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

Research Report G:
Trial One – The Processor Trial

Extending R&D within supply chains (dairy and meat processors)

University of Melbourne
Nicole Reichelt, June 2018
Rural Innovation Research Group

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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 describes the actions and outcomes from Trial 1, the Processor Trial. 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 (this report)
- 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

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.

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 H, I, J and K). 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.

The synthesis of findings and implications from across the trials contributes 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 (Report K). This report describes the actions and outcomes from Trial 1 - The Processor Trial.

Executive summary

The Processor Trial was a collaboration between Dairy Australia (DA), Meat Livestock Australia (MLA), Australian Pork Limited (APL), private sector farm advisory professionals, the University of Melbourne (UoM) and two food processing companies. The Trial Project Officer represented the consulting firm, RMCG; the Trial Project Consultant represented the consulting arm and key delivery agent of the South Australian Government, Rural Solutions South Australia: Primary Industries and Regions South Australia: (RSSA: PIRSA). The private sector trial partners represented a dairy processor based in Victoria and a meat processor based in south east Australia. The two processors were approached by the Trial Project Team members (DA – dairy processor/Trial Project Consultant – meat processor) through their already established connections with each processor in RD&E related matters.

Food processors are significant private sector actors in the agricultural advisory service system as they are responsible for aligning farm outputs with industry standards, market specifications and consumer preferences. Food processors employ frontline staff as intermediaries between the processing company and their suppliers (farmers) at both a transactional and service level. While there is anecdotal evidence from industry that recognises processors as providers of farm services and acknowledgement of the unique relationship processors have with their suppliers (farmers), it is not well documented about the nature and extent of these extension and advisory services embedded in the supply chain or the aspirations of processors to engage with RD&E. This research gap has been identified by others as a need to conduct more empirical inquiries about the evolving roles of different organisations in pluralistic agricultural advisory systems, with specific interest in the functions and practices of private sector actors (Nettle et al., 2017), including the food processing sector. In response to this knowledge gap and emerging opportunity to engage with processors, the research question guiding the Processor Trial was: *what is the 'opportunity' for RD&E stakeholders to collaborate with and support dairy and meat processors in RD&E?*

Based on this rationale and identified knowledge gap, the Trial Project Team generated a set of specific research objectives to guide the collaborative engagements with the participating dairy and meat processing companies:

- Identify shared interests between dairy and red meat processors and RD&E stakeholders in the extension and advisory space to enhance supply chain performance.
- Understand current and potential extension and advisory services of producer-relevant R&D outputs in dairy and meat supply chains.
- Recognise how to shift ad hoc connections between processors and RD&E stakeholders to strategic engagement so that it becomes 'business as usual'.

As part of the Trial 1 intervention, six engagement meetings (introductory, planning and reporting back sessions) were held with management from the dairy and meat processing company, followed by a series of professional development trial activities held with their frontline staff (nine dairy field officers and sixteen meat livestock buyers).

These Key Trial Activities were supplemented with numerous other facilitated interactions amongst trial participants including twenty-five teleconferences, several face-to-face meetings, 20+ semi-structured interviews and two online surveys.

The key findings from the Processor Trial are:

1. Both the dairy and meat processor were proactive in the RD&E space and seek openings to collaborate with a range of RD&E stakeholders suggesting there is potential for further and future co-innovation opportunities to progress RD&E in the processing sector.

2. An effective strategy for practising RD&E co-innovation with processors is developing the opportunity through the professional development of front-line staff as a means for the continuous improvement in supply chain performance (aligned with each processor's learning and change culture, i.e. considering each processing company as a learning organisation).
3. Processor staff are required to develop and maintain a complex and dynamic skill set to continue offering a valuable service to their suppliers (farmers), therefore it is important to understand the particular professional development needs of front-line staff in real-time.
4. Processors connect well to industry R&D but management could enhance their 'packaging' of R&D information to build the knowledge base of frontline staff.

