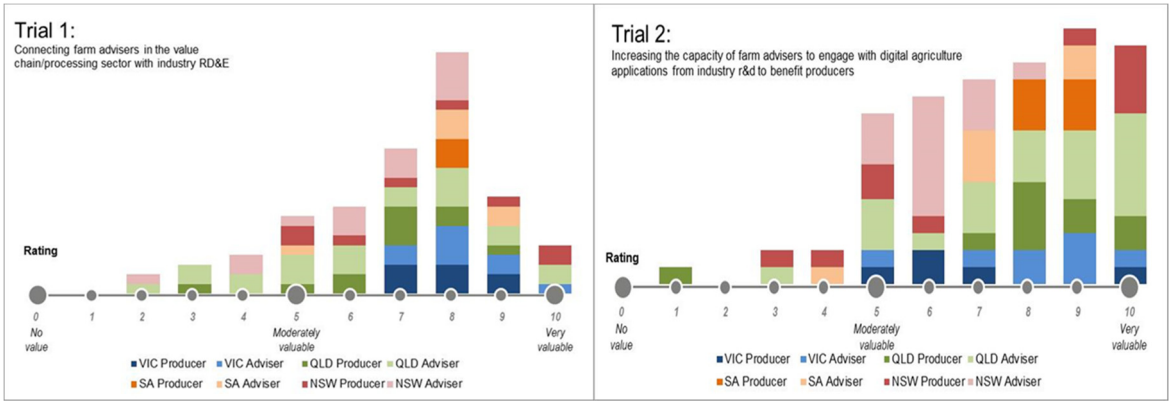
Identifying and refining the trial concept

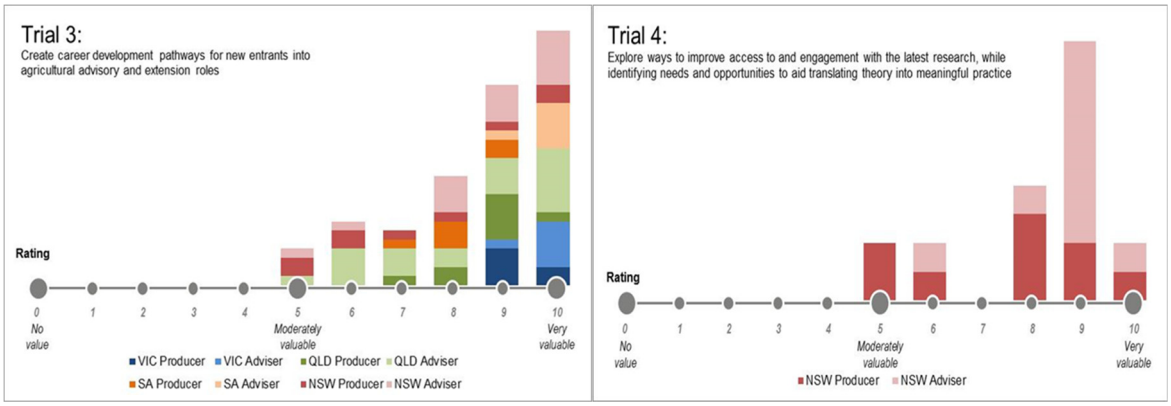
Three draft trial concepts were developed based on project assumptions around gaps, needs, and opportunities for advisers derived from the international literature and in consultation with participating RDCs and representatives of the Victorian and New South Wales departments of primary industries. These concepts were based on broadly recognised gaps or opportunities within the current Australian RD&E system and a set of selection criteria designed to ascertain that the trials addressed:

- opportunities around engaging with the processing sector/ the supply chain
- gaps and opportunities in precision/ digital agriculture
- gaps in professional development and career pathways for new entrants into the advisory sector.

These three draft concepts were tested at four regional forums the project team conducted with advisers and producers in South Australia, Victoria, Queensland and New South Wales in early to mid-2016. The forum participants were invited to rank the suggested concepts by order of their perceived importance to the private sector and to provide detailed feedback on the drafts. A fourth trial concept, addressing the gaps in the agricultural knowledge system, was developed from additional forum responses and was test-run with participants at the last forum in New South Wales (Figure 1).

