Accelerating the development of agtech solutions worth adopting

Challenges and opportunities for effective value proposition design in Australian agtech

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Foreword

Innovation in agriculture is not a new phenomenon, in fact Australian farmers are considered among the most innovative in the world.

Technologies such as automation, GPS guidance, yield mapping, sensors and remote imaging were considered cutting edge just a few years ago, but now are commonplace. Technology has always been part of agriculture but the current rate of change is unprecedented and poses unique challenges and opportunities for the sector.

This change also relates to how farmers interact and access new technologies. The traditional supply chain is being disrupted by the rapid emergence of agtech startups being driven by entrepreneurs, often with no agricultural experience, attempting to solve problems along the agri-food and fibre supply chain. The nexus between old and new throws up as many challenges as it does opportunities, but getting it right will ultimately lead agriculture on a path to continued growth and prosperity.

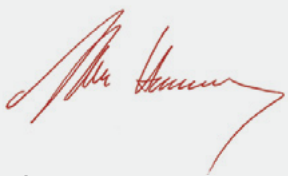
Australia has a relatively immature agtech ecosystem compared to other countries, such as the UK, the US and Israel, but there is a sense we are on the cusp of realising the opportunities agtech brings. The narrative though, often focuses on the supply end – around deal flow or the technologies themselves – this report fills a gap in our knowledge of the early stage of the ecosystem, specifically in relation to how farmer's interact with, and adopt, agtech solutions.

This report acknowledges the barriers farmers face interacting with agtech and seeks to highlight opportunities for entrepreneurs, farmers, researchers and the service sector to understand the needs of each group and build relationships necessary to drive technology adoption in the sector.

AgriFutures Australia has embarked on an ambitious path to support the maturity of the agtech ecosystem in Australia, including launching evokeAG, an event designed to connect all parts of the ecosystem. This report is a further initiative to help advance the knowledge around agtech.

It has been produced under AgriFutures Australia's National Rural Issues Program. It is an addition to AgriFutures Australia's diverse range of over 2000 research publications and it forms part of our National Challenges and Opportunities arena, which aims to identify and nurture research and innovation opportunities that are synergistic across rural sectors.

Most of AgriFutures Australia's publications are available for viewing, free downloading or purchasing online at: www.agrifutures.com.au.



John Harvey
Managing Director
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Agtech is a new industry that has emerged globally, as well as in Australia, driven at least in part by the accessibility and affordability of new technologies.

The opportunities available in agtech are attracting new participants, such as entrepreneurs, with different skills, networks and areas of expertise. This new innovation pathway holds potential to help Australian agriculture increase in profitability. However, the rapid emergence of this new industry, and the pace at which it operates, has caused both confusion and frustration for existing industry players, including producers. Adoption of agtech is therefore low, and perhaps more critically, producers are becoming sceptical of the value that entrepreneurs and new technologies can bring to Australian agriculture.

There are several reasons why adoption has remained low, including lack of connectivity in regional areas, lack of robust foundational data sets and the overall nascence of the industry. An additional adoption barrier is that producers perceive the value propositions of agtech products and services to be weak. Technologies are being pushed into the industry by entrepreneurs who do not understand the complexities of farming, rather than pulled into agriculture by producers who see value to be gained from adopting agtech solutions.

This report both acknowledges the frustrations of producers and other industry participants who are sceptical of the value that the agtech industry has delivered, as well as seeks to address this challenge by highlighting opportunities for key stakeholders.

Entrepreneurs follow a fundamentally different product design and development process than innovators within traditional research, development and commercialisation organisations. Commercial funding structures for startup companies, and best practices of value proposition design, suggest that product functionality starts small and grow over time as user feedback is iteratively collected and the product is refined. However, this iterative process – often called value proposition design or design thinking – is unfamiliar to producers who are accustomed to interacting with products only after they are fully developed. This disconnect creates a challenge for agtech. Entrepreneurs must innovate within an industry where emerging technologies may be unfamiliar to users, and where geographical and cultural constraints limit interactions with users that are necessary for value proposition design.

As a result, primary producers are experiencing weak value propositions. In some cases, agtech products are too limited in functionality to provide value to users or to justify a switch away from current products (e.g. customised excel sheets). The entrepreneurs bringing these products to market must search for the subset of users who are willing to help them develop the product further, or for whom even their limited functionality product (i.e. minimum viable product or MVP) solves a problem. As they continue to follow the best practices of value proposition design and as the broader agtech ecosystem evolves (e.g. more connectivity, data standards), these products will grow in functionality and utility, and more producers will see value. In other cases, there are agtech products that simply do not solve a meaningful problem or provide value to customers because the product was developed without customer understanding or involvement. These products are unlikely to be adopted and the startup companies behind them are not likely to succeed.

Understanding the processes that entrepreneurs follow to develop strong value propositions, and the challenges they face in agtech, creates opportunities for all participants to help support more effective value proposition design. Drawing on interviews with producers, agtech entrepreneurs and other stakeholders, this report identifies the following nine opportunities for producers, entrepreneurs, and other stakeholders involved in agriculture to enable and accelerate the development of agtech solutions worth adopting.

Producers

Engage at the right time

Build awareness of emerging technologies and capabilities for evaluating solutions

Entrepreneurs

Get out in the bush, talk to producers, and bring samples

Work with industry professionals to help segment the market

Communicate transparently about what is being built and when it will be ready

Sector Supporters

Define and amplify industry problems

Identify and invest in translators between agriculture and agtech

Reduce barriers for producers to experiment with agtech

Embrace entrepreneurs as a new and critical stakeholder

Introduction

Section 1

Adopting technology presents a huge opportunity for the food and fibre sectors in Australia. Digital technologies alone hold the potential to increase the gross value of production by over $20 billion, an increase of 25%.[1]

The development of technologies that create value for Australian agriculture is of course not new. Research and Development Corporations (RDCs), universities, governments, grower groups, and private businesses have successfully invested in the development and commercialisation of new technology for decades. However, the new wave of innovation activities happening today differs significantly from the traditional innovation processes. New technologies – from satellites to sensors, and including science and software capabilities like data analytics, artificial intelligence, gene editing, and microbiology – are increasingly more affordable and accessible. The barrier to entry for innovation in agriculture is dropping, and the pace of innovation is accelerating.

Technologies that used to cost hundreds of millions of dollars, and were only accessible to agribusinesses, biotechnology, and equipment companies with large R&D budgets and long development timelines, are now readily available. As a result, an entirely new industry has come into existence, with new possibilities for products and services that were too expensive to build or sell to consumers until very recently. This new industry, often referred to as agtech[2], is rapidly attracting new participants, such as entrepreneurs and venture capital investors. These new participants are unlike the traditional providers of technology in agriculture: they bring different skills, networks, and expertise, and utilise very different processes to bring products and services to market.

The entrance of new innovators and emerging technologies holds great promise for Australian agriculture. It offers a new pathway for technology development and commercialisation and has created a groundswell of momentum to solve problems along the agri-food and fibre supply chain. However, the rapid emergence of the agtech industry has not yet delivered on the potential benefits: producers and industry alike report low levels of technology adoption, and frequently cite weak value propositions as the reason.

Report overview

This report looks at the prevalence of weak value propositions in the current agtech landscape and identifies opportunities for stakeholders to enable and accelerate the development of agtech solutions worth adopting.

Section two, provides context on the growth of agtech and identifies weak value propositions as a key factor contributing to producer frustration. Section three, explains how startups innovate by detailing the process of value proposition design that startups utilise, and then Section four identifies challenges to this process in Australian agtech, including points within this process that are causing frustration for producers and/or creating challenges for entrepreneurs.

Finally, section five identifies opportunities for stakeholders to intervene and improve value propositions design in agtech. Drawing from interviews with a range of agriculture and agtech stakeholders, this section identifies ways that producers, entrepreneurs, and other sector supporters can help to overcome the issue of weak value propositions, and ultimately, contribute to the accelerated development of agtech solutions worth adopting.

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[1] Leonard, E. (Ed), Rainbow, R. (Ed), Trindall, J. (Ed), Baker, I., Barry, S., Darragh, L., Darnell, R., George, A., Heath, R., Jakku, E., Laurie, A., Lamb, D., Llewellyn, R., Perrett, E., Sanderson, J., Skinner, A., Stollery, T., Wiseman, L., Wood, G. and Zhang, A. 2017. Accelerating precision agriculture to decision agriculture: Enabling digital agriculture in Australia. Cotton Research and Development Corporation, Australia [2] Other terms are used as well, such as AgriFood Tech and AgriTech. This report uses agtech to encompass the range of technologies and disruptive business models along the agrifood and fibre supply chain, with a particular emphasis on upstream businesses that directly impact primary producers.

New technologies are increasingly more affordable and accessible.

The emergence of agtech

Section 2

The agriculture industry globally, including in Australia, is undergoing a technological revolution as digital, and digitally enabled biological, technologies are developed and commercialised for use along the supply chain.

The emergence of exponential technologies has profound implications for the agricultural industry. Exponential technologies refer to technologies with performance (i.e. speed, power) that doubles annually in relation to cost3. In other words, these technologies progress slowly for a long time, and then suddenly, performance and affordability rapidly improve. An example is the decrease in the cost of genome sequencing on a logarithmic scale (see Figure 1).4

Because of technological improvements, exponential technologies are becoming increasingly affordable, and are attracting the attention of innovators both large (e.g. corporates) and small (e.g. startups) in agriculture. Examples include areas like biotechnology, analytics (e.g. Artificial Intelligence and Machine Learning), and virtual and augmented reality.

The availability and affordability of these technologies has catalysed the growth of a new industry focused on the application and commercialisation of these new technologies in agriculture: agtech. New innovation and commercialisation pathways, such as startup companies, have emerged. The entrepreneurs leading these companies see an opportunity for both profits and impact if they can bring technologies to market that help the agriculture industry meet increasingly powerful consumer demands, as well as adapt to – and thrive in spite of – new resource constraints (e.g. climate change).

