

Enrolling advisers in governing privatised agricultural extension in Australia: challenges for the innovation system

Author name(s): and N Reichelt, B King, M Ayre, R Nettle

Author affiliations: Rural Innovation Research Group, Faculty of Veterinary and Agricultural Sciences, University of Melbourne

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Abstract

The Australian agricultural research, development and extension (RD&E) system is an interesting and complex case of impacts and governance challenges arising from the privatisation of agricultural extension in Australia and internationally. This paper is an inquiry into the process of setting up a national, multi-stakeholder project collaboration aimed at stimulating the role of the private sector in the Australian agricultural extension and innovation systems. Following description of the project's action research design and use of a theoretical framework adapted from agricultural innovation systems (AIS) scholarship, the paper discusses the challenges the project faces in pursuing its aim of establishing an innovation platform to reframe current RD&E practices and governance arrangements towards an enhanced agricultural innovation system based on the collaboration of multiple actors. One fundamental challenge for the project emerging from initial findings is that its objectives tend to lead stakeholders toward an instrumental conceptualisation of the role of the private advisory sector in the AIS as one of demand and supply of services. This understanding poses challenges to the project process itself and potentially inhibits the project's vision of establishing and facilitating the governance of co-innovation processes by supporting new roles for advisers as key actors and contributors within the Australian innovation system. The paper describes these emergent challenges and initial project responses. In this way, the paper addresses the project as an 'innovation platform in action', offering to progress understanding of how to advance the establishment of innovation platforms within situated AIS more widely.

1.1 Introduction

The role and importance of farm advisory services in supporting producers to meet new challenges is of interest to both academic and political agendas (Fraure et al. 2012; Prager et al. 2016). Accompanying this interest has been empirical research into the challenges and impacts from privatisation of agricultural extension services and the increased reliance on commercial providers in agricultural extension systems, particularly in the European Union (EU) (Klerkx and Proctor, 2013; Prager et al. 2016). This research has revealed specific impacts of privatisation on the agricultural extension system including disconnects in the social organisation of the innovation system such as the exclusion of particular types of agricultural producers from relevant knowledge systems (Labarthe and Laurent, 2013; Prager et al, 2016); reduced links between private sector advisers and new knowledge/research (Klerkx and Proctor, 2013); and reduced professional pathways and capacity development opportunities for advisers (Labarthe 2009).

The Australian agricultural research, development and extension (RD&E) system is an interesting case of these impacts arising from the privatisation of extension and the associated challenges for the agricultural innovation system (AIS) (Murphy et al, 2013; Klerkx and Nettle, 2013; Hunt et al, 2014). Following significant institutional change over the course of three decades, the Australian RD&E system is recognised as particularly complex and diverse (Hunt et al. 2014; Robertson et al. 2016). Historically, the extension function in Australia was tightly coupled with the role of the State in encouraging agricultural productivity and sustainability through a co-ordinated system of investment and delivery closely connected with research and development. However, with reduced public investment, the RD&E system has become industry-driven, and multiple organisations and individuals are involved in agricultural extension, including public, private, industry-good (farmer levy-funded) and vocational training providers. The Australian government and primary producers co-invest in research and development through Rural Research and Development Corporations (RDCs), and there are currently fifteen RDCs, of which five are Commonwealth funded statutory bodies and ten are industry-owned companies. Each of these have different extension and engagement models with the private advisory sector. This complexity has produced challenges that include: progressing co-innovation within a science-centric national innovation system (Klerkx and Nettle, 2013; Nettle et al. 2014); co-

ordinating efforts with a diverse range of advisory organisations; and developing the capacity of the advisory sector (Murphy, et al, 2014). These challenges have come into political and policy focus through recent Australian government inquiries related to agricultural competitiveness (Commonwealth of Australia, 2014) and innovation (Commonwealth government 2015), leading to government investment in projects that aim to 'strengthen[ing] pathways to extend the results of rural R&D, including understanding the barriers to adoption' and 'Establish[ing] and foster[ing] industry and research collaborations that form the basis for ongoing innovation and growth of Australian agriculture' (Commonwealth Government, Rural RnD for Profit Program 2015, 93). Within these government objectives is an implicit assumption that the private sector will replace the role of the State in extension delivery, particularly in advisory services that support farmer decision-making related to all aspects of farm management (ibid, 30).