The Project Trial Team arrived at the following recommendations for action beyond the project to map out possible ways to continue, scale up and institutionalise the co-innovation process that emerged from the Processor Trial.

Processors (company scale):

- To continue working through the Trial Activity Plans including the delivery of professional development activities identified as a priority
- Management to find ways to 'filter' and 'package' R&D and general farm production information for their front-line staff to avoid "information overload"
- RDCs to continue engaging with the processor participants in RD&E

Dairy and meat processing industries (industry scale):

- DA and MLA to invest in extending the Processor Trial co-innovation model within their industries, e.g. RDCs to hold an information/opportunity workshop with individual processing companies.
- DA to ensure the Processor Trial case study video is made available to the dairy and meat processing sectors in Australia.
- Fund a dedicated position to initiate further co-innovation processes as a multi-disciplinary venture (private-industry-public partnerships) – this could be done through a co-investment arrangement (processor company+ RDC+ other partner) to resource a co-innovation broker embedded within a supply chain whose remit would include brokering RD&E opportunities that enhance the performance of supply chains including the profitability of farm businesses. This role could be integrated with MLA's *Supply Chain Adoption and Extension Officer* positions.

Cross-sectoral (across industries)

- Communicate the positive outcomes of the Processor Trial to stimulate greater interest across the dairy, meat and other industry processing sectors to explore the feasibility of undertaking a similar process in partnership with RDCs and private sector consultants – RDCs have the advantage of offering extra human and financial resources and adding political weight to the value proposition.
- RDCs to lead the development of a network of supply chain co-innovation brokers across industries to share and learn from each other's experiences.

Trial 1: The opportunities and objectives

Based on the responses received from the regional forums and the subsequent workshop discussions with Trial 1 partners and private sector participants, the objectives of Trial 1 were:

- Identify shared interests between dairy and red meat processors and RD&E stakeholders in the extension and advisory space to enhance supply chain performance.
- Understand current and potential extension and advisory services of producer-relevant R&D outputs in dairy and meat supply chains.
- Recognise how to shift ad hoc connections between processors and RD&E stakeholders to strategic engagement so that it becomes 'business as usual'.

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The Trial Project Team anticipated the following outcomes from responding to the research question and developing actions to achieve the objectives:

- Enhanced extension and advisory services provided by processors to their suppliers in the delivery of farmer-relevant R&D outputs within dairy and meat supply chains.
- Stronger and integrated interactions between processors, RD&E stakeholders and producers into 'business as usual' collaborations.
- Development of a pathway for processors and RD&E stakeholders to continue co-innovation practices in the RD&E space to enhance supply chain performance supported by a clear mutual value proposition.

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.

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 (see the process of engagement of the private sector in action research trials Figure 3).