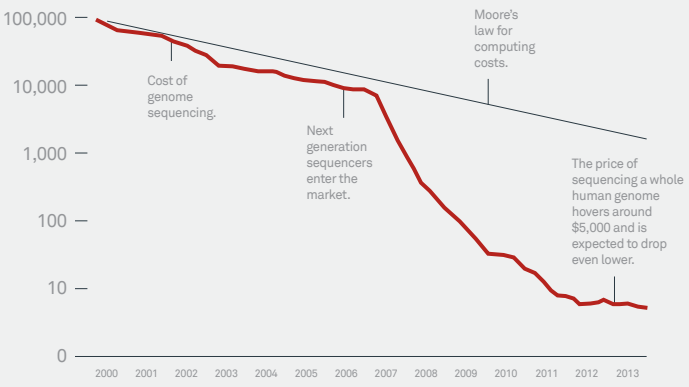
Oft cited as the least digitised industry in the world[5], agriculture is proving to be an irresistible opportunity for entrepreneurs and investors looking to bring technologies to market along the supply chain. According to news site and investment platform AgFunder, over USD $10B was invested along the agrifood supply chain in 2017 alone, with participation from over 1400 unique investors.[6]

Activity is growing in Australia as well. Since 2016, the agtech ecosystem in Australia has grown from minimal activity to comprise eleven operational incubator, accelerator, and pre-accelerator programs dedicated to food and agriculture, a growing number of pitch and prize competitions, and hundreds of agtech startups.[7]

> Agriculture technology development is no longer the exclusive domain of government and corporates with multi-year timeframes and multi-million-dollar budgets.

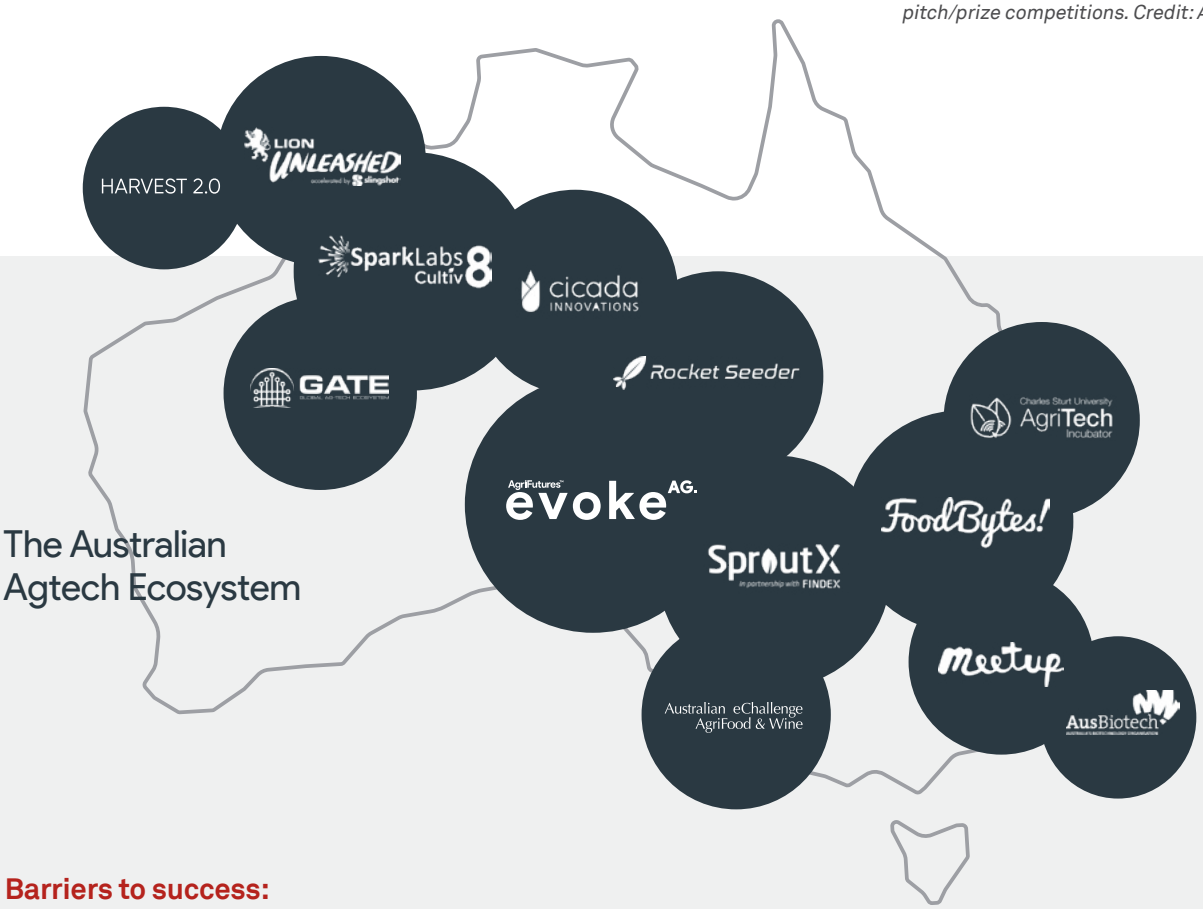
Falling fast

In the first few years after the end of the Human Genome Project, the cost of genome sequencing roughly followed Moore's law, which predicts exponential declines in computing costs. After 2007, sequencing costs dropped precipitously.



[3]See The Law of Accelerating Returns (Ray Kurzweil, 1999) and Moore's Law [4]https://www.nature.com/news/technology-the-1-000-genome-1.14901 [5]McKinsey Global Institute, 2015. [6]AgFunder Agtech Funding Report, 2017 [7]AgThentic data, see www.resources.agthentic.com and www.agtechfoodtechhub.com

Figure 2 Snapshot of the Australian Agtech Ecosystem, including accelerators, incubators, and pitch/prize competitions. Credit: AgThentic



Barriers to success: The value proposition problem

Despite the increases in investment activity and the emergence of many new support models and agtech companies, producers so far report little benefit and low levels of technology adoption. This is a global occurrence. A 2017 paper by Rabobank explains that, "despite the strong conceptual foundation for using data-intensive tools in agriculture, farmer adoption has been quite low".[8] A 2016 report by HighPath Consulting echoes this sentiment by saying, "while there is no sales data publicly available for agtech, our discussions with farmers have indicated that most agtech offerings are not widely accepted yet at this point."[9]

For participants in the agriculture industry who have been hearing about the promise of digital technologies, it sometimes seems that there is more "hype" than reality.

There are several barriers limiting producers from adopting technologies. For example, infrastructural challenges like lack of connectivity or access to foundational data sets, as well as implementation challenges such as lack of viable models for installation, support, and maintenance.

Another barrier to adoption is the lack of strong value propositions. In other words, producers are not adopting technologies because the product or service does not deliver value (e.g. efficiencies, profitability or convenience) or has an unclear return on investment (ROI). The 2016, StartupAus and KMPG report, Powering Growth: Realising the Potential of Agtech for Australia, explains that low levels of agtech adoption are due, in part, because of entrepreneur's "inability to clearly articulate the value of the technology to users."[10]
Other reports agree:

Producers indicated the value of changing to digital agriculture is not clear...If digital agriculture is to be adopted, it needs to be sustained by consistency of service and support and the reliability of technology. [11]

Farmers are more likely to adopt new technologies if there is clear value in doing so. CSIRO's experience suggests natural adoption rates are approximately 30%.[12]

For participants in the agriculture industry who have been hearing about the promise of digital technologies, it sometimes seems that there is more "hype" than reality.

[8]K. S. Zuckerberg & D. J. Kennes, 2017. Bungle in the Ag Tech Jungle. Rabobank Food and Agriculture Research. [9]2016, Agtech Beyond the Hype, HighPath Consulting, Inc and Moore & Warner Ag Group, LLC. [10]Powering Growth: Realising the Potential of Agtech for Australia. Startup Aus and KPMG, 2016. [11]Accelerating precision agriculture to decision agriculture: Enabling digital agriculture in Australia, 2017. [12]Powering Growth: Realising the Potential of Agtech or Australia. StartupAus and KPMG, 2016.

The emergence of agtech

All too often, products and services that lack strong value propositions are being developed and marketed to producers (see Figure 3, below). If agtech cannot provide clear benefits, solve meaningful problems, and meet the requirements of interoperability, robustness, support, and data governance, then adoption will remain low. For agtech to achieve its goal of elevating and enhancing Australian agriculture, the products and services developed must have strong value propositions that are well communicated, and well understood by, producers and the broader food and fibre industry.

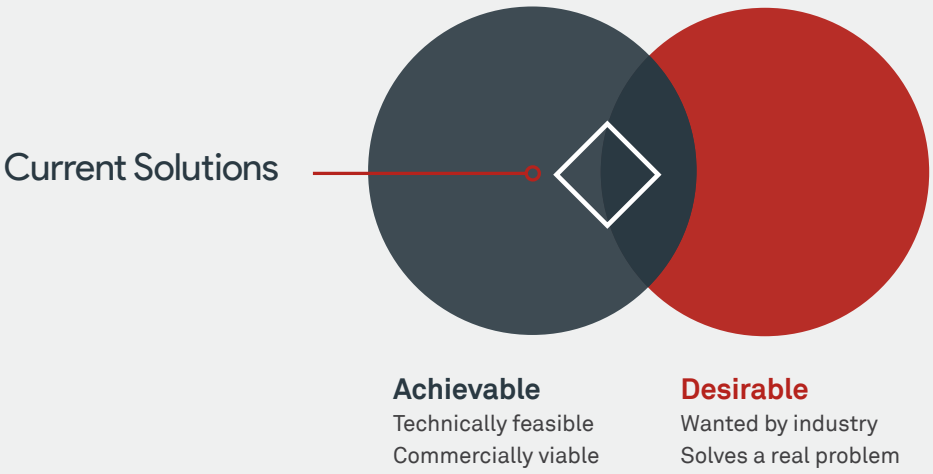


Figure 3 Summary of the state of agtech solutions in Australia

The intersection of the Achievable (left circle) and Desirable (right circle) circles is the ideal state or solutions with strong value propositions. The area represented by the white box represents the currently available solutions in agtech.