This paper is an inquiry into the process of setting up one of the national projects funded under the Commonwealth Government Rural RnD for Profit Program 2015, entitled: 'Stimulating private sector extension in Australian agriculture to increase returns from R&D' (referred to as the Advisory Project in the following). This novel research project is aimed at increasing agricultural productivity through an enhanced AIS in Australia. It aims to do this by understanding the role and functions of the private advisory sector, and by investigating the constraints and enablers of private sector engagement in the system. It applies action research with stakeholders to progress practice changes that address these constraints, and to strengthen cross-industry, public-private connections as well as the private advisory sector itself to drive agricultural innovation for increased on-farm profit. The project has received funding for three years and will conclude in June 2018. This paper reports on two research activities that have been run to date, at the end of the project's first year: following reviews of the literature and current RD&E engagement practice, the project has completed its first action research phase with a number of project stakeholder consultation forums. These forums inform a plan and methodology for action research-based trial interventions that will be established with stakeholders and partners at the beginning of the second project year and will run for two years. By bringing together a range of AIS stakeholders in a novel interactive learning and research space, the trial interventions will likely establish new social networks that may have not existed before. However, a more formal social network analysis will be conducted as part of later research steps and is not reported on here. Our reference to social networks and social capital throughout this paper is therefore mainly theoretical and prospective.

In a departure from the traditional Australian linear RD&E model, the project adopts Agricultural Innovation Systems (AIS) as its conceptual framework (World Bank 2006). AIS thinking provides a framework for understanding the dynamics (functions) and structures (elements) of complex extension and innovation systems. It has been influential in agricultural development by advancing the concept of innovation platforms as a social space and process to facilitate multi-stakeholder coalitions (Röling, 2002) to develop knowledge and understanding of a domain of activity, and to progress desired change through communication and learning cycles (Röling and Wagemakers, 1998). However, current literature outlines numerous challenges in establishing, maintaining and governing such platforms (Ison, et al, 2014). Most fundamentally, innovation platforms require a set of institutional arrangements and governance structures that facilitate participatory processes of knowledge production and learning; are supportive of emergent practices and collaboration (Hall, 2005; Paine and Nettle, 2008); build innovative capacity (Nettle, et al., 2013; Schut et al. 2015); establish the legitimacy and mandate for the platform (Röling, 2002) and respond to the emergent nature of innovation platforms (Aarts and van Woerkum, 2002; Boogaard et al. 2013). However, analysis of the preconditions for the formation of innovation platforms remains limited, particularly in the Australian RD&E system. This includes, for example, analysis of what enables or constrains governance arrangements that support public-private alliances, the co-ordination of services and activities for innovation, and practices of co-development that enrol advisers as key actors in a complex RD&E system.

Drawing on conceptual framings from transition theory (Schot and Geels 2008), this paper discusses the challenges the Advisory Project faces in pursuing the project's vision of establishing an innovation platform to reframe current RD&E practices and governance arrangements. The paper describes the implications for the co-development of innovation processes together with stakeholders as pursued by the project and proposes initial project responses to the governance challenges revealed by this preliminary analysis. In this way, the paper presents the Advisory Project as an opportunity to progress understanding of how to advance the establishment of innovation platforms within a situated AIS.

2. The Australian Advisory Project as ‘innovation platform in action’

2.1 The conceptual framework

The Advisory Project adopts a systemic framework of inquiry in order to identify, articulate and diagnose the complexity and diversity of agricultural innovation dynamics for improved innovation outcomes. A systemic approach to the inquiry enables understanding of how knowledge moves through an innovation system and encourages participatory, networked, and trans-disciplinary engagement of groups and individuals in efforts to support innovation at a range of farm, regional or societal scales (Knickel et al., 2009) and across whole value chains (Klerkx, 2015). The Project uses AIS as its conceptual foundation based on the World Bank (2011, 3) definition of AIS as ‘a network of organizations, enterprises, and individuals focused on bringing new products, new processes, and new forms of organization into economic use, together with the institutions and policies that affect the way different agents interact, share, access, exchange and use knowledge’. This systemic framing is central to the Advisory Project’s methodology of co-developing interventions, working collaboratively with stakeholders as a basis for establishing agricultural innovation platforms. Innovation is increasingly considered as a process of co-development involving diverse groups of actors (RD&E providers from industry, public and private sectors) with shared interests ‘co-operat[ing] and co-ordinat[ing] their activities to generate new knowledge, technologies, and practices for desired change’ (Klerkx and Nettle 2013, 1), as well as fostering partnerships and linkages along and beyond agricultural value chains. In this context RD&E is a subset of AIS (Klerkx, 2015). We particularly emphasise the importance of the horizontal organisation of such collaborations for the successful and lasting enrolment of all actors as equal contributors. This stance is reflected in our use of the term ‘co-innovation platforms’ throughout this paper.