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

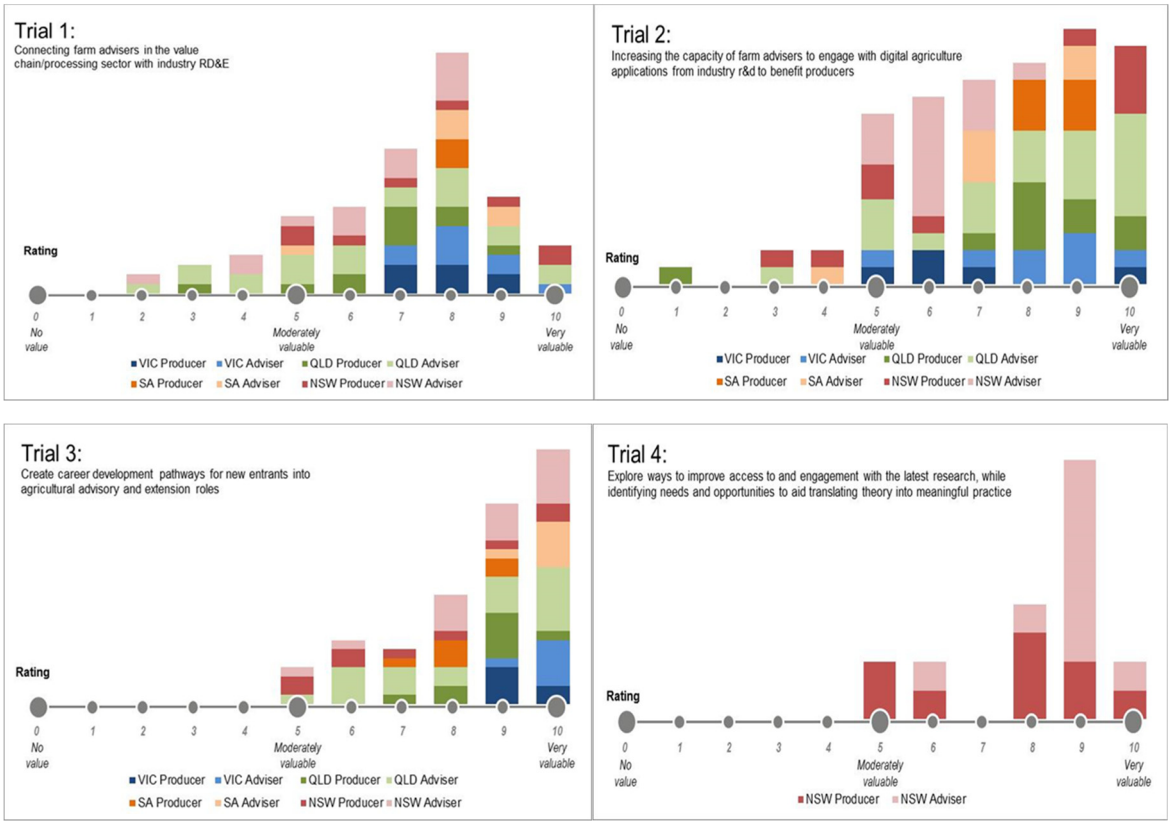
Identifying and refining the trial concept

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 2).

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:

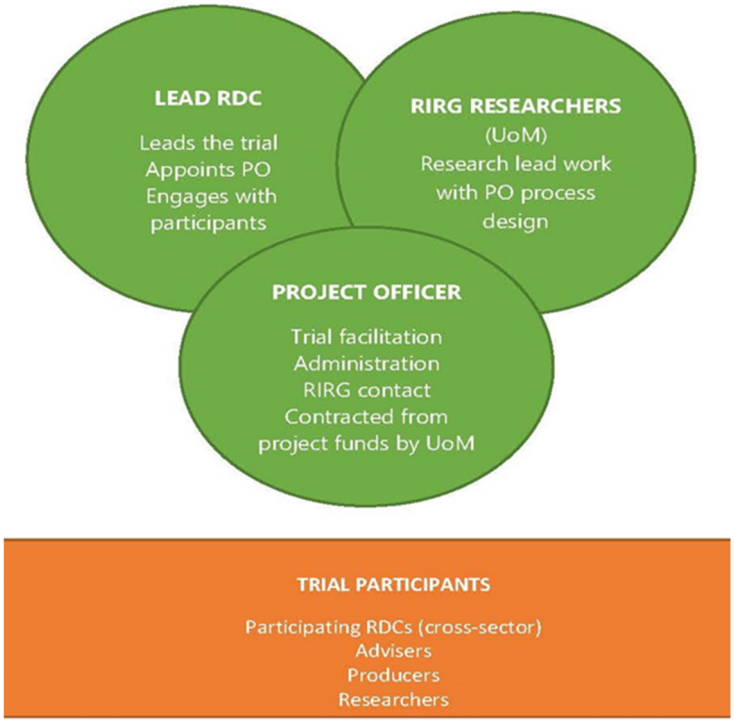
The role of the Research Lead included:

- 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.

Figure 2: Trial set up: participants and roles



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'.

