Driving Adoption of Agrifood Technology in the Australian Wine Industry

Final Report

21th October 2019

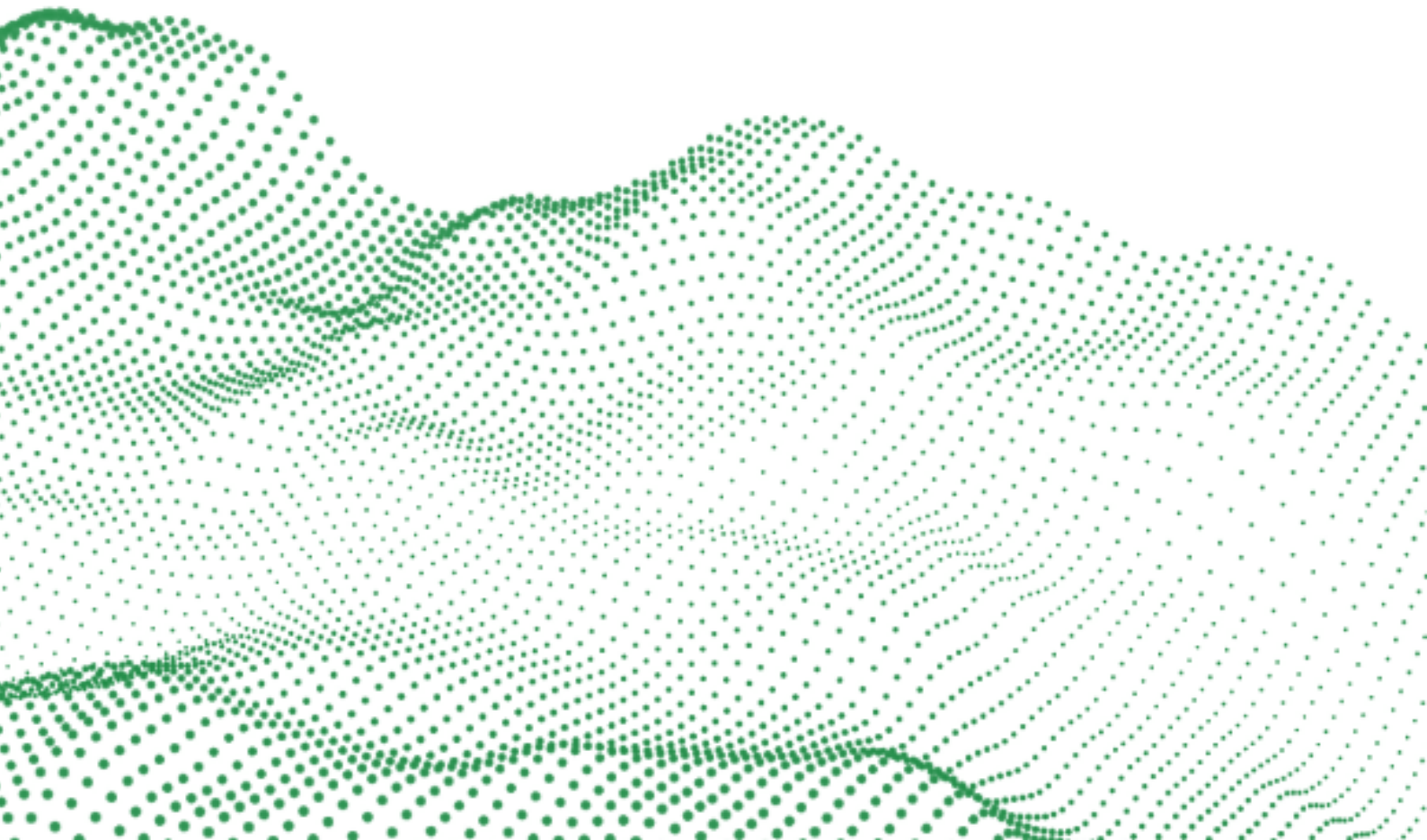


Table of Contents

ABSTRACT 3

EXECUTIVE SUMMARY 4

1 INTRODUCTION 6

1.1 Adoption barriers 6

2 METHODOLOGY 8

3 RESULTS 9

3.1 Industry challenges 9

3.2 Technology solutions 11

3.3 Industry participant segmentation 12

3.4 Adoption capability and impact 12

4 RECOMMENDATIONS 14

4.1 Common infrastructure 16

4.2 Regional Program Focus Vineyard 18

4.3 Collective Action Program 19

4.4 Competitive Clusters 20

CONCLUSION 21

TECHNOLOGY ENGAGEMENT PLAYBOOK 1

OVERVIEW 2

IMPLEMENTATION METHODOLOGY 3

2.1 Setup phase 3

2.2 Operating phase 4

2.2.1 Selecting a target group 4

2.2.2 Selecting and designing an engagement model 4

2.2.4 Designing a regional program focus vineyard 6

2.2.5 Implementing a collective action program 6

2.2.6 Implementing a competitive cluster 7

Abstract

The digitisation of grape and wine production in Australia has the potential to significantly boost the value of production in the wine industry; however, limited value from technology is currently being realised.