The Multiple Level Perspective (MLP) is a theoretical approach, which posits how interventions in innovation systems (including AIS) impact at three scales - niches, socio-technical regimes, and socio-technical landscape (Geels, 2002; Schot and Geels, 2008). We conceptualise the Advisory Project as a niche within the dominant socio-technical regime that is Australia’s existing AIS, as we explain further below (see also Fig. 1). Niches represent ‘protected spaces’ within which innovation can develop in relative ‘shelter’ from mainstream competition. Socio-technical regimes represent the relatively stable dominant paradigm within which an emerging innovation will successfully compete or not. The socio-technical landscape is the exogenous context and represents political, social and economic structures within which regimes and niches exist (Hermans et al. 2012). Schot and Geels (2008, 540) describe three key processes for the successful development and operation of a niche that can lead to change on the level of the regime, which we use here as a heuristic for our preliminary analysis of emerging challenges on both project and system levels. These are the articulation of a shared vision and stakeholder expectations; the building of social networks involving all relevant actors; and the establishment and facilitation of learning processes at multiple levels.

Systemic analysis involves analysis of both structural and functional elements to better understand strengths and weaknesses of the innovation system (Hermans et al. 2012). Structural analysis includes identifying the actors, institutions, interactions and infrastructure that form the basic building blocks of the innovation system. Functional analysis supports the structural analysis by providing insights about dynamic processes that include entrepreneurial activities, how knowledge is developed and disseminated, how shared visions across stakeholders are created and embedded, how resources are accessed and mobilized, how demand and supply is balanced and stimulated, and how legitimacy is generated and sustained in the overall process. Structural and functional elements are highly coupled and each influences the other (Wieczorek and Hekkert, 2012). Analysis of structural and functional elements within the AIS can explain the enabling and constraining conditions in which niches are situated within their broader regime and sociotechnical landscape.

2.2 Locating the Advisory Project in the Australian AIS

The Advisory Project is a cross-sector collaboration involving six agricultural RDCs (Dairy Australia, Meat & Livestock Australia, the Cotton Research & Development Corporation, Sugar Research Australia, Australian Pork Limited, Horticulture Innovation Australia) and the state governments of Victoria and New South Wales. It is led by Dairy Australia and a team of researchers at the University of Melbourne and has an overall aim of strengthening connections and the private advisory sector to drive agricultural innovation for increased on-farm profit.

The project is situated within the Australian AIS, which is currently dominated by a political focus on a science-centric RD&E system (Nettle et al, 2013; Commonwealth of Australia, 2015). The Advisory Project is a part of the overall Australian AIS and is intended to be an intervention in Australia's current RD&E approach to agriculture to drive positive change that will enable the AIS to address the challenges noted in the previous section. It is therefore an example of a 'niche' activity within which relatively small networks of transdisciplinary actors interact in the 'protected space' of this 3-year research project (Geels, 2002; Schot and Geels, 2008). The action research project is then emergent as an innovation platform (niche process) within the Australian AIS (regime) and is explicitly designed to coordinate or catalyse processes ultimately capable of achieving a regime shift (social innovation) over time (see Figure 1).

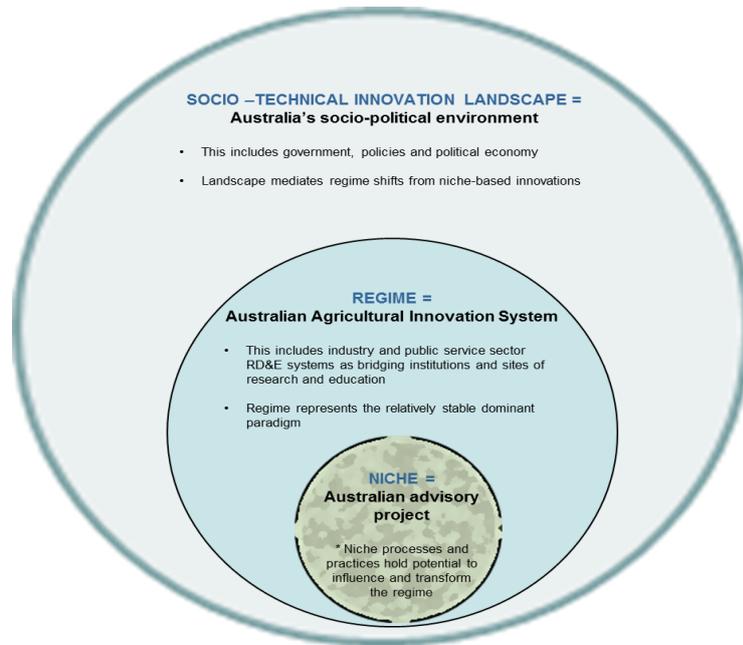


Figure 1: Locating the project in the multi-level Australian innovation system

3 Project design and methods

The (systemic) project design uses mixed method (Tashakkori and Teddlie, 2003) and action research approaches (Kindon et al., 2007) to address the four key research questions concerned with what motivates the private agricultural services sector to provide their services and if and how this sector prepares for increased engagement in the RD&E system; how producers decide on their investment in private provider extension and what are the broader implications and emerging gaps of privatisation in agricultural extension. The use of both quantitative and qualitative social research methods concurrently in an action research setting is more likely to lead to greater validity of findings by providing a form of triangulation (Tashakkori and Teddlie, 2003) and allowing for a number of perspectives to be drawn upon to make sense of data generated. Importantly, the methodology is designed to empower project stakeholders and project participants as co-researchers, opening up 'spaces' for their direct input, and to document the research process and practice as a meta-inquiry that will enable changes to be tested and evaluated in real time (Heron and Reason, 2006). The mixed methods and action research approach is applied in five key research activities: 1) literature review, 2) project stakeholder forums, 3) national survey, 4) practice-based engagement trials, and 5) meta-inquiries (systemic scale). A social network analysis will be conducted as part of research steps 3) and 4), the national survey and engagement trials.