While some solutions that are both achievable and desirable do exist, many startups are bringing solutions to market that have weak value propositions. In other words, they are developing solutions that are not desired by customers. Additionally, significant 'whitespace', or opportunities to create desirable products and services, remains for entrepreneurs to capitalise. In other words, important producer problems are currently not being solved.

What is a value proposition?

Value propositions describe how a product solves a problem for a customer, or in other words, how it achieves the 'job' that customers need to get done. Whether that is knowing when to fertilise, making it easier to keep track of animal location and health, or saving money on inputs, a great value proposition targets an important problem and solves it in a reasonable way.

Weak value propositions do not solve problems customers care about, or they miss the mark on the context or other challenges customers face.

Agtech is being fuelled by powerful new technologies, savvy entrepreneurs and substantial capital; but in many cases, the solutions are missing the mark.

Diagnosing the value proposition problem

Why is it that the agtech offerings in market in Australia today have failed to achieve strong value propositions in the eyes of many producers?

One reason is that agtech is a new industry, and that this state of affairs – product offerings that are unsatisfactory to industry participants, who feel they are incomplete, poorly articulated, and/or hard to access – is common in new industries. New industries are characterised by the entrance of large numbers of new players who are challenging the status quo, and rapidly building and releasing new products, sometimes with imperfect information and untested technology. Customers in these industries experience a flood of new providers and a deluge of new products. As a result, new industries feel incredibly chaotic, especially to existing participants.

In addition to the challenges arising naturally from the fact that agtech is a new industry; entrepreneurs are also struggling to develop strong value propositions because agriculture is an incredibly challenging industry to innovate. There are many reasons for this, including the tyranny of distance, significant variations in production systems and producer capabilities (e.g. digital literacy[13]), the relationship-based nature of the industry, and the complexities and timeframes of natural systems. Agtech entrepreneurs must overcome these challenges, as well as the standard challenges that startups face, as they work to develop products and services that meet the needs of producers.

Despite the fact that agtech in Australia is an emerging industry, there is significant benefit to be gained from building an innovation ecosystem in which entrepreneurs develop technology-based solutions for primary producers that have strong value propositions and are therefore readily adopted. Raising awareness of the innovation processes that startups follow, and the challenges they face, as well as the areas of frustration for producers, will help to support both entrepreneurs and producers to realise the benefits of agtech.

The following sections detail the value proposition design process that entrepreneurs follow, explaining the failure points that lead to weak value propositions, and highlighting how and when entrepreneurs and other agriculture industry participants can collaborate to reduce the failures and frustrations.

Three characteristics of new industries

New industries can be chaotic and confusing, especially for established industry participants. There are three key reasons.

First, the promise of low competition and large markets attracts many new innovators who see an opportunity to develop new products and services. As a result, new industries often experience a flood of new products hitting the market simultaneously, and often in unpolished states, because of the potential commercial rewards that come from being first to market.

Second, because of how new the industry is, entrepreneurs entering for the first time lack information about their users. Further, entrepreneurs are trying to build entirely novel products. This point cannot be emphasized enough: entrepreneurs, especially in new industries, are often seeking to build completely different, never-made and never-seen-before products, rather than incrementally better versions of existing products. Therefore, by definition, there is no knowledge about what makes a product good or bad, or what is desirable, and comparable examples to imitate do not exist. The product category is as new to the entrepreneurs, as it is to the customers they are selling to.

Finally, especially in new industries, entrepreneurs lack the time and budget to go slowly and carefully to 'get it right' on the first try. With limited funding and active competition to be first in market, entrepreneurs are racing the clock to develop and commercialise their products. They are trained in, and expected to, deploy products rapidly and iteratively for customer feedback: a 'get it out and see how it goes' approach.

Osterwalder, Y. Pigneur, G. Bernarda, and A. Smith, 2014. Value Proposition Design: How to Create Products and Services Customers Want

[13]Zhang A, Baker I, Jakku E and Llewellyn R (2017) Accelerating precision agriculture to decision agriculture: The needs and drivers for the present and future of digital agriculture in Australia. A cross-industry producer survey for the Rural R&D for Profit 'Precision to Decision' (P2D) project. EP175936, CSIRO, Australia.

Understanding how startups innovate

Section 3

While the current noisiness and pace of the emerging agtech landscape in Australia is undoubtedly frustrating for producers, it is critical to understand why entrepreneurs in new industries behave the way they do.

This section first explains the process that startups use to innovate, and then highlights the challenges that ensue for both startups and producers as startups use this process to develop products and services in agtech.

The best practices of entrepreneurship have been frequently studied and written about in the last twenty years. Multiple frameworks of best practice entrepreneurship have been popularised, such as Lean Startup and Steve Blank's Customer Development process.[14] These methodologies place specific emphasis on value propositions: developing products that offer real benefits to customers, for example by addressing an important and unmet need. Using design thinking, entrepreneurs seek to understand customer requirements, prototype a solution, and iteratively test the resulting product with customers.

Value proposition design is a methodology emphasises the need to focus on developing a product that helps users fulfil a significant "job to be done" in a manner that is better, in the eyes of the user, than the currently available options. It is a highly iterative process where entrepreneurs engage with end users to receive feedback on constantly evolving versions of the offering.

The result of this process is the holy grail of product development for entrepreneurs: product market fit.

Product market fit is attained when a given product and its features solve a meaningful problem for a customer segment in such a way that customers not only use it, and are satisfied, but also refer it to others and display a willingness to pay for continued use.

Figure 4, below, details the product development process that entrepreneurs follow[15], and shows the continuous cycles of customer understanding and validation required for effective value proposition design and commercial progress.

Design thinking in value proposition design

Alex Osterwalder's book the Business Model Canvas, and the follow up book Value Proposition Design, use design thinking approaches to develop strong value propositions. The process includes the following steps:

Empathise:	Understand the customer and their needs
Define:	Articulate the 'job to be done'
Ideate:	Come up with possible solutions
Prototype:	Build a quick version of the solution
Test:	Work with customers to validate whether the solution solves the problem

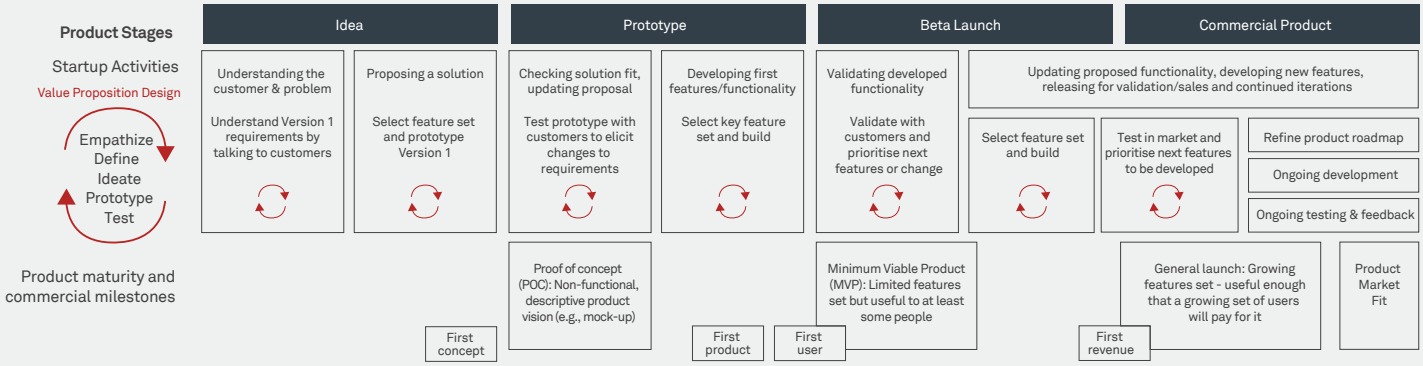


Figure 4: Detailed view of the product development process that entrepreneurs use

The top row of the diagram labels the stages of the product, showing the evolution from left to right over time. Starting as an Idea, developing to a Prototype, then to a functional Beta Launch, and then to a Commercial Product, each subsequent step reflects new functionality.

The second row of the diagram illustrates the activities that entrepreneurs must undertake to progress toward product-market fit. The value proposition design process is a cornerstone of each activity: entrepreneurs will iteratively seek feedback from users as their offering matures. Specifically, entrepreneurs gain a deeper understanding of their users in the 'Empathise' stage. They then 'Define' the problems and requirements revealed. Next, they 'Ideate' possible solutions, or features, that could address the revealed requirements. Finally, they 'Prototype' those features and test them with users. Depending on the outcome, they repeat the process either until they meet the requirement or move toward the next commercial milestone. Features or requirements that have been captured from users, but not prototyped or tested, are incorporated into the startup's 'product roadmap' to be prioritised later. The third row of the diagram shows the evolving product maturity (i.e. typical state of the product) and commercial milestones.

As shown above, value proposition design requires iterative feedback from customers. As agtech entrepreneurs work to understand producer challenges and uncover product requirements, they constantly seek interaction with, and feedback from, producers. However, this product development process is unfamiliar to producers, who are accustomed to interacting with products only after they are fully developed. Until recently, producers have interacted with sales people rather than engineers, and finished products rather than concepts and prototypes.

This disconnect creates a challenge for agtech. Producers are being asked to give feedback to entrepreneurs that they do not know, on products that seem to be incomplete. At each stage in the development process, the desired level of producer involvement changes. Figure 5, below, expands on the product development process to illustrate the types of producer involvement that entrepreneurs look for as the product matures, and the target producer profile they are seeking at each stage (see the final row in the diagram, shown in green).

Figure 5 also shows, in the fourth row, the typical startup funding sources. Capital, and in particular venture capital, is a critical ingredient for startup success. Building products, especially for complex and harsh environments like those in agriculture, is incredibly expensive. In the early stages, startups cannot fund development from revenues, as they do not yet have revenue, and further, are many years away from being profitable in most cases. This is a unique characteristic of venture-backed startups: their goal is growth, and not necessarily profitability. As venture-backed startups are a new phenomenon in agriculture, producers are not familiar with venture-backed startups or the associated metrics, incentives, and product development processes. This is frustrating for producers, as well as entrepreneurs, and ultimately creates several challenges to effective value proposition design.