Figure 3: the process of engagement of the private sector in action research trials:

Analytical approach to Trial 1

To complement the overall co-innovation framework guiding the trials (report K), the Processor Trial drew on insights from an organisational learning approach to innovation. In this approach, the concepts of 'organisational learning' or the 'learning organisation' are useful to draw on as an interpretive framework for understanding the dairy and meat processors' strategies for change and what might drive their adoption of co-innovation opportunities and practices. A learning organisation is the location and context in which structures and competencies are used to support learning and innovation (Wang and Ahmed, 2003; Roland, 2005). Wang and Ahmed (2003) and Shin et al. (2017) argue that the original idea of the learning organisation and the process of organisational learning need to be revisited because of today's challenging operating environment that is being shaped by climate change, hyper-dynamic markets, vertical integration of supply chains, rapid technological developments, global economic stagnation and a proliferation of information generation. The prevailing organisational learning concepts lock mindsets and practices into taking a traditional scientific approach to management that while provide a 'safe' logic and manageable risk, it can fail to generate the level and type of change that may be required to achieve a competitive edge. Success from organisational learning is recognised as being achieved slowly over time through a consistent emphasis on and commitment to communicating a clear direction and purpose, empowering staff, accumulating and sharing internal knowledge, gathering and integrating external information and challenging the status quo (Shin et al., 2017). In summary, "The old model, 'the top thinks and the local acts', must now give way to, "integrating thinking and acting at all levels," (Shin et al., 2017:47).

Participants in Trial 1

Core Trial Project Team - consisted of a lead industry representative from Dairy Australia (DA) and industry representatives from Meat Livestock Australia (MLA) and Australian Pork Limited (APL); a Project Officer (RMCG - large rural consulting firm), engaged to facilitate and coordinate activity in the trial and work with the Project Team to engage both dairy and meat processors/trial participants; and a Project Consultant (PIRSA - commercial arm of a government department in South Australia), engaged to facilitate activity and engagement for the meat processing sector only a social researcher (University of Melbourne).

The Project Officer and Project Consultant were selected using an Expression of Interest process run by the Industry and Research Leads. Both the Project Officer and Project Consultant had industry engagement skills through their consultancy work, research experience and developed networks in the dairy sector (Project Officer) and meat sector (Project Consultant).

Private sector trial participants – consisted of inviting and working with one dairy processing company and one meat processing company over the 15-month trial period. The trial project team enrolled each processing company based on already established connections with a trial project team member (e.g. dairy processor connected to the RDC Lead; meat processor connected to the Project Consultant) and additional criteria deemed important to the needs of the co-innovation trial (e.g. some link with RDCs, processor interest in a range of quality processing aspects, a stable or growing processing business that is export orientated and open to exploration).

The dairy processing company is one of the largest and oldest dairy processors in Australia and operates according to a set of core values: efficiency through simplicity, family-orientated environment, ownership and commitment, a hands-on approach and passion. The meat processing company is Australia's largest meat packer, marketer and exporter, supplying grain-fed and pasture-fed meats to export and domestic customers for over twenty years. The company's core values are: planning, determination, discipline, availability, sincerity and simplicity.

Both processors employ a team of frontline staff (dairy field officers and meat livestock buyers) who have regular direct contact with producers. Both frontline teams have similar roles in securing primary produce that meets the supply chain quantity and quality requirements. In the dairy case, the Trial Project Team worked with 8 dairy field officers and the team manager i.e. Field Services Team (FST). The FST involves staff that have a diversity of education and work experience (e.g. ex-farmers, technical sales and previous AgVic dairy advisers). In the meat case, the Trial Project Team worked with 16 livestock buyers, the Farm Assurance Manager and the manager of the livestock buyers i.e. Livestock Buyer's Team (LBT). Similar to the FST, the LBT also involves staff who have a diversity of education and experience (e.g. 'school of life', cadetship and agriculture graduates from formal education courses).