As part of the ongoing meta-inquiry into the Advisory Project, this paper draws upon three research activities conducted to date: a literature and practice review, project stakeholder forums and a systemic inquiry into AIS in practice. These activities are directed at the establishment of four practice-based and thematically selected interventions (the engagement trials) co-designed with stakeholders and project participants at a later stage of the project. These interventions are at the core of the project aim to help establish stakeholder-led co-innovation platforms by trialling different models of engagement between RDCs and selected private sector actors over the course of two years.

The literature review was based on a review of (50+) industry documents, research reports, academic papers and relevant websites, in combination with a series of guided telephone and face-to-face conversations (n=14) with key informants from state agencies, the cotton, dairy, horticulture, meat and livestock, pork and sugar industries regarding their engagement practices with the private sector in RD&E. The project stakeholder forums (n=5) target advisors and primary producers and are designed as a participatory process to inform the action research interventions (trials) and other research activities. To date, three forums have been held in three Australian states (South Australia, Victoria and Queensland) and have assisted in identifying opportunities for improved access and engagement with RD&E for advisers, identifying skill development needs of the private sector, and developing an understanding of the business models operating within the sector as either enablers or barriers to engaging with RD&E. The sampling criteria for farmer participation were based on a range of industries, engagement with advisers and supply chain actors, and range of ages. The sampling criteria for private adviser participation were based on a range of organisational type, alignment with different industries and supply chain actors, and a cross-section of career stage.

3.1 Project governance arrangements

Project stakeholders and partner investors are important co-researchers in the Advisory Project, as are primary producers and advisers participating in the project forums, and in establishing and maintaining the practice trials. The project governance arrangements, including regular reporting to and meetings of project management and steering committees, project stakeholder workshops and stakeholder attendance at producer and adviser forums, aim to maximise opportunities for stakeholder input and cross-sector engagement. There is a particular focus on co-developing with stakeholders the practice-based engagement trials that will be conducted as part of the project in order to address its main aims of strengthening connections between private advisers, RDCs and the latest research; identifying and addressing barriers of engagement, and stimulating growth of a capable private sector. Each of the trials will focus on one of four contexts for exploring private sector engagement with R&D, while ensuring their cross-sectoral significance and contribution to public, industry and private interest; they will further include a professional development component not currently used or available. The trials are intended as co-innovation platforms by enrolling all stakeholders as active participants in the development of self-sustaining processes that are transferrable across themes and sectors, and therefore trial these platforms as mechanisms for the governance of innovation more generally.

The project governance structure is emergent and expected to remain dynamic as the project progresses. In addition to the Management and Steering Committees, an Expert Panel provides advice from an internationally comparative perspective. Australian extension professional bodies, the Agriculture Institute Australia (AIA) and the Australasian Pacific Extension Network (APEN) will be engaged in advisory roles when developing the trials and related training modules for advisers (see project map showing units of governance and sites of action research and engagement in Figure 2). Last but not least, each engagement trial will require its own separate governance arrangement designed to progress both research and applied change processes.