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[14] https://www.interaction-design.org/literature/topics/design-thinking
[15] This process is best practice across industries, but the diagram here applies it specifically to agtech, e.g. substituting "producer" for "user".

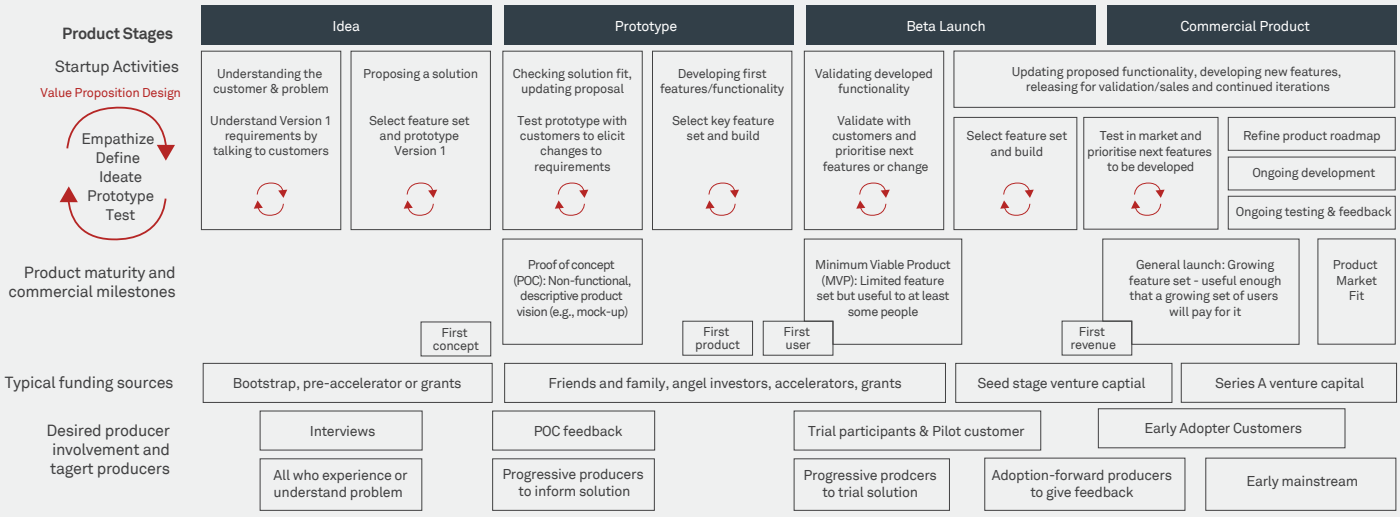

Figure 5: Expanded product development process, showing typical funding sources and interaction points between producers and startups

Value proposition design challenges in agtech

Section 4

This section identifies four specific challenges to effective value proposition design that arise as startups in agtech bring new products and services to market.

Challenge 1

Lack of domain expertise

In the early stages of development, startups are focused on identifying a problem that is worth solving and then defining and refining the requirements of the solution until it meets customer needs. In many industries, startup companies are formed by entrepreneurs who want to "scratch their own itch". In other words, entrepreneurs often build startups to solve problems they have experienced themselves.

However, entrepreneurs in agtech often come from outside agriculture (e.g. they have technology or business backgrounds), and therefore lack deep awareness of the problems that producers face and the context in which they need to solve them. These entrepreneurs are limited by their ability to understand requirements, and therefore are limited in their capacity to create good solutions. As a result, producers are seeing technologies that have been pushed into agriculture, rather than pulled in because of the need to solve a burning problem.

"We'd looked at a lot of apps and we'd had quite a few failures, because out there in the marketplace, there's a lot of these [startups] who think they know all the answers, and really they don't. And were not willing to listen. They thought they had the ultimate device."

Andrew Carruthers
AD Commodities

"We had the benefit of starting our business with a whole lot of expertise on board. Too many people say, 'I want to do a startup' and then hunt around for a problem, but the best way to do it is to start with a problem."

Peter Richardson
CEO, Maia Technologies

Challenge 2

Lack of industry networks

To be successful, entrepreneurs must develop solutions that are desirable to customers. As described above, the best practice methodology for ensuring desirability is to connect with customers and iteratively engage in value proposition design. Initially, startups work with customers to understand requirements, and then later they look for early users to test with, so they can collect feedback and verify interest.

However, entrepreneurs in agtech that do not have agriculture backgrounds lack the industry networks and credibility that are necessary to connect with producers. Agriculture is an especially relationship-based industry and entering from the outside can be difficult. This presents a challenge for entrepreneurs, who need to test their product with actual customers as early as possible, so they can capture feedback as to whether their solution is on the right path. In many cases in agtech today, producers are seeing products, some of which have cost significant amounts of money to develop, with weak value propositions because they were developed without producer guidance or involvement.

"Initially when I started working in agtech I thought that farmers would be excited by all the amazing new technologies coming through from startups and jump at the chance to use them, but actually the opposite is true. They are inundated with new tech, and have developed almost an apathy for it, because most of it is not hitting the mark."

Guy Hudson
Executive Director, SparkLabs Cultiv8[16]

"It can be hard when our engineering teams have never been on a farm, and don't empathise with our users. We try to send them out to visit customers, so they can see the problems, and see our product being used"

Tristan Shannon
Head of Product, AgriDigital

The emergence of agtech and the growth of startup activity means that producers are asked to be part of the product design process, beginning at the very early stages of ideation and prototyping.

Challenge 3

Producers are being asked to engage with, or buy, products with limited functionality

The emergence of agtech and the growth of startup activity means that producers are asked to be part of the product design process, beginning at the very early stages of ideation and prototyping. This style and stage of producer involvement is unprecedented in agriculture. In the past, researchers and technology developers from large organisations with large budgets have generally developed full-featured offerings before coming to the market. The emphasis on customer-centric, iterative design is new for agriculture.

With agtech, producers are being asked to evaluate products much earlier, when products have fewer features. Startups cannot afford, and best practice encourages them not to attempt, to build a fully featured product without input and validation from end users. Further, investors do not want to see money spent on product development without proof of customer interest, for fear of building a product which users are not interested.

This is a significant reason why functionality is limited when startups first launch. The best practices of entrepreneurship tell founders to test products early and often, not when they are 'finished'. By repeatedly interacting with customers, startups can elicit feedback and verify their understanding of user requirements, thus ensuring the solution they develop has a strong value proposition.

The entrance of this customer-centric approach is a huge opportunity for agriculture to realise the benefits of emerging technologies if strong value propositions can be developed. However, products with limited functionality can be frustrating for producers, even in the best cases, because they are, by definition, a minimum solution that only solves part of larger problem. MVPs rarely integrate with other systems; often they have sub-par user experiences and are usually guaranteed not to be a full substitute for an existing system. To further complicate this situation in agtech, many producers have developed highly custom systems (e.g. using excel), or have been using the same systems for many years. Thus, the simple solutions presented by startups seem insufficient, and not worth switching to.

In the worst cases, entrepreneurs confuse an MVP with a partial solution. Where the former does solve a problem – however small the problem and clunky the solution – the latter violates best practice, delivering a set of features that does not solve any problems for the end user.

Generally, startups do not charge users for an MVP; rather, they seek to collect feedback from trials, demonstrations and customer conversations that they can use to further refine the product. In some cases though, an MVP is advanced enough to warrant a paid trial. Here, a producer pays for a product that they know will improve over time, as they want to have early access, shape the solution, or because they see enough value with just the MVP version.

A challenge arises when startups attempt to charge for paid trials before their product delivers value to their customers. Though startups may want to impress investors with revenue, asking for money before delivering a strong value proposition only serves to increase producer frustration with agtech. To be clear, startups are not intentionally looking to take advantage of users; rather, they are being overly ambitious with when they are selling, and how ready it is for real users.

"We were happy to work with an agtech startup to give them some feedback on an early version of their product. We would have been happy to put in some time and maybe even a little bit of money, but they wanted tens of thousands of dollars. And the product didn't even work yet. We said no."

Jen Medway
Livestock Farmer

"We've run down a lot of dark alleys and come up short, with guys that have pretended and told us that their program or product will deliver, and they don't. So I can understand where a lot of other farmers like myself would absolutely lose faith in the process, and just go back to the old notebook."

Andrew Carruthers
AD Commodities

[16] *Agtech Accelerator program in Orange, NSW that has successfully attracted domestic and international startups.*

Developing new products takes a lot of time and money, especially within the agriculture industry.

Challenge 4

Iterative product development processes take time, and time is money

In addition to the challenges arising from the fact that producers are not accustomed to being asked to work with startups and give feedback, frustration increases when they are asked to give significant support to startups without compensation for their time, or acknowledgement of their input into the development process. Another aspect of this challenge is the mismatch in expectations, especially around startup financing. Producers often find it confusing to see startups raising millions of dollars while simultaneously asking them to voluntarily invest time and feedback.

For startups, though, the staggered nature of venture capital investing – a key source of funding – dictates that entrepreneurs need customer validation of their product early and quickly. In the early stages, startups use customer validation and engagement as evidence of progress, or traction[17], to show investors that they are building a solution that customers will pay for. Their goal is to attract funding, so they can further develop and improve the product.

For agtech startups, the product development process is constrained by resource availability. With limited financing available to drive development, startups must prioritise which features they build, and when. This means that feedback from end users is all the more critical. Startups want to know which features their customer's value, so that they can prioritise and deliver a better product.

Developing new products takes a lot of time and money, especially within the agriculture industry. Entrepreneurs do not have access to the same resources that research organisations or corporates have, and innovation timelines in agriculture can be prolonged (e.g. due to the need to trial a solution over a season). Often, startups will spend months or years, and several hundreds of thousands of dollars, developing technology before any customer revenue flows in. Lacking revenue, they are instead sustained by funding from their own resources, private investors, and government or other public sources.