Figure 1: Regional practitioner ranking of three suggested trial concepts. A fourth was developed on the basis of additional feedback received and was ranked at a forum in NSW





Establishing the teams

The trials were purposefully designed according to the key principles of co-innovation (text box 1). To ensure that the values of diversity, inclusion and equality were met, each core team consisted of an RDC or government lead, participating RDC representatives, a researcher from the University of Melbourne, and a Project Officer from the private advisory sector. The selection of trial participants further aimed to ensure representation of the diversity of adviser typologies in Australia by including small to medium businesses/sole traders, retailers/input suppliers, larger consulting firms and agribusiness firms as well as, wherever possible, other types of advisers not captured by this typology.

Engaging the private advisory sector as key contributors to the trial development was a central purposeful design element as they were the project's link to wider advisory networks and ensured that the trials were engaging an adequate range of individuals and types of advisers. The Project Officers were invited into a broker role that drew on their professional networks as well as their understanding and perspective of the problem the trial was addressing. They held a key role in ensuring that the private sector perspective guided the further definition of the trial concepts and trial actions.

Trial roles

Each core trial team consisted of one Industry Lead (RDC lead), one Project Officer (PO) and one Research lead from the UoM research team (RIRG lead).

The RDCs/ state governments:

Following the establishment of the trial concepts, the RDCs nominated the concepts of interest to them. A trial Industry Lead and participating roles were decided. Their role included:

- leading the establishment and progress of the trials
- identifying partners and actively support engagement
- engaging in the co-design process
- supporting responses to needs identified through the process.

The Project Officers:

Following an expression of interest process, four Project Officers and one trial consultant were appointed through a contractual agreement with the University of Melbourne. The Project Officers were professionals from the private advisory sector, with industry specific networks and experience in project design/development and workshop facilitation. Their role included:

- contributing a private advisory sector perspective to the definition of the trial opportunity

- identifying suitable trial partners and networks private advisory sector
- working with RDCs, trial partners and project researchers to enact the trial methodology
- facilitating all interactions between trial partners (broker role).

The project team researchers:

The role of the Research Lead included:

- development of the action research plan, structuring the trial communication documents, and overseeing the trial methodology
- working with the Project Officers to design facilitate trial engagement workshops
- gathering research data and providing feedback on insights gained to inform the co-design process.

Trial participants/partners:

Trial partners and participants were identified from the private advisory sector utilising both the RDCs' and Project Officers' networks. The RDC Leads, POs and Research Leads started engaging with prospective trial partners using a refined trial concept-briefing document.

Co-defining the trial opportunity – step 2

Following the initial engagement, the private sector trial partners were invited co-define the opportunities for collaboration through the trial and identify the shared interests or shared problems the trial was going to address, as well as who might be additional core participants that needed to be engaged. Inviting further diversity into the refined definition of the problem and opportunities was central to the collaborative process for a number of reasons:

1. It ensured inclusivity and diversity of adviser perspectives and resulted in a richer, more complex understanding of the problem/opportunity at hand.
2. The approach produced a break in habitual, linear approaches by recognising the diversity and complementarity of professional skills as a clear asset to the process.
3. The recognition of all trial participants as equal in the process contributed to improved mutual understanding of people's different professional contexts and needs.
4. Empowering participants as co-innovators and co-designers encouraged them to take ownership of the process and collective decision-making.
5. Mutual decision-making and commitment to collective action was intended to help create trust between different stakeholders.

Intervention Action – co-designing action

While each of the four trials operated at its own pace and according to the specific trial's contextual design, their implementation phase generally focused on developing a co-design process for the intervention action in the identified area. Once all participants had arrived at a shared understanding of the problem and the opportunity they were going to address, several rounds of workshops and meetings identified and designed engagement, development and learning activities to be implemented as part of the trial and beyond the project's duration. This action-oriented approach in the implementation phases followed a classic action research cycle of 'plan, do, observe, review'.