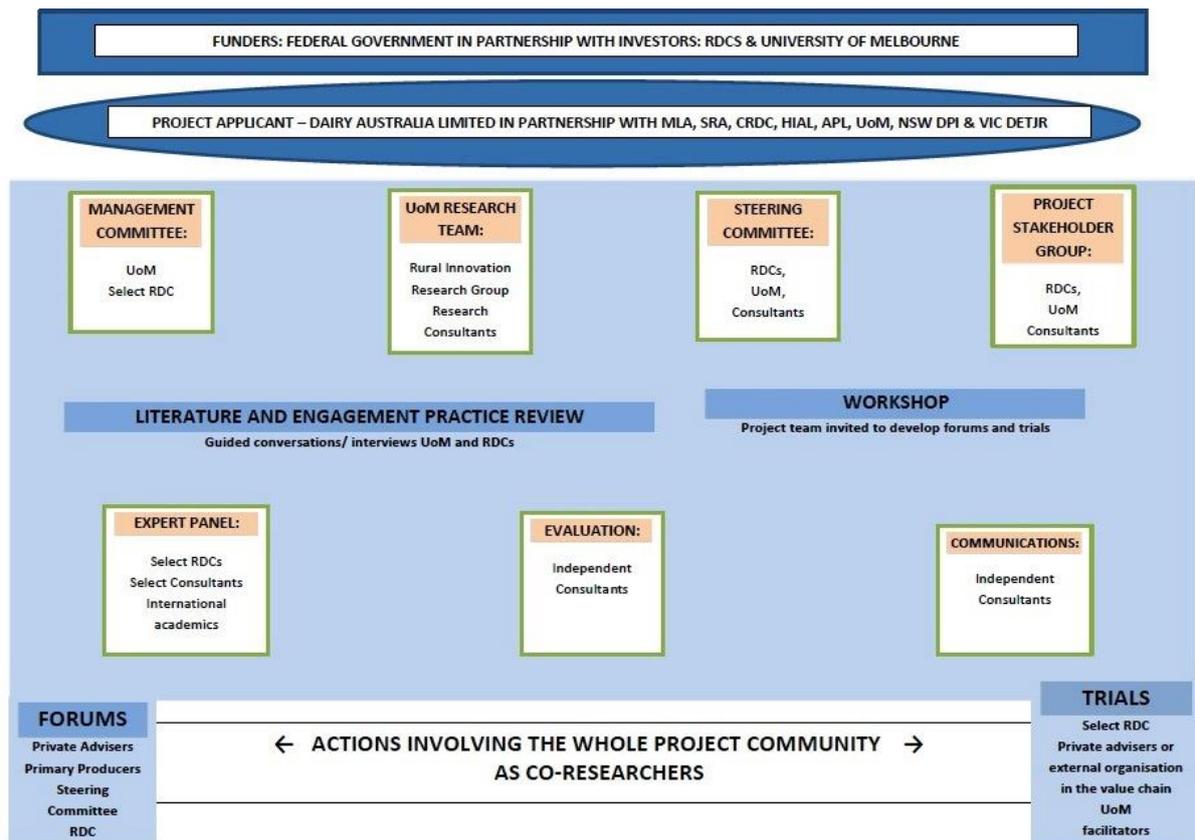


Figure 2: Project Map showing governance structures and sites for engagement

4. Findings and Discussion: Emerging challenges from empirical research to date

The emergent challenges for agricultural innovation in the Australian context are based on an initial situation analysis drawing on the empirical work from the review process conducted in 2015 (literature and industry and public sector engagement practices) and forums run with primary producers and advisers across four states (April-June, 2016). The review process captured perspectives on private sector engagement on a per industry and state public service sector basis (top-down). The forums captured perspectives of producers and private sector practitioners about their engagement experiences with industry-based RD&E systems (bottom-up). The results from both research engagements are presented here as emerging challenges based on their implications for the three niche processes: the articulation of expectations and a shared vision, the building of social networks, and learning processes, as discussed by Schot and Geels (2008, 540).

Variances in the degree and nature of privatisation (as a change process) across industries and the state public service sector

At a system scale, developing and governing the Australian AIS is challenging in that each primary industry's RD&E system is undergoing processes of privatisation at different rates and in diverse ways. Although the underlying trend at a national policy level is for social systems to transform towards neoliberal market-based models of operation, this is not occurring as a synchronised process and the agricultural sector is no exception. For example, the review identified that the dairy, and meat and livestock RDCs were only moderately developing towards a privatised RD&E system, considering a sustained reliance on levy-based investments and public funds to resource the system through an industry-based delivery structure. In comparison, the cotton industry has developed a largely commercial extension program based on a central service delivery organisation, CottonInfo. This is a joint venture between Cotton Australia, the Cotton Cooperative Research Centre and Cotton Seed Distributors Limited (a private corporation). Significant corporate funds are directly invested in the employment and resourcing of the regional support roles for CottonInfo (Rural Innovation Research Group, 2015).

A further differentiation at the system level is that each industry's RD&E system operates at multiple geographical, operational and practice scales. For example, the dairy industry provides RD&E services and practices private sector engagement at a regional (sub-state) scale. In contrast, the meat and livestock industry operates at both national and state scales with examples of industry-based extension services being delivered at the national scale (through mass communication channels and information events) as well as engaging the private sector in specific delivery roles at the state scale in publicly funded programs through Public Private Partnerships.