At the stage in the journey where entrepreneurs are testing their product, they often do not yet know if the business is commercially viable, and they are almost never generating revenue. Even after startups raise capital, development is extremely expensive and startup salaries are rarely at the top of the market.

This challenge of mismatched expectations is exacerbated by time and resource constraints. While entrepreneurs are under pressure to collect significant amounts of user feedback so they can develop better products, the producers they are contacting are also time poor, as well as concerned about giving away valuable information to people they do not know or trust.

Agtech startups and producers lack awareness of the context in which each other operate and are hamstrung by the lack of a common language for engagement. They also struggle to empathise with the constraints they both face. Ultimately, if producers and agtech startups are not able to find pathways of engagement that avoid frustration and enable collaboration, weak value propositions will pervade.

"One of the challenges in building complex software is for users to understand the complexity and the process of building out something that's new that hasn't been done before. That we can't just deliver software straightaway or features straightaway, despite them wanting that or us wanting that, too."

Emma Weston,
CEO, AgriDigital

"The technologists have struggled to interface with the farmers…there hasn't been enough effort really trying to engage the farming population on what their particular problem is, and that's let to a whole heap of challenges around adoption and practice change…and missed opportunities. And also has meant that some of the famers have gone off the solutions on offer at the moment because of some of the early interactions they had where there were solutions identified, but the farmer bought in and had a poor experience. You have to realise you only have one shot at getting someone to change, so thinking it through first and getting them involved…becomes so important."

Chris Sounness
CEO, Birchip Cropping Group[18]

[17]This type of progress is often referred to as "traction". In the early stages of a startup's life, traction takes the form of customer interviews and positive feedback, such as signing up to a mailing list, clicking on an ad, or expressing interest in a trial. Later, traction is measured by success in marketing and sales, as well as positive customer feedback. [18]This quote comes from Chris's interview on the Bushtech Podcast.

One of the challenges in building complex software is for users to understand the complexity and the process of building out something that's new that hasn't been done before.

Opportunities for producers, startups, and sector supporters

As described in Section one, many producers are currently frustrated that the agtech landscape feels chaotic, and that products are not delivering strong value propositions. Though some of this messiness is actually to be expected in an emerging industry with many new entrants and limited knowledge of user requirements, improving the interactions between entrepreneurs and producers will help quicken the progress of the sector, and unlock the potential that emerging technologies hold for agriculture. This section presents opportunities for producers, entrepreneurs, and other stakeholders involved in agricultural RD&E to overcome the current challenges in the agtech landscape and support the development of more agtech products and services with strong value propositions.

Opportunity 1

Engage at the right time

The evolving functionality of products, and the need for iterative feedback from users, offers multiple opportunities for producer engagement. Engaging in value proposition design with startups is an opportunity for producers to provide insight into their challenges and provide product feedback that directly shapes agtech product development to ensure they solve real problems. It is an opportunity to co-create products that deliver significant benefits in the form of products that are developed and tailored to producers' expressed needs and wants.

However, the means of engagement and benefits for producers need to be well understood, as not all producers can engage with startups in the same ways or at the same time. To maximise benefits and minimise frustration, it is critical for producers to select the appropriate stage for engagement, based on their desires, capacity, and risk tolerance (see Figure 6).

Activity is growing in Australia as well. Since 2016, the agtech ecosystem in Australia has grown from minimal activity to comprise eleven operational incubator, accelerator, and pre-accelerator programs dedicated to food and agriculture, a growing number of pitch and prize competitions, and hundreds of agtech startups.

At a high level, producers with more experience working with, adopting and refining technology can gain significant value from engaging with very early products, providing feedback from idea and concept through to trialling the early MVP (see Case Study, below). By guiding technology development in this formative way, they can help to catalyse the creation of products that improve their operations and provide real value to the industry. In contrast, producers that are more conservative can gain value by adopting products at general launch, after seeing them tested and refined by pilot customers. If entrepreneurs follow best practices, products at this stage will be developed enough to provide value, so producers will benefit as soon as they are adopted. Table 1, below, illustrates how and when the three different "producer personas" described above can engage with agtech, and what they can gain in return.

It is important to note that for all products with strong value propositions, the ultimate benefits come from the value they can bring to the farming operation. As farmer and startup founder Mic Fels describes on his blog, even though his app is incredibly cheap, there is immense benefit from using it:

"There was however a second prong to this crazy, outlandish business model, and that was that our own farm business needs these tools. From day one [my pitch] was that there are millions to be made in our own farm business from using these tools, and that has unquestionably been the case since we started using them. We literally can no longer afford not to have them."

Mic Fels
Farmer and Founder of iPaddock[19]

"I've seen well-trained startups develop deep customer empathy and work hard to deliver high value, customer- centric solutions. These solutions are often better than things we've seen in agriculture in the past, that were developed in a lab without customer feedback. In the past researchers might not have asked customers what they wanted, so the solution missed the mark and a lot of money was wasted."

Mark Ferguson
Livestock Consultant, neXtgen Agri

[19] *https://www.ipaddock.com.au/how-i-make-money-out-of-ipaddock/*

Figure 6: Producer Personas for Technology Adoption

	The Visionary	The Pragmatist	The Traditionalist
	• Always on the cutting edge of new products and services in the market • Is the first to try new things, and to tell peers how to went • Has played with a bunch of different technology solutions before, and is quite familiar with the trial, testing and feedback pocesses • Knows that not everything is going to be useful, especially at first, but finds it interesting anyway	• Evaluates products on their robustness and utility first, but likes things that are innovative • Is happy to be early, but not necessarily first • Is keen to bring new technology into the enterprise, once a few others say it had added value • Is keen to engage with new ventures, but is not quite sure how to	• Chooses products that are easy to implement, and are guaranteed to work, because has seen friends and neighbours use it • Is a bit curious about technology, but lacks the time to try new options • Doesn't want to waste time talking about things that don't exist yet
Engagement opportunities by stage	**Idea Stage:** Share challenges and needs with entrepreneurs; Explain what is working and what is not, and the ins and outs of farming operations **Prototype Stage:** Comment on proof of concept solutions **Beta Stage:** Act as a pilot customer, trialling the MVP.	**Idea Stage:** Share challenges and needs with entrepreneurs **Product Stage:** Adopt products at general launch	**Idea Stage:** Share challenges and needs with entrepreneurs **Product Stage:** Adopt products after friends and neighbours have adopted it
Look for:	Teams that are responsive and respectful, and listen to feedback	Ways to 'try before you buy' Companies with good support availability and quick response times to questions	Testimonials and good reviews Trial periods, product demonstrations, videos, consultations
Benefits:	Be one of the first to use and gain benefits from products, before they hit market Shape products to unique business needs, and benefit early from product features Share expertise and insight, and be seen as an ambassador of technology in the community Prioritised feature requests, support responses, and subsidised usage	Be one of the first to use and gain benefits from products as they hit market Provide feedback that helps shape product development Business gains from adoption	Business gains from adoption

Case study: Visionary ("early adopter") Farmer

Andrew Carruthers, *AD Commodities*

As a highly valued partner and customer, AgriWebb gave Andrew direct access to the engineering team, and prioritised his support requests.

- Frequent technology adopter and innovator
- Previously commissioned development of custom software for use on farm
- Uses a variety of software tools on tablets and smartphones, drones, and more.
- Farms 6500 acres (livestock) in New England, NSW

Relationship with AgriWebb

As a highly valued partner and customer, AgriWebb gave Andrew direct access to the engineering team, and prioritised his support requests. He also receives a significant discount on the annual license of the product and is often one of the first users to test new features before they are released to the general customer base.

"They'll actually take on our suggestions, and then ground truth it with other producers, and implement it. It's about building what customers want. Right from the get go the AgriWebb guys were more worried about what we needed, than what they thought they knew."

Andrew Carruthers
AD Commodities

"Andrew has been a key influence in the direction of our new product. And it has been great to see him get a lot of value out of the product – he's one of our top 3 most active users in the country."

John Fargher
Co-Founder, AgriWebb

2016

Trialled AgriWebb

Emailed the team with feedback

AgriWebb identified Andrew as a helpful and progressive customer who was keen to engage on a deeper level

2017

Andrew became a key product feedback source for AgriWebb. Members of the team visited his properties in Armidale 3 times during 2017 to discuss current features and feedback, and scope new features

AgriWebb's Biosecurity Planning feature was developed with significant input from Andrew

> "[Our customers] really appreciated us coming out with deep industry knowledge. We understood what their businesses were all about, what drives them, what motivates them, what the challenges they face were."
>
> **Tristan Shannon**
> *Head of Product, AgriDigital*

Opportunity 2

Build awareness of emerging technologies and capabilities for evaluating solutions

Agtech products are often released far earlier in the commercialisation phase than producers are accustomed to. Though this can be frustrating, it also means that products can be rapidly altered to incorporate feedback, and new features can be developed much faster than has traditionally been the case. Producers can benefit from this: the option to engage early and provide feedback is a real opportunity for producers to shape product development, and producers who position themselves as active co-creators of technology can gain enormously.

However, evaluating emerging technologies brought to market by startups is different from evaluating products from established companies. The latter is a product evaluation involving traditional metrics like price, functionality, ease of use and return on investment. The former, especially in the early stages of the value proposition design process, requires different metrics because the product will evolve significantly over time based on the producer's input.

In deciding whether and how to work with agtech startups, producers must act more like investors, evaluating the team, as well as the product. In addition to considering the product roadmap (i.e. the vision for where the product is headed), producers will benefit from considering the team behind the product. Is the team open to feedback? Does the team follow best practices, such as getting out into the agriculture industry and talking to users? Does the team follow through on promises? Are the entrepreneurs enjoyable to work with?