The Processor Trial involved the Trial Project Team working with each processor separately as two sub-trials: the dairy sub-trial and the meat sub-trial. The co-innovation roles that each trial member played were initially planned but became progressively emergent and dynamic in that they changed according to what was needed at each stage of the process and who had the capacity and legitimacy at the time. However, all Processor Trial members shared the responsibility of co-designing the activities and functioning and information provider. The role descriptors in Table [1] are drawn from trial surveys and participant observations made by the Research Lead. The resourcing of the co-innovation roles in the Processor Trial was drawn from the project funds where RDCs provided in-kind contributions as project investors, the Project Officer and Project Consultant employed as an independent contractor to the University of Melbourne at daily rates equivalent to their standard service fee, the Research Lead was provided a salary from project monies and the processor participants were offered reimbursements for any trial related expenses (e.g. travel, accommodation).

While the trial did offer sitting fees to frontline staff at $500 per trial activity, the offer was not taken up by processor management as trial activities took place at each processing plant and were integrated as much as possible with the company's operational tasks for a seamless experience.

Table [1]: Summary of the roles and resourcing of Processor Trial project team and participants.

PARTICIPANTS	ROLE TITLE	DESCRIPTORS	RESOURCING
Dairy Australia	Industry Lead	Adviser, connector, co-designer, information provider, participant identifier, supporter and translator	Investor, in-kind contributions
Meat Livestock Australia	Industry representative	Adviser, co-designer, connector, expert, facilitator, information provider, leader and driver	Investor, in-kind contributions
Australian Pork Limited	Industry representative	Information provider, observer, supporter	Voluntary participation
RMCG	Project Officer	Adviser, co-designer, deliverer, developer of trial process, industry expertise, information provider, facilitator, project management, report writer	Project funded through a contract agreement
Rural Solutions South Australia – Primary Industries and Regions South Australia	Project Consultant	Adviser, administrator, co-designer, connector, deliverer, expert, facilitator, information provider, leader and driver, observer, participant Identifier for trial, report writer	Project funded through a contract agreement
University of Melbourne	Research Lead	Adviser, applied theoriser, co-designer, deliverer, facilitator, information provider, leader and driver, observer, project management, report writer and supporter	Project funding
Dairy processing company	Processor participant (management and frontline staff)	Enabler, co-designer, decision-maker, gate-keeper of staff and company and information provider	Voluntary participation, some financial compensation
Meat processing company	Processor participant (management and frontline staff)	Enabler, co-designer, decision-maker, gate-keeper of staff and company and information provider	Voluntary participation, no financial compensation

Research process and data collection in Trial 1

Each sub-trial involved 6 Key Trial Activities aligned with the action research phases (see Table [2]). These 6 Key Trial Activities were supported by twenty-five Trial Project Team teleconferences, regular email contact, sub-trial meetings and whole-project events (e.g. forums and symposium). For each Key Trial Activity, the Trial Project Team generated a 'session plan' whether it was an engagement meeting, reporting back exercise or frontline staff workshop. The session plan consisted of: a title, who was participating, the purpose, the logistics, and breaking up the session into sub-activities (description, timing, resourcing and identifying who would lead the sub-activity). Having a session plan circulated to all participants before the Key Trial Activity took place assisted with managing expectations at each stage of the co-innovation process, being transparent about the collaborative process and introducing a discipline of using time efficiently. Each activity was documented as either meeting notes or summary reports, which were circulated to the processor participants.

Table [2]: Key Trial Activities aligned with the action research phases.