Variances in the degree and nature of private sector engagement across industries and the state public service sector

At the engagement practice level, the review process captured the diversity in engagement dynamics across industries, state public service sectors and within each industry's RD&E system (e.g. across programs and projects). Three engagement typologies were identified: 1) directive (an engagement activity initiated by industry or public sector as an intervention or strategy that is directed by industry or public institution where the outcome focus is on the producer); 2) participative (engagement that invites participation from the private sector with varying degrees of involvement and influence on the RD&E system where the outcome focus is on the producer) and 3) supportive (engagement that can be directive or participative but the outcome focus is on servicing the private sector's needs). Each sector's engagement practice is a combination of directive, participative and supportive ways of connecting and interacting with the private sector in RD&E activities, however, there tends to be a dominant pattern of engagement highlighting the key engagement dynamic(s). For example, the dairy industry engages with the private sector in both participative and supportive ways (e.g. private sector invited as co-researchers on a research project to trial a new participatory extension model based on social learning; providing capacity building opportunities for the private sector through targeted programs such as participation in industry-led formal education). In contrast, the meat and livestock industry engages in more directive ways of extension delivery through mass communication channels and individual private sector actors are 'enrolled' by private sector actors putting in an expression of interest to become a co-investor in meat and livestock initiated R&D projects through a co-investment scheme (see Table 1. for a summary of engagement differentiation across the project partners). The different engagement modes used by each sector have implications for how both industry and public extension services work with private sector providers and can therefore influence the RD&E system and delivery of advisory services. At the structural (organisational) level, the different engagement dynamics are mediated through various funding, administration and service delivery structures established within each industry and state public service sector. These organisational structures can both enable and/or constrain private sector engagement dynamics.

Industry/ State public service	Current Engagement dynamics	Activity examples	Examples of engagement organisational structures
Industry 1	Directive	<ul style="list-style-type: none"> > Regional Development Officers involved in information provision > e-newsletter > contracting consultants in data collection 	Central commercial extension institution
Industry 2	Participative and supportive	<ul style="list-style-type: none"> > Co-developing collaborative research projects > capacity building of advisory sector (education) 	Regional service delivery platform
Industry 3	Directive, participative and supportive	<ul style="list-style-type: none"> > national roadshows > co-investment in industry-based research > collaborative delivery of extension program 	Strategic Co-investment Funding Pool
Industry 4	Directive and supportive	<ul style="list-style-type: none"> > joint development of a whole farm systems project > co-investment in innovation research 	Co-investment R&D administration body
State Public Service	Directive and autonomous	<ul style="list-style-type: none"> > information provision > collaborative research ventures 	n/a
Industry 5	Directive and participative	<ul style="list-style-type: none"> > inviting private sector participation in R&D planning through membership of R&D advisory committees > industry updates and meeting events 	R&D Specialist Group
Industry 6	Directive and supportive	<ul style="list-style-type: none"> > industry updates > field-based demonstrations > industry showcase events 	extension and communication unit

State Public Service	Supportive and autonomous	> information provision > training events	Public and Private Partnerships
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Table 1: Matrix of industry and public sector engagement with the private sector

Engagement challenges from the advisor and producer perspective

From a practice (bottom-up) level perspective, private sector advisers participating in three of the four engagement forums run to date described similar variations in their engagement with R&D providers across industries. Advisors recognise that some RDCs welcome and support participatory engagement while others do not. The overall view of advisers who participated in the forums was that engagement with industry continues to be top-down and directive, largely due to being driven by government and funding obligations.

Private advisers experience of a 'lack of voice' and a 'lack of appreciation' of their expertise when working with RDCs as evidenced by inadequate RDC follow-through on consultant feedback, as well as a lack of dialogue and two-way knowledge flow between advisers and RDC. Despite the rhetoric of RDCs working collaboratively with the private sector, advisers did not often experience interactions as 'genuinely collaborative'. The lack of consistent core funding for RD&E projects and programs, funding cuts and the short-term nature of programs was identified as undermining potentially successful joint interactions. Further, advisers have experienced inconsistent communication when working with RDCs, which also undermines efforts at an industry scales to develop shared long-term vision for innovation and engagement.

Poor coordination between industries was seen as a missed opportunity to share learning around existing, well-functioning networks, structures, or engagement practices. Forum participants referred to RDC networks as 'closed' or 'hard to get into' and observed that this significantly constrains opportunities for advisers to develop their professional knowledge and to contribute to RDC strategy. Networking, collaboration and the sharing of learning were further constrained by market-based competition between advisers, particularly between sole traders or small businesses and large companies. Nevertheless, forum attendants saw opportunities for greater RDC involvement in adviser capacity building, and mentoring programs for younger consultants as being opportunities to improve relationships and collaboration with RDC's.

Sole traders and small businesses in particular felt disadvantaged by the RDC engagement focus on big companies. Being a sole trader or small business presents greater challenges in accessing project funding as submissions are time intensive. Similarly, time and financial constraints limit the scope for personal professional development as access to new research, training and workshops comes at high financial costs. For sole traders and small businesses in particular time spent at a training day or workshop equates to financial loss for the business. Restricted or costly access to research and information, and insufficient availability of discussion and learning platforms for the translation of research findings and industry trials into meaningful practice further resulted in the perception of R&D organisations as knowledge gatekeepers.