> ***"We now spend a lot of time investigating what we do, and what we implement…We've had so many failed starts with so many other people who promised and charged you for a product that they said would do A to Z but it only did A to B. The things we look for in technology now have certainly evolved over the last 10 years. When I first started looking at technology, I'd always look at what the [current functionality of] the product was at that stage. Now, because of my exposure to a really good team, we look more at the foundations. The team behind the product. That's what I look at now, first and foremost. Because unless you have that team behind you, you could be walking down a deep dark hole and not know it until you're at the end."***
>
> **Andrew Carruthers**
> *AD Commodities*

The emergence of new technologies will also change farming practices and environments. Just as previous eras of technology advancement in agriculture, such as mechanisation and the green revolution[20], caused fundamental changes in the agricultural landscape, so too will emerging technologies from the agtech industry. However, without awareness of what is coming and the potential it holds for agriculture, producers will be unable to effectively participate.

Producers therefore need to cultivate an awareness of what is out there and what is possible. Technologies are rapidly improving and increasingly resources are deployed to develop spe cific applications for agriculture. Producers who are aware of applications of emerging technologies in other industries, as well as their application for agriculture, can help to generate ideas and stimulate thinking about what is both possible and practical.

Cultivating a general interest in seeing and evaluating new products, and understanding the potential of emerging technologies, will equip producers to deal with the potential and reality of the emerging agtech landscape. Rather than being surprised about new developments, or constrained to conceiving of solutions based only on experiences, cultivating awareness of emerging technologies and acquiring the capabilities to evaluate and adopt technology effectively will reduce risk and frustration, and provide a strategic advantage to producers who are willing and able to engage with emerging technologies and agtech entrepreneurs.

> ***"As we've introduced more information on emerging technologies to producers, and given practical examples of what things like sensors and artificial intelligence can do, we've seen them really change their thinking on what's possible. To know what's possible is the first step in being ready to get involved, and to get ahead with new technologies."***
>
> **Mark Ferguson**
> *Livestock Consultant, neXtgen Agri*

> ***"[Good agtech solutions] always encompass where [the farmer is] at with technology in terms of ownership of hardware but also where their mindset is at – what they feel comfortable with and what they don't feel comfortable with. Because that the end of the day in order to improve productivity it all comes down to confidence level."***
>
> **Brooke Sauer**
> *Digital Ag Manager, McGregor Gourlay*[21]

[20] *https://www.britannica.com/event/green-revolution* [21] *This quote comes from Brooke's interview on the Bushtech Podcast.*

Opportunities for entrepreneurs

Opportunity 3

Get out in the bush, talk to producers, and bring samples

Ultimately, the responsibility for developing agtech products with strong value propositions lies with the entrepreneurs themselves. Startups must follow best practices of value proposition design, including engaging with users early and often.

Great value propositions solve important, unsolved jobs to be done, and do so in ways that satisfy customer workflows and budgets. Entrepreneurs working in agtech, especially those without experience or background in agriculture, must invest in immersing themselves into the agricultural context and value chain in which their users operate. Doing so helps ensure that the problems they are addressing are well defined and are important to their users, and that the solutions they develop are practical in the context in which they will be deployed.

Though phone conversations may suffice, especially at first, getting deep insight requires spending time in the environment where users operate, and problems exist. Agtech Entrepreneurs need to spend time at field days and on farms. To minimise frustration and reduce the effort needed from producers, entrepreneurs can look to leverage established events, work with industry advisors, and collaborate with established groups (e.g. grower groups).

In these conversations, entrepreneurs must look for insights about farm size, history of the operation, infrastructure availability, existing practices and tools, workflows and budget, and more. However, though this information is critical as it ultimately defines the required product functionality, entrepreneurs must invest in building relationships and gaining trust. Producers will ultimately benefit through the development of products with strong value propositions. But in the early stages producers are giving time and insights, and entrepreneurs must be respectful and appreciative of their contributions. Coming for the field day or conference alone will not suffice, it is more valuable to stay for the networking and follow up.

Further, entrepreneurs will benefit from doing more than just talking to producers. Bringing proofs of concept and samples, such as sketches or rough prototypes, can help to elicit feedback and ground the discussion in reality. However, there is a temptation to wait to engage users with a fully developed product. However, producers appreciate seeing something real rather than hearing about something conceptual and therefore, having something physical that they can easily try out, encourages users to give more feedback. Waiting until a product is developed to get firsthand user feedback guarantees missing features and ideas that users really want.

"Too many people will sit there and build a program and have no idea – never been crush side! Never worried about pushing sheep up. Never moved a mob of sheep in their lives, they just don't understand what it takes, what we go through on a day to day basis. My advice to new teams in this ag space that don't have that first-hand experience? Go out and get it. Get your boots dirty. Actually come out and experience it, understand it. Push cows up. Catch a lamb or two."

Andrew Carruthers
AD Commodities

"For entrepreneurs who are thinking about getting into agtech, you have to get to know the environment. You've got to meet as many farmers as you can. You've got to understand the supply chain. You've to understand the challenges, and then look for the problems that need solutions."

J. Matthew Pryor
Co-Founder, Observant

"Trust is a big part of [innovation in agriculture] and that means often you have to travel long distances and spend time outside of a CBD type environment… building those networks is hard but is a worthwhile investment and will pay off in spades in the long run.."

Chris Sounness
CEO, Birchip Cropping Group[22]

"My advice to entrepreneurs in this marketspace is to listen to your customers. Understand your customer first. Understand what they need, and what's going to make their life easier. Otherwise what are you building?"

Andrew Carruthers
AD Commodities

[22] *This quote comes from Brooke's interview on the Bushtech Podcast.*

Figure 7: Andrew Carruthers (AD Commodities) and John Fargher (AgriWebb)

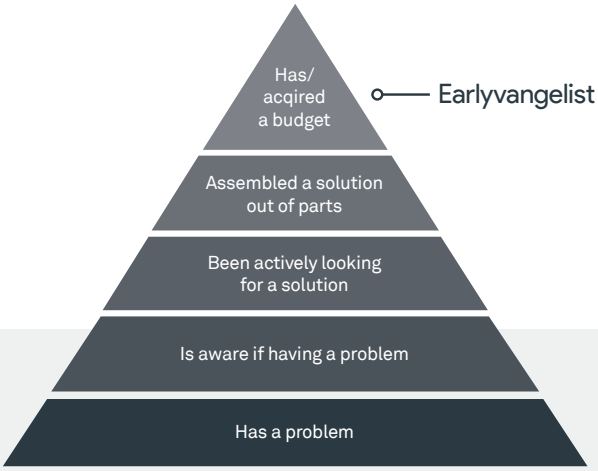

Figure 9: 'Earlyvangelist' Hierarchy Framework. Source: Startups.Co, available at: https://www.startups.co/education/lessons/channels-partners/6

Opportunity 4

Work with industry professionals to help segment the market

In the early stages of value proposition design, only certain types of users will be willing and able to give feedback and engage in the iterative feedback processes (see Figure 6, above). Entrepreneurs must therefore carefully segment their market to identify the early adopters who can and want to help guide product development. There are two established frameworks for this. The first framework is the technology adoption curve (Figure 8). This type of segmentation is well known and captures the risk appetite, tech-savviness, early product familiarity and motivating behaviours of each group. Early adopters are those with a history of picking up and trialling new technology. These users are discerning, but experimental. Table 1, is an adaptation of this framework specifically for customers in agriculture.

The second framework segments the market at the product level, rather than the population level. Originally championed by entrepreneur and startup coach Steve Blank[23], the 'earlyvangelist' framework segments potential customers by their awareness of a problem, and their 'need' level in response to that problem (See Figure 9). "Earlyvangelists", a contraction of early evangelists, are those who are aware of the problem, have actively looked for solutions (e.g. building a makeshift product themselves), and have available budget to procure a commercial solution.

The ideal pilot customer for early stage agtech startups sits at the top of the "earlyvangelist" pyramid: users with awareness of the problem, desire to solve it, and available budget. Earlyvangelists also fit the description of the "early adopter", or The Visionary (Figure 6), as they are relatively tech-savvy and have the capacity and desire to investigate and experiment with solutions.

Working with these types of producers can not only streamline the development process, but also help to avoid frustrating potential future customers who might be less tech-savvy and less patient with products that are still being developed. To find producers who have expressed interest in a problem or emerging technology, entrepreneurs can look to work with industry professionals, such as consultants, and advisors. These intermediaries have strong networks and know producers, and can help ensure both producers and entrepreneurs benefit from the interaction. They may also have broader networks in the space, and may be able to help entrepreneurs find collaborators, such as other organisations working to solve the same problems, or groups or individuals who have worked on the problem before.

"I've been able to help a few startups find the right producers to talk with about their technologies and get feedback. When you get the right groups of producers in the room who've already expressed an interest, both sides can get a lot of benefit from engaging."

Mark Ferguson
Livestock Consultant, neXtgen Agri

It is worth noting that the technical and operational sophistication of early adopter customers can create a risk for agtech startups. If startups develop features that only sophisticated customers can use or benefit from, they will not achieve widespread adoption of their product. There is a balance to be struck between developing a product with forward-looking customers that meets their needs and realising that reaching commercial scale and mainstream adoption, requires functionality that solves the problems of the broader population. Again, intermediaries can be an ally to entrepreneurs looking to engage with producers at the right times and in the right ways.

"Something we have to be careful with is that [some of early adopter customers are] really sophisticated customers. Not everything they ask for is going to be relevant or useful for our general customer base."

John Fargher
Co-Founder, AgriWebb

"We spent a year trialling with fifteen different farms, understanding their needs and making sure the product made sense and worked for them. That was really important to us getting it right, testing across these diverse environments. Not all farms are the same, and we didn't want to build something that only made sense for one situation."

Doug Fitch
CEO, Agworld

The technology adopters curve

As captured by Everett Rogers in his book Diffusion of Innovations (1962), people tend to adopt new technologies at varying rates. Their relative speed of adoption can be plotted as normal distribution, with the primary differentiator being individuals' psychological disposition to new ideas.