ACTION RESEARCH PHASE	KEY TRIAL ACTIVITIES	WHEN
Phase A: ESTABLISHMENT – Co-defining the opportunity	Introductory meetings with processors	February-March 2017
	Establishing participation and finalising sub-trial plans	March-April 2017
Phase B: INTERVENTION ACTION – co-innovation/co-designing	Situation analysis of each processor in RD&E	March-August 2017
	Reporting back to processors and co-developing activity plans	August-September 2017
	Co-delivery and support for activity delivery	September 2017-June 2018
Phase C: ANALYSIS – key findings and recommendations	Structured Monitoring and Evaluation	Ongoing throughout the trial process
	Reflective practice	
	Documenting trial process	

All project interactions were regarded as sources of data and therefore a mixed methods approach to data collection was appropriate. The Lead Researcher kept notes of team meetings and telephone conferences to document the emergence of the collaboration. The team-led design of workshops and learning activities provided opportunity to reflect on how the understanding of the RD&E situation evolved with the action research. The 'reporting back' meetings with processors (management) and frontline staff workshops provided the all trial participants the opportunity to collaborate, network and learn from each other in the pursuit of a shared goal (enhancing the performance of the dairy/meat supply chain through the delivery of quality frontline services to suppliers). Further data collection occurred based on group discussion notes as well as questionnaires, semi-structured interviews and online surveys that were used to evaluate the experience of co-innovation experience

Key results

The dairy and meat processor participants are proactive in the RD&E space

The dairy and meat processor clearly demonstrated that they are active in the RD&E space in two key ways: 1) progressing the role of their frontline staff in the delivery of R&D extension and farm advice; 2) direct involvement in R&D partnerships, delivery and accessibility. Both processors were also found to be actively shaping a learning and practice change culture within their company by working with others to continuously improve their supply chain performance.

> *We want to be exceeding supplier expectation, and probably meeting company expectations. [Currently] it's a pretty dynamic and challenging environment, but it offers a lot of opportunity for individuals in terms of professional development. We want to be continually challenging the team. (Dairy Processor, Manager Interview 2, 2017)*
>
> *We are probably one of the few processors that are doing a lot of extension … [T]his is where the data analysis that we do every week, [is fed back as] information to our buyers…the [intention] is about achieving results for our customers. [I]t's a real up and down the chain approach. Not too many processors that I know … have put investment in [the value chain-extension] area. (Meat Processor, Manager Interview 1, 2018)*

This suggests that there are great prospects for RD&E stakeholders (RDCs, government, research organisations and farmer-based organisations) to work with the processing sector as an opportunity to co-innovate in the RD&E space.

1) Role of frontline staff - Both the dairy and meat processor is reimagining and evolving the traditional role of the field officer and livestock buyer beyond a procurement service (transactional supplier relationship) and towards a service offer that is; responsive to the individual supplier situation, farm business focused, facilitates on-farm practice change and proactively assists in improving the overall performance of the supply chain. The challenge of progressing the role of frontline staff is in balancing the delivery of a quality core service to suppliers with adding value in a constrained environment (e.g. limited time, understaffing, performing role under stressful conditions). At the same time, acknowledging that every supplier will have their own individual and changing expectations of what role the field officer or livestock buyer needs to play in their farming situation. These challenges need to be considered when RD&E opportunities are proposed by those involved in a co-innovation process.

2) Involvement in R&D – Both the dairy and meat processor are active in R&D in several ways: management participating in research projects and program development as partnership arrangements, delivery of industry-driven programs to their suppliers and frontline teams accessing research outputs from a range of sources including RDCs (e.g. DA and MLA), research bodies (e.g. DairyBio), regional farming community and attending field days. Access to R&D information could be strengthened by strategically connecting to a suite of research and NRM organisations and management 'packaging' R&D information into a more user-friendly format to support their frontline staff in delivering a quality knowledge service.

Frontline staff need to maintain a complex and dynamic skill set

Processor frontline staff (field officers and livestock buyers) are required to develop and maintain a complex skill set to in order to offer a comprehensive and responsive service that adds value to their suppliers' farming situation. Table [3] summarises the results of the professional development needs analysis with the field officers and the skills audit with the livestock buyers, highlighting the topic areas used to assess their capability, each team's current capability strengths and the skill/knowledge areas prioritised for professional development and group training. Facilitating frontline staff to self-

assess their skill and knowledge base is valuable for collectively reflecting on the relevance of certain capabilities to their daily professional practice, making transparent the strengths and weaknesses across the team and making grounded decisions on professional development as either an individual learning pathway or as a team-scale investment.