Overall, the engagement practice review and forum responses reflect the challenges and impacts of privatisation and commercialisation in agricultural extension described by the international literature: exclusions from knowledge systems (Klerkx and Proctor, 2013; Prager et al, 2016), reduced professional pathways (Labarthe 2009; Labarthe and Laurent 2013) and overall social disconnects in the innovation system (Shwartz 1994; Leeuwis 2000; 2004). The following discussion of the empirical results from the Australian context elaborates on their implications for the establishment of innovation platforms such as the Advisory Project, their impacts on the extent of innovation and how these emerging challenges are being addressed in the present project, creating potential learning for addressing these challenges at system level.

5. Discussion

Setting up an innovation platform is a challenging endeavour at both the niche (project) and larger regime (AIS) levels. Our discussion of the emerging challenges surrounding the three key niche processes for innovation (Schot and Geels 2008) highlights difficulties and opportunities for articulating a shared vision and managing multiple expectations, building social networks to generate

new forms of social capital within and beyond the niche boundary, and enabling learning processes at multiple levels.

One fundamental challenge to the project and its process is that its objectives tend to lead stakeholders toward an instrumental conceptualisation of the role of the private advisory sector in the AIS as one of demand and supply of services. This understanding potentially inhibits the project aims of supporting new roles of advisers as key actors and contributors within the Australian innovation system by limiting them to an instrumental role (Leeuwis and Klerkx, 2009).

Constructing a shared vision and common processes for innovation as 'desired change' is challenging as participating RDCs have historically not functioned at a cross-sectoral level, have evolved their industry's RD&E agendas in isolation from one another and have few established collaborative practices to enable exchange of ideas. The different funding and investment models of RD&E (sub)systems and the varying degrees of privatisation across the RDCs and state public service sectors mean that it is likely to be difficult to create a shared vision of how and what the private sector should be 'enrolled' in as change agents in the AIS space. It is also likely to be challenging to create synergies as to where cross-sectoral investments should be made in the private sector for RD&E outcomes.

The multi-scaled nature of RD&E provision and engagement of the private sector within and across the industry and public sectors adds complexity to the operationalization of Australia's AIS. This increases the chance of: disconnections at institutional and cross-sectoral levels, disjointed social networks if they function as closed communities of practice or fail to cross scales of interest, and isolated social learning processes that generate 'patches' or 'islands' of innovations that remain inaccessible to the rest of the AIS, i.e. keeping a niche innovation within the confines of the local innovation boundary. Acknowledging the heterogeneous practice and diversity in experiences, needs and ideas, that exist amongst private sector advisors and producers is just a preliminary first step towards establishing an innovation platform (niche). A second step requires that key actors are engaged, empowered, and actively enrolled in contributing towards strategic pathways of innovation through project activities. Responding to the challenge of forging a shared vision, the Advisory Project has held an interactive workshop with project stakeholders, orientating actors into a shared 'innovation space'. A number of multi-actor committees (including private sector members) have been formed to govern aspects of this shared vision, and to empower a cross-range of actors in translating its various facets into practice. For instance, the interactions have surfaced evidence of shared (cross-sectoral) interest among the project partners in private sector engagement around themes of capacity building, targeting 'upstream' actors in the supply chain and building a cohesive value proposition as to why the private sector should be enrolled as key RD&E actors. Second, the forums for advisory and farmer practitioners provide spaces for dialogue and the capturing of RD&E innovation visions from their perspectives. Importantly, the forums offer participants the opportunity to make suggestions for and rate the value of different engagement trial options as well as the potential to become active contributors to shaping the trial interventions as co-innovation platforms in practice.

These activities respond to what Le Masson et al. (2012, 232) call 'generative expectations management' where the governance of innovation is orientated towards designing opportunities that generate new values, interests and visions as an outcome of participating in niche processes that function as flexible bounded spaces. The development and implementation of the project's new interests and shared vision is at the task level about managing multiple expectations from various sectors of the RD&E system where there is a possibility for a misalignment of values and anticipated outcomes; and expectations that are shaped by actors having different motivations to be involved in a project that has been initiated at the federal level and partially funded through industry partners.

It becomes apparent from our initial review and the forum results that networks are fragmented across Australia's primary industry RD&E system and are in some cases non-existent or struggling, in the case of private sector advisors and producers connecting with the research sub-system. This means there is less chance for multi-directional knowledge flows and the opportunity to coordinate collaborative activities at higher (strategic) levels. This becomes an important issue to address when we consider that informal social networks hold the potential to work beyond bureaucratic/institutional structures that may constrain the forging of novel connections needed to stimulate practices for innovation. Enabling informal or shadow networks to emerge and develop alongside traditional organisational pathways increases the likelihood of new alliances that are inclusive of both customs to allow for routine tasks, such as intellectual property (IP) management to occur in conjunction with the emergence of new experiences and practices. However, such networks and alliances also build the social capital needed for innovation and provide impetus for doing "business [as] 'unusual'" (Tenywa

et al., 2011). The project is responding by actively connecting people (through higher level project governance activities, forums and trials) that would not normally meet together for the purpose of participating in innovation processes and activities. Co-locating a range of RD&E actors to discuss and co-develop a series of pathways for innovation has the potential for new social networks to emerge at both the project and system scale, which may stimulate systemic change as an outcome of working together across sectors and interests.