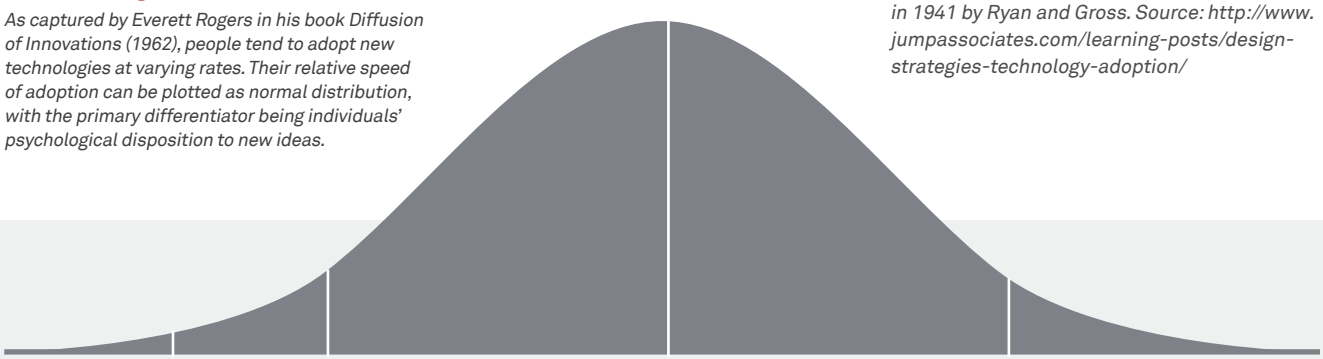

Figure 8: The adoption curve. Originally defined in 1941 by Ryan and Gross. Source: http://www.jumpassociates.com/learning-posts/design-strategies-technology-adoption/

Innovators

2.5% are risk takers who have the resourcesand desire to try new things, even if they fail.

Early Adopters

13.5% are selectiveabout which techonologies they start using. They are considered the "one to check in with" for new information and reduce others' uncertainly about a new technologyby adopting it.

Early Majority

34% take their timebefore adopting a newidea. They are willing to embracea new technology as long as they understandhow it fits with their lives.

Late Majority

34% adopt in reaction to peerpressure emergingnorms, or economicnecessity. Most of the uncertainly around an idea must be resolved before they adopt.

Laggards

16% are traditional and make decisionsbased on past experience. Theyare often conomicallyunable to take risks on new ideas.

"Early on we started to explore the market, do research, and test our concept. Then we did one year of beta trialling…we learned that in actual fact, the number of people that could consume the product we built originally was actually quite small, because we had targeted very sophisticated users to capture the biggest benefits…now we're working backwards toward mass adoption. We did it this way to ensure we could deliver significant value to real customers in the long term."

Peter Richardson
CEO, Maia Technologies

Opportunity 5

Communicate transparently about what is being built and when it will be ready

Given the significant resource constraints they face, entrepreneurs must be laser focused on identifying the most critical pieces of the problem to solve and starting there. As described above, a MVP must fully solve a problem for pilot customers, even if that problem is a small one. If functionality at the MVP stage does not resonate with customers, entrepreneurs must iterate until they find the right problem-solution fit, and must not confuse limited functionality, which is necessary at the MVP stage, and poor functionality, which is a result of not following best practices.

As products are evolving throughout the iterative process of value proposition design, it is important for startups to provide producers with transparency about the product's status, current capabilities and the timeline over which future features will be developed. Selling the vision for the eventual product is key to get early adopters on board; however, entrepreneurs must be honest and up front about current functionality.

Producers must not feel duped into buying a product that lacks promised functionality, as this benefits the startup in the long run, and contributes to the fatigue and sense of 'hype' (vs. reality) prevalent in agtech right now. Further, early adopter customers are investing time and sharing knowledge to help startups refine their offerings, and startups must be careful to build real relationships and trust. Doing so will benefit both the producers and the startup in the end.

"We decided to make [the challenges and timelines of building software] really transparent – we actually have a community portal that we share with our users, where we make our product roadmap completely transparent. They can actually see what's coming up in the next two weeks, next 4 weeks, next 6 weeks, 3 months, 12 months, never."

Emma Weston
CEO, AgriDigital

"It's important to not just look at the solution on its own, but to understand and build a relationship as well. Farmers are very relationship driven, and in terms of building a solution, you've got to make sure you build that trust. You've got to make sure that they are aware that you're going to be there for them, and that you're going to deliver on the expectations that you've set."

John Fargher
Co-Founder, AgriWebb

[23] *https://steveblank.com/about/*

Opportunities for sector supporters

There are existing organisations within the agricultural landscape that are uniquely positioned to help agtech entrepreneurs progress through the value proposition design process, as well as reduce frustration and help producers gain value from engaging with the agtech community. Examples include, but are not limited to, RDCs, grower groups, universities and extension organisations, retailers, and government organisations (e.g. Department of Primary Industries, Local Land Services and the Department of Agriculture and Water Resources). This section explores opportunities for these groups, collectively referred to in this section as sector supporters, to overcome value proposition challenges in agtech.

Opportunity 6

Define and amplify industry problems

Great value propositions come from well-defined problems, but agtech entrepreneurs, especially those without a background in the industry, often do not know which problems are worth solving. Sector supporters can help agtech founders create more value by providing them with additional understanding of industry problems held by the masses, as well as their relative importance and the associated requirements for solving them. Doing so can also save producer's time, helping to reduce frustration and fatigue for producers.

Further, existing pathways to elevate industry problems (e.g. advisory panels, events with self-selected participants) often cater to the extremes: those who are on the cutting edge of technology and already engaged and those who are loudest (i.e. the "squeaky wheels"). Though entrepreneurs will seek to work with early adopters, it is critical that solutions are targeted at problems that are experienced by a representative sample of users. Doing so ensures a larger impact for the industry, as well as commercial viability for the startup.

Sectors supports in the agricultural community have a wealth of experience and knowledge that can be hugely helpful to entrepreneurs seeking to gain insight into industry problems. Sector supporters can therefore help to catalyse the creation of strong value propositions by auditing existing work and knowledge that exists and sharing it with the agtech community in consumable formats for entrepreneurs to discover and digest. Sector supporters can also provide producers themselves with platforms to share problems with the agtech community. Finally, and perhaps most critically, sector supporters can help ensure entrepreneurs hear about problems experienced by a representative sample of producers.

This information is invaluable to entrepreneurs, who can then target the problems identified and incorporate the learnings gained, rather than develop technologies and businesses that fail to solve real problems. For entrepreneurs who lack domain expertise especially, identification and amplification of industry problems is critical, as is exposure to a representative sample of producers.

> "Founders in agtech, especially when they come from outside of agriculture, often struggle to connect with farmers. Having access to connections like agronomists and consultants can help provide startups a channel to connect with early adopting customers."
>
> **George Peppou**
> *Agtech Accelerator Director, Cicada Innovations*[24]

Sector supporters seeking to help in this way can consider training around problem articulation. Not all problems are suitable to be solved by emerging technologies, nor are all problems raised by producers worth elevating to startups. Through training, sector supporters can provide startups with insight into the biggest opportunities and associated risks, with respect to industry problems. They can also help entrepreneurs engage with a representative sample of users, rather than the loudest or most tech-savvy voices in the room.

> ***"There are amazing insights from people who will never get heard under the current systems. The very top end of producers are already raising their hands to give feedback, but there are still real problems out there for the rest. We need to find and solve these problems."***
>
> **Mark Ferguson**
> Livestock Consultant, neXtgen Agri

> ***"Entrepreneurs who come into agtech from a non-ag background find it really hard to build networks, and the ones they can build are often with the really early adopters. What's hard to realise is that they then have a huge hurdle to overcome to reach the rest of the market."***
>
> **Guy Hudson**
> Executive Director, SparkLabs Cultiv8

Opportunity 7

Identify and invest in translators between agriculture and agtech

The value proposition design process that agtech startups follow is full of terminology that can be unfamiliar to producers. Similarly, entrepreneurs from outside agriculture find farming terminology to be unfamiliar.

Further, as described above, the constraints and incentives of both parties are not always well understood and can lead to frustration. As startups and producers engage, it can feel to both sides like they are speaking a different language and have trouble finding common ground. This is exacerbated by instances where agtech has overpromised and under delivered, causing producers to be increasingly sceptical.

Sector supporters have an opportunity to help increase the levels of empathy and raise awareness of constraints and processes for both producers and startups. Specifically, sector supporters can identify and invest in translators who have knowledge of both agriculture and agtech.

Translators can help find common ground and build a common language for producers and entrepreneurs. They can appreciate the high-tech and long-term visions of agtech entrepreneurs and communicate them to producers in terms of how they can be practical, grounded solutions to current problems.

Beyond communications and a common language, translators can help to manage expectations around timelines and raise awareness of constraints. For example, translators can help producers understand the metrics that venture capitalists look for, as well as help entrepreneurs to appreciate and work within relevant constraints that producers face (e.g. seasons, varying workloads at certain times of the year, farm safety, cultural nuances, etc.). Agriculture to agtech translators have knowledge of, and experience with, existing forums and events that can help startups and producers connect.

[24] *Cicada Innovations is an incubator, that runs and agtech accelerator program called GrowLab*

Using existing industry events (e.g. field days, conferences, workshops) and channels (e.g. grower groups, industry organisations), where appropriate, they can help minimise the time required from producers, as well as maximise the amount of, and diversity of, feedback that entrepreneurs can collect. As importantly, translators can advise startups on best practices for working with farmers, such as following up after events to collect feedback.

> ***"Workshops can be great ways to get feedback, but when new concepts are introduced, ideas can take a while to form. We need to give people time to have a drive home, talk to their husband or wife. Then you can reach back out and they might have more ideas. Following up is so important."***
>
> **Mark Ferguson**
> *Livestock Consultant, neXtgen Agri*

Translators can also help entrepreneurs to segment the market, ensuring entrepreneurs engage at the appropriate stage for producer preferences and capacity. Connecting producers to entrepreneurs in this curated way will help entrepreneurs gain the understanding and feedback needed to develop useful offerings and minimise frustration for producers.

To identify translators, sector supporters can look to industry professionals as well as technology champions within the producer community. Consultants, advisors, technology-focused industry organisations and grower groups already work with producers, and in many cases, are increasingly active in the agtech community.