Table [3]: Summary of results from the professional development analysis and skills audit activities.

PROFESSIONAL DEVELOPMENT (PD) NEEDS ANALYSIS (FIELD OFFICERS)	SKILLS AUDIT (LIVESTOCK BUYERS)
Topic areas covered in the PD needs analysis. > Farm business management. > Agronomy. > Animal nutrition. > Nutrient management. > Animal health and management. > Dairy human resources. > Extension skills to assist change on-farm.	**Topic areas covered in the skills audit**. > Meat processor operations. > Meat industry. > Assessment of carcases. > Farm production. > Recruiting producers and maintaining supply – extension and advisory skill set. > Work skills.
Current strengths > Range of skills, knowledge and expertise within the team that can be drawn on by each team member as an accessible resource. > Field Services Team provides good coverage of regional issues and local knowledge > Most of the team are "comfortable" or "confident" in their extension capability > Team functions with high ethical principles	**Current strengths** > Live animal assessment of cattle > Analysing company's kill data sheets. > Understand the farming context per producer. > People and communications skills that maintains trust > Operate with integrity based on courtesy and respect. > Ability to work as team. > Time management. > Being accountable for actions/decisions taken.
Priority areas for further PD > Managing conflict and initiating difficult conversations. Strengthening and expanding expertise networks. > Farm business management. > Animal nutrition. > Feed budgeting.	**Priority areas for group training** > Interpreting data from MLA's Livestock Data Link (LDL). > Use of LDL Solutions to feedback Library. Interpreting the MSA Index (beef). > Knowledge of which carcase measures are used to calculate the MSA Index (beef). > Lean meat yield and eating quality (Lamb).

In summary, both processors (management and frontline staff) acknowledge that it is not realistic to expect everyone in their teams to have the same high-level capability across all topic areas or become specialists to offer expert advice. The diversity of each team's knowledge base and skill sets is recognised as an asset to draw on. At the same time, management and staff acknowledge that their role, skill sets and knowledge base needs to change to respond to new farm production challenges, align with the aspirations of the company and adapt to consumer-orientated supply (value) chains.

Collaborating to enhance each processor's RD&E situation generated value for trial participants

Similar value was generated for each processor participant at the management and staff level: the Trial Project Team provided an independent and trusted view of the company's performance, the trial activities enabled the strategic planning of professional development for frontline staff and the principles of co-innovation provided a safe and open space for peer learning and direct communication. Finally, the Processor Trial provided an opportunity for cross-industry learning between frontline team managers based on their trial common experience. Table [4] is a

representative sample of what the processor participants identified as 'value' from collaborating with the Processor Trial Project Team. The value statements have been based on semi-structured interviews with processor management, trial activity evaluation forms, engagement meeting notes and participant observations.

Table [4]: A representative sample of the 'value' generated for the processor participants.

<table>
<tr><th>DAIRY PROCESSOR</th><th>MEAT PROCESSOR</th></tr>
<tr><td colspan="2">Provided a trusted 'independent party' to review frontline staff capability and internal communication and information flows.
Opportunity for frontline staff to give feedback about current operations and reflect on their role.
Supported the strategic planning of frontline staff professional development at team and individual level.
Opportunity for the processor participants from different industries to share their trial experiences including comparing their respective roles in frontline staff management and the different ways to engage staff and suppliers in skills development.</td></tr>
<tr><td>Flexible and 'non-invasive' approach when and how engagement took place with the processor therefore the trial experience was not disruptive to core business activities.</td><td>Trial functioned as a 'catalyst' for management to focus on the Livestock Buyer Team as a 'just-in-time' opportunity.</td></tr>
<tr><td>Provided the field officers with an opportunity to reflect on strengthening their expertise networks through a Social Network Analysis activity.</td><td>Creation of a survey tool to engage with their supplier base.</td></tr>
</table>

The trial also provided the RDCs (DA and MLA) with the 'know-how' for developing a shared interest with processors in the RD&E space, i.e. adopting a professional development approach targeting frontline staff based on a grounded understanding of the staff's role, everyday practice and specific PD needs. Ultimately, the value from the Processor Trial has been generating social capital and a proven process to support further engagement opportunities between processors and multi-sector stakeholders in RD&E.