Key results

The actions and key results for each of the trials are described in the trial companion reports G (The Processor Trial); H (The Precision Ag Trial); I (The Advisory Pathways Trial) and J (The Knowledge Trial).

This section presents key results arising from implementing the collaborative/co-innovation model across the four trials.

The value of the collaborative model

The results from the four trials reflect that the collaboration instigated by the trials raised the participants' awareness of their roles within the trials and, it can be argued, of their current and potential future roles within the RD&E system. This observation is particularly pertinent in regards to the findings from interviews with the Trial Team members. While the understanding of their roles overlapped between RDCs and Project Officers in the categories: Connector, Designer and Facilitator, RDCs/state government partners additionally described their roles in a variety of ways, noting the multiple ways in which they contributed to the trials as being applied theorisers, co-designers, information provides, observers, supporters and translators.

A shared understanding of the real innovation challenge can be achieved

The interactions in each of the four trials provided opportunity to arrive at a shared understanding of the four problem contexts as viewed through the different perspectives of industry bodies, state governments and the private advisory sector as players in the RD&E system. The description of the problem context of each trial was expressed at both a generic and trial-specific level. At a general level, RDC representatives, Project Officers and trial workshop participants from the private advisory sector formed a shared understanding of at least three key issues in the RD&E system:

- A problematic RD&E context, due to a lack of strategic engagement between industry and the private sector and the disconnection of R&D outputs from the commercial sector and advisers/producers.
- A lack of producer trust in the integrity of information communicated due to a high turnover of advisers and lack of 'know-how' in judging the credibility of commercial research products.
- A support gap for advisers in the extension space, the need to build the skills of advisers and to develop longer-term careers in extension and advisory provision.

Action is stimulated through shared goals for the collaboration

In addition to the technical foci of the four trials, RDCs and POs agreed that their collaboration aimed to generate adaptive, working co-innovation models (general or specific to a problem context) that illustrate the inclusive and sustainable engagement of the private sector in addressing the key issues identified:

- the generation and translation of new knowledge
- connecting up of the RD&E system
- building the capability and capacity of the private sector in extension and advisory provision.

Further, industry, private sector partners and workshop participants shared concerns for developing a value proposition for the private sector participants beyond a research or process perspective. The

Trial Teams are committed to building a post-project legacy. Most of the RDC and PO interview respondents recognised the strength of their team and expressed their optimism and excitement about the opportunities the project presents.

Industry and private sector advisers share and align strategies for success

The RDCs and POs were able to provide some practical ways that they might address or have already achieved to overcome some of the challenges of implementing the trials. This indicates there is a sense of optimism, resourcefulness, flexibility and open attitude towards the collaborative engagement model of the trials.

Some of the strategies mentioned were:

- building networks and aligning with other strategies
- building on and leveraging off, already established local connections and networks with the private sector
- having trust in the capability of the Project Officers
- defined trial team roles and recognising strengths of the team
- outlining and documenting a process
- good communication
- team building
- timing of activities.

Learning by doing: participants experience new ways of doing things that can be replicated

The trial data reflect the learning process participants experienced as part of their involvement in the multi-stakeholder collaborations in the individual trials. The trials created the opportunity for collaborative capacity building. The increased understanding of how the collaborative process works includes the participants becoming aware of the significant efforts involved in building a functioning collaboration and how they address the challenges faced by any collaborative alliance when embarking on the process of 'practising collaboration', such as:

- Careful selection of participants who have capacity to participate, and a prior commitment and interest in a problem context, enables productive deliberations and collective action.
- Convening groups of advisers (innovation actors) from different industries creates the opportunity for learning from diversity to manage the uncertainty and complexity, which characterises the agricultural RD&E system.
- Defining the problem and developing shared understandings of both the issue and potential solutions.
- The experience of uncertainty and/or ambiguity around trial objectives, actions and process due to the co-development of a shared approach.
- Defining the roles and responsibilities of project collaborators.
- Limited time for face-to-face interaction due to the geographical 'tyranny of distance' and the participants' workload not associated with their trial involvement.