Producers themselves can also be translators between agriculture and technology. Though many producers are innovative and self-sufficient, a small percentage have developed homemade, technology-based solutions to their on-farm challenges.

> "If you're coming into agtech and you're not from the domain, or with the experience of having worked across agricultural supply chains... I think that it is a little bit harder to come into this market, but it's obviously not impossible. Technologies with great focus on the problem, with knowledge of the customer base, and with the versatility to get out there and meet the community are still going to do great."
>
> **Emma Weston**
> *CEO, AgriDigital*

These prototypes represent significant insight into industry problems; these producers hold significant value for the agtech community. These producers, who have a deep understanding of challenges and a notion of the required solution, can play a critical role as translators given their understanding of both emerging technologies and agriculture.

For example, these producers can take their concept forward to commercialisation, join forces with an entrepreneur, or become a key advisor to an agtech startup building a solution to the same problem. Sectors supporters can catalyse and support these interactions through programs[25], marketing (e.g. case studies) and intentional matchmaking interventions.

[25] *For example, the MLA Donor Company has run a pilot program, Producer Innovation Fast Track. More information available here: https://www.mla.com.au/globalassets/mla-corporate/about-mla/documents/mdc/pift-brochure-final2.pdf*


Great value propositions
come from well-defined
problems.

> "The greatest hurdle in the whole precision agriculture space is more about the support required to move forward and to adopt and take on technology - because it's not necessarily a whole new farming system, it's just using tools in a different way and finding information from different sources."
>
> **Brooke Sauer**
> *Digital Ag Manager, McGregor Gourlay*[26]

Challenge 8

Reduce barriers for producers to experiment with agtech

Agtech products need to connect with users who are willing and able to give feedback – both positive and negative – on products throughout their development. As described in the previous section, working with agtech startups in the early stages (e.g. early prototypes and beta trials) can be resource intensive for producers. Time, in particular, is a barrier to participating in trials with early stage startups. Producers are busy running their operations and often do not have spare time to spend on a trial, which might include selecting the technology or startup, installing the technology, structuring the trial (e.g. setting aside a plot or paddock), debugging issues and collecting and analysing data.

Though cost can also be a barrier, as described above, well-trained startups will develop solutions that are worth the investment and will not look to charge producers before they will receive value in return. Sector supporters who want to lower barriers to experimentation and encourage best practices for trialling new technology can instead help by reducing the time burdens for producers. Lowering the barriers to experimentation means first helping producers think through what to try and why, and then how to set up a trial that will rigorously test the idea or technology.

Sector supporters can help to lower or eliminate barriers to experimentation, as well as improve the experience for both producers and startups, by investing in training for trusted intermediaries, such as consultants, advisors, or other industry professionals, who can then facilitate successful trials between producers and agtech startups. This kind of support is useful to producers as it puts the responsibility on a trusted intermediary to do the due diligence on the startup and the technology, again saving time for producers. Such facilitators can also help to give producers confidence about the trial process, including where to start and what support is provided.

Current models exist to support the trialling and testing of technologies. For example, subsidised trials exist to encourage producers to adopt technology, as well as research projects that involve startups, producers and early prototypes. However, interventions where producers receive free technology runs the risk that they are participating in the trial because it is free, rather than because the product delivers value. In this case, startups do not receive the validation they need to know they are developing a strong value proposition.

Instead, sectors supporters can help by subsidising the total cost of experimentation, reducing producer frustration without compromising the value to either the producers or startups. This approach also ensures rigor around trials and feedback, as well as allows producers to focus on what they are good at – running the business – rather than technology skills. Thereby, opening up the possibility of trials to a larger group of users (i.e. not just the tech-savvy ones).

[26] *This quote comes from Brooke's interview on the Bushtech Podcast.*

Opportunity 9

Embrace entrepreneurs as a new and critical stakeholder

As agtech continues to grow and more entrepreneurs look to develop technology-based solutions for Australian agriculture, sector supporters increasingly need to understand not just the needs of producers, but also of entrepreneurs. The best practice of customer-centricity now applies to this new stakeholder group. Sector supporters have an opportunity to work with entrepreneurs, invest in understanding their needs and process, and design inclusive initiatives that leverage their skills. Doing so can reduce the risk of developing engagement initiatives which do not match entrepreneur needs and processes and fail to improve the quality of the value propositions being developed.

Shifting to include entrepreneurs as a key stakeholder group will require a shift in mindset for many sector supporters who are not accustomed to working with startups and may be unfamiliar with, or even resistant to, their rapid, iterative, growth-oriented development processes. Education and exposure may therefore be necessary to help sector supporters understand how startups work, and conversely how to work with startups. Just as entrepreneurs need to spend time building relationships with producers and invest in understanding their environment and context, so too do sector supporters need to engage with the agtech startup community. Exposure, for example through attending events with an attitude of curiosity and openness, will help to raise awareness and will provide opportunities to build connections within this new innovation ecosystem. Exposure can also be beneficial to sector supporters and their organisations, who will learn new ways of thinking.

Sector supporters can also help the industry avoid weak value propositions by investing in capabilities to identify risk and reward in the agtech space. New ventures are inherently risky, but sector supporters who are equipped with knowledge of best practices will be better able to help other sector supporters and ultimately producers to reduce risk and maximise rewards. In some cases, this expertise can be cultivated amongst existing personnel and in other cases, it may need to be outsourced to specialists.

A key example of sector supporters making risk and reward decisions relates to funding and investing in agtech initiatives. Funding agtech innovation is different to funding research and sector supporters need to develop appropriate investment models to capture the different needs and nuances to design initiatives that enhance the ecosystem and unlock the potential that agtech entrepreneurship holds for the agriculture industry.

> "Whether or not [working with a particular startup] eventuates into anything is almost irrelevant, but being able to offer that connection between farmer and startup and bring some perspective to them is really special. For them to say, "Actually, that issue is not very important to us, but this one is."
>
> **Brooke Sauer**
> *Digital Ag Manager, McGregor Gourlay*[27]

[27] *This quote comes from Brooke's interview on the Bushtech Podcast.*

Conclusion

Section 6

The entrance of entrepreneurs working to bring valuable technology-enabled solutions to the agriculture industry creates a huge opportunity for producers to access technologies that improve their operations, productivity and profitability. However, to date, solutions in Australian agtech have fallen short in the eyes of many producers. At a high level, the industry is new, the processes and constraints of startups are unfamiliar, and engaging with these startups is different from the familiar process of buying fully developed products bought to market by large companies. In particular, there are four key challenges to overcome to catalyse and support effective value proposition design in agtech:

Challenges

1. Lack of domain expertise
2. Lack of industry networks
3. Producers are being asked to engage with, or buy, products with limited functionality
4. Iterative product development processes take time and time is money

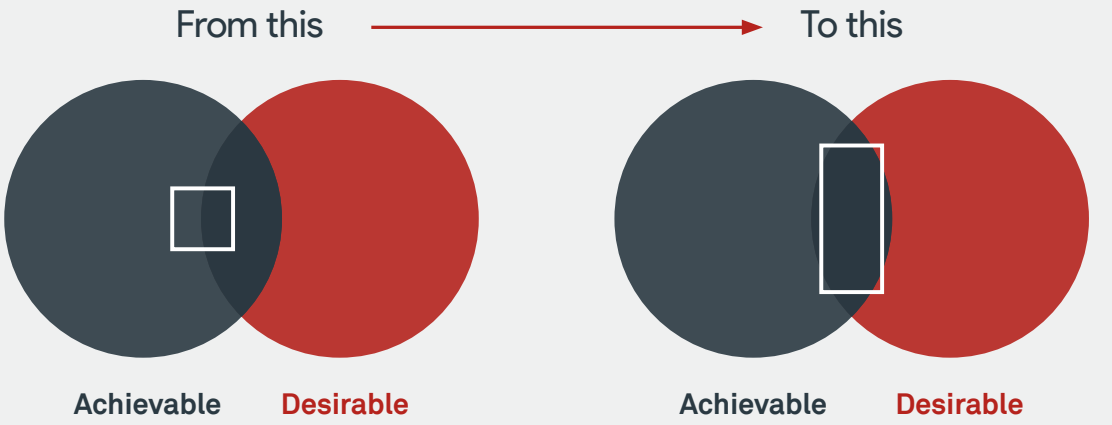

Figure 10: The current and desired states of agtech value propositions.

All participants in the emerging agtech ecosystems, as well as participants in the existing agriculture industry have a role to play in accelerating the progress of strong value proposition design. Entrepreneurs, producers and sector supporters, in particular, have several opportunities to accelerate the development of high-value solutions worth adopting.

Producers can help by knowing how and when to engage with the agtech community and by building awareness of emerging technologies and capabilities for effectively evaluating solutions delivered by startups. Entrepreneurs can spend time talking to and working with producers and utilise samples to build trust. They can also work with industry professionals to help segment the market.

Perhaps most importantly, entrepreneurs must communicate transparently about what is being built and when it will be ready. They must set and manage expectations with integrity. Sector supporters, such as RD&E organisations and industry professionals, have a role to play in defining and amplifying industry problems. They can also build a common language between agriculture and agtech by identifying and investing in translators, or intermediaries who can facilitate engagements between agriculture and agtech participants. Sectors supporters can also reduce barriers for producers to experiment with agtech, considering time, as well as money. Finally, sector supporters must begin to embrace entrepreneurs as a new and critical stakeholder when considering initiatives and investments.

In summary, there is an opportunity to create more solutions at the intersection of do-able and desirable (see Figure 10, below). A vibrant agtech ecosystem in Australia is one in which more solutions are developed that are desired, and therefore adopted, by industry. These solutions will complement existing processes, solve meaningful problems and be delivered to industry through sustainable, trustworthy and commercial businesses.

To realise the potential benefits of agtech for Australian agriculture, the new human and financial capital moving into agtech must be harnessed and supported so that it can solve high-impact problems, create commercially viable businesses and ultimately help maintain a global competitive advantage.

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