Conclusions and recommendations

The Processor Trial (Trial 1) confirmed that the dairy and meat processors are highly active in the RD&E space and seek opportunities to collaborate and co-innovate with private, industry and public RD&E stakeholders. The Processor Trial clearly demonstrated that processor frontline staff (dairy field officers and meat livestock buyers) function as R&D extension providers in their service roles with producers (suppliers). Frontline staff need to maintain a complex skill set that is responsive to their supplier needs and proactive to meet the contemporary challenges of agriculture (e.g. social licence to operate, digitization of agriculture, increasing production with improved resource efficiency, supporting supply chain sustainability). This suggests there is significant potential to develop further opportunities for co-innovation in the extension space between processors and RD&E stakeholders where value can be added through multi-stakeholder collaborations. The value over time can be significant for the processor (e.g. value generated through the Processor Trail include providing an independent and trusted voice for informing organisational change, accessing expertise with co-innovation capability and capacity, and new tools to consult their supplier base with). There is also value for the RD&E stakeholders in building their co-innovation capability and awareness of how the processing sector works in the RD&E space. Any value proposition for co-innovation needs to be sensitive to the organisational context of each processing company to ensure the opportunities are in alignment with their commercial drivers and culture of learning and change, i.e. considering each processing company as a learning organisation. RD&E investors and administrators (RDCs and

government) have a role in resourcing and brokering these new co-innovation processes within Australia's food processing sector by working with processing companies in their provision of adaptive and innovative extension to their suppliers (producers). This will ultimately enhance the market and sustainability performance of agricultural based supply chains

Recommendations for action

The Project Trial Team arrived at the following recommendations for action beyond the project to map out possible ways to continue, scale up and institutionalise the co-innovation process that emerged from the Processor Trial.

Table [5]: Recommendations for action from the Processor Trial

PROCESSORS (COMPANY SCALE)	• To continue working through the Trial Activity Plans including the delivery of professional development activities identified as a priority • Management to find ways to 'filter' and 'package' R&D and general farm production information for their front-line staff to avoid "information overload" • RDCs to continue engaging with the processor participants in a collaborative RD&E space
DAIRY AND MEAT PROCESSING INDUSTRIES (INDUSTRY SCALE)	• DA and MLA to invest in extending the Processor Trial co-innovation model within their industries, e.g. RDCs to hold an information/opportunity workshop with individual processing companies. • DA (as the Industry Lead in this trial) to ensure the Processor Trial case study video is made available to the dairy and meat processing sectors in Australia. • Fund a dedicated position to initiate further co-innovation processes as a multi-disciplinary venture (private-industry-public partnerships) – this could be done through a co-investment arrangement (processor company+ RDC+ other partner) to resource a co-innovation broker embedded within a supply chain whose remit would include brokering RD&E opportunities that enhance the performance of supply chains including the profitability of farm businesses. This role could be integrated with MLA's *Supply Chain Adoption and Extension Officer* positions. • Trial Project Team members continue to make connections with related project work in Australia and internationally to inform the findings of the Processor Trial e.g. maintaining a connection with New Zealand's Red Meat Profit Partnership
CROSS-SECTORAL (ACROSS INDUSTRIES)	• Communicate the positive outcomes of the Processor Trial to stimulate greater interest across the dairy, meat and other industry processing sectors to explore the feasibility of undertaking a similar process in partnership with RDCs and private sector consultants – RDCs have the advantage of offering extra human and financial resources while adding political weight to the value proposition. • RDCs could lead the development of a network of supply chain co-innovation brokers across industries to share and learn from each other's experiences

Project publications

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