- The reliance of the collaborative effort on the individuals' medium-to-long term commitment to the process, particularly in a competitive, market-based environment where time spent on the collaboration can mean a monetary disadvantage.

Conclusions and considerations for co-innovation practice

The insights gained from the trial interactions confirm that there are multiple dimensions of value in the improved engagement and collaboration between different actors in the agricultural RD&E system and when managing the diversity, complexity and uncertainty of innovation challenges faced by the private advisory sector.

However, the results also demonstrate that it requires an (independent) intermediary to support, facilitate and maintain collaboration. RDCs and governments have a potentially pivotal role in supporting co-innovation with private extension providers and supply-chain companies. Further, effective co-innovation initiatives require a change to 'business as usual' approach and this in turn may require the reconfiguring of institutional relationships and arrangements, for example, by acknowledging existing power structures. Last but not least, co-innovation requires gaining a grounded understanding of the collaborators' commercial context: co-innovation models need to be made 'fit for business.'

As the discussion of the four technical trial contexts (reports H-K) demonstrates, each co-innovation trial was shaped very strongly by a range of factors, including but not limited to the type of innovation challenge faced in the trial, the industry context and its accompanying cultures, and what types of advisers were engaged with. For instance, this means that all four models are 'hybrid' in that they combine contractual/transactional relationships with their design based on co-innovation principles discussed in the first part of this report.

Considered together, the lessons from the four trials provide key considerations for the effective engagement of the private sector in RD&E system and in fulfilling extension roles. This provides a framework for progressing greater engagement of the private sector across industries. The following 'considerations for co-innovation practice' have been synthesised from across the trials to inform recommendations for taking a more nuanced approach to engaging the private advisory sector for co-innovation:

Considerations for engaging the private advisory sector for co-innovation	**Includes, but not limited to:**
Transactional relationships are part of collaboration	There is a need to acknowledge the commercial context collaborators operate in. Collaborators need to be enabled/ supported through adequate resourcing of roles and relationships, i.e. by combining both contractual (transactional) and co-innovation elements.
Accept that competition is part of the commercial environment of working with the private sector	Competition may but does need to conflict with collaboration. However, explicit recognition of the competitive private sector environment is required. Finding a common value proposition and building ownership of this value proposition and a shared process
Consider time frame for the collaboration	Finding shared interests and trust building are time-intensive. Uptake of 'new ways of doing things' into everyday business takes time.
Acknowledge importance of and invest in innovation broker roles	Contracting innovation brokers to facilitate the engagement process capitalises on existing social and professional networks. Brokers are pivotal to connecting, networking across agricultural sectors to foster common interests and industry good.
Acknowledge that building social capital is part of the value proposition	Strengthening and making connections is part of building social capital, which enables the sharing of resources (i.e. time and knowledge) and the building of a common understanding of the aims and purposes of the collaboration. Invest in building social capital.
Engender shared commitment to change	Change requires all the collaborators' willingness to accommodate the risk of conflicting perspectives emerging. Collaborators need to be willing to accommodate potential loss of competitive advantage through sharing knowledge and resources. Protecting organisational interests can constrain collaboration efforts.
Consider market signals for co-innovation	Establish incentives for collaboration by responding to end-user needs, business goals and strategies. Weigh up short term risks with long-term gains.
Acknowledge and be transparent about power imbalances	Collaboration/ shared ownership can be empowering and contribute to redressing issues of power, however, transparency about and acknowledgement of existing power relationships – for example, who provides the resources, what level of governance are people operating at? – are required.
Legacy and leadership	Acknowledge the legacy and establish leadership/ responsibility to coordinate and embed co-innovation practices in everyday routine.

Project publications

Nettle, R. 2017, Workshop paper: farmers adoption and farmers benefitting from R&D – where are we now? University of Melbourne

Nettle, R., Klerkx, L., Faure, G., Koustouris, A., 2017, Governance dynamics and the quest for coordination in pluralistic agricultural advisory systems, Journal of Agricultural education and extension,

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