While generating a shared vision and establishing novel social networks are important at a conceptual and structural level for niche innovation and systemic change, it is the learning processes that provide the substance for innovation and these need careful design and maintenance. Multi-actor learning helps to develop a complex understanding of what needs to change and what needs to be influenced in the system in order for localised learning to move through the system and link with higher order social organisation, structures and processes to operationalise institutional and strategic change. It is important at the project scale that learning from reflections, group discussions and outcomes of the research process are intentionally captured and fed back into the innovation process so that the system becomes a responsive (adaptive) system of innovation. Some project team members have demonstrated their role as a 'learning historian' or knowledge manager by recording and communicating learning generated from the literature review and forums and creating a feedback loop by reporting back to the project community. However, the risk is that these roles remain within the realm of the project team rather than being adopted by all co-innovators in the system as lead actors in learning and knowledge building within and beyond the life of the project.

In response to this challenge, we envisage the engagement trials to be the sites for enrolling actors from both the private sector and the RDCs in the concerted effort to establish a new collaborative working dynamic as the foundation for self-sustaining co-innovation platforms. Based on the stakeholder workshop and forums, four initial trial proposals have been developed and received strong support from participants. These include increased networking and collaboration in the support of new entrants into the advisory sector; RDCs working with advisers in the value chain; the application of precision agriculture technology; and improved private adviser access to the latest research in real time, while identifying needs and opportunities to aid the interpretation and application of this research in practice. The trials' design methodology stipulates explicitly (pro-)active roles for the participating partners for, first, collectively defining the opportunities for collaboration and, second, establishing co-design and governance processes for intervention in the identified area, following a planning, action and reviewing cycle. Beyond the topic areas of the individual trials, however, it is the establishment of this methodology for collaborative learning and action that has potential to build the foundations for cross-sectoral, public-private co-innovation platforms to operate into the future.

In summary, the trial design responds to these key engagement issues and opportunities observed by the research participants. The analysis of the research findings indicates a need to reframe current RD&E and governance practices from a linear model to a more systemic and networked co-innovation model (AIS). Through their design as co-innovation platforms, the trials make key contributions towards this aim by engaging RDCs and advisers across industries in the creation of a shared vision for innovation, and by creating opportunities for new alliances and multi-actor learning that enrol and empower participants as active agents of change in a shared co-innovation space. At the time of writing, the implementation of the trials in practice is pending. However, the collaborative experience and learning intended and generated by the trials explicitly reframes current RD&E practice as sustained co-innovation practice within the niche (the project); and, while there is no guarantee of transformation at the regime level, these niche practices significantly increase the potential for a regime shift towards collaborative RD&E at the level of the national AIS.

6. Conclusion

Our discussion outlined the process of establishing the Advisory Project as an 'innovation platform in action' with the aim to collaboratively develop and introduce new practices into the engagement repertoire of key actors in the Australian agricultural RD&E system. In doing so, the paper described challenges emerging from the analysis of the current engagement situation and from the action research process itself. In this way, the research steps to date present a gap analysis of the preconditions for the formation of innovation platforms. Currently, the private sector is being engaged by industry and the public service sector in a range of ways that may be one-off events, part of a fixed term project or institutionalised in organisational structures that regulate and bound the engagement practice within internal processes. This approach was shown to inhibit the development of a shared

cross-sectoral vision for the RD&E system, and to constrain the formation of multiple actor networks and learning processes as the basis of agricultural innovation. The analysis of preliminary findings from the literature and practice review of RDC engagement patterns, and from the forums with private advisers and producers, indicates that the RDC's and private advisers' perceptions of the current RD&E system and their respective roles within the AIS are in misalignment. The discussion outlined the project's action research responses to these challenges, including the approach of involving multi-actor committees in governing aspects of the project and its shared vision, and inviting diverse actor groups to help shape and translate this vision into practice. Importantly, we note that the co-development of four engagement trials enrolls both advisers and RDCs as actively collaborative actors in the establishment of four co-innovation platforms that determine the preconditions and provide the space and processes for building experience and envisioning new governance dynamics for the Australian AIS. Acknowledging that the AIS is embedded within Australia's larger socio-technological regime and socio-political landscape, the next challenge becomes how to liberate the experience, practices of engagement and any resulting innovation embedded within the trials and organisational structures of participating actors, in order to build momentum to drive innovation as a process and outcome into the larger system.

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