The purpose of this project was to identify practical, actionable ways to increase awareness of, engagement with, and adoption of agriculture and food technology (agrifood tech) solutions.

Four key recommendations were made based on findings from interviews and surveys with Australian and International wine grape industry participants and a global scan of commercially available agrifood tech.

Establishment of ***Common Infrastructure*** services were recommended to enable effective dissemination of agrifood tech information to industry and support the repeated design and implementation of three technology engagement models, including: 1) regionally located ***Focus Vineyard*** technology demonstration sites; 2) a ***Collective Action*** program to provide widespread access to technologies; and 3) ***Competitive Clusters*** to catalyse collaboration between agrifood tech companies to develop more powerful solutions for industry.

Executive Summary

The development of technology-based solutions in agriculture and food holds potential to create significant value for participants along the supply chain globally. In the Australian wine industry specifically, adoption of digital technologies alone has the potential to boost the gross value of production by $706M[1]. However, grape growers and winemakers in Australia are currently realising limited value from agriculture and food technology innovations.

This is due to an ineffient technology innovation adoption process, most commonly in cases where grape growers and winemakers have gained awareness of specific technologies, but have not progressed to evaluation. This breakdown between awareness and evaluation occurs for two main reasons: either the technology does not pass the interest phase; or the technology is not able to reach the evaluation phase.

To increase the uptake of high potential technologies, Wine Australia seeks to eliminate these key adoption barriers over the long term by introducing grape growers and winemakers to commercially available agriculture and food technology (agrifood tech) solutions in the grape and wine sector in ways that can be readily understood and easily adopted - quick wins. This forms the purpose of this project.

Research was conducted to investigate the factors affecting engagement with, and adoption of, agrifood tech in the Australian wine industry. This involved interviewing a wide range of Australian and International wine grape industry participants and experts in both viticulture and winemaking. A scan of commercially available global agrifood tech solutions in the grape and wine sector was also conducted.

Two surveys were also launched, firstly targeted at the broader wine industry and secondly for an individual Wine Australia Regional Program group. The purpose of the surveys was to help validate and refine key industry challenge areas, identify the desired attributes of agrifood tech solutions, and determine effective technology engagement models for the industry.

The results from this research fall into the following key areas:

- a set of ten key industry challenges that are common across the industry, mapped to desired technology solutions with potential to overcome them;
- a database consisting of over 200 entries of globally available agrifood tech solutions and their relative impact on industry challenges;
- the key characteristics and segmentation of grape growers and winemakers impacting on adoption; and
- Insights about the adoption capabilities and constraints of grape growers and winemakers.

Insights from this research indicate a large degree of variation in the level of concern and distribution of the identified ten key industry challenges across the Australian grape and wine industry. This variation was due to factors such as region, size and scale of operation, individual personalities, and specific technology needs and constraints.

Findings also indicated that there are more significant challenges, requiring technologies to overcome, in relation to viticulture as opposed to winemaking. Addressing viticulture challenges was therefore identified to be more likely to drive broader adoption of technologies in the Australian wine industry.

Findings from the agrifood tech scan indicated that there is no such thing as a single list of "one-size-fits-all"agrifood tech solutions that are able to solve the adoption barriers. Further, given the broad range of industry challenges and technology solutions, as well as the varied needs and constraints of individual users, a solitary demonstration site will not be effective to drive adoption.

It was also determined that there can be challenges in securing the necessary resources and skills to select, evaluate, trial and communicate results about the benefits of technology. This resource gap can be in availability and capability, and has been a contributor to the lack of adoption of agrifood tech in the past.

[1]Accelerating precision agriculture to decision agriculture: Enabling digital agriculture in Australia, Summary Report. Accelerating precision agriculture to decision agriculture project (P2D) (2017)

Based on these insights, a localised selection and filtering process is recommended to match individual region's unique challenges with participants (i.e. grower-adopters) and agrifood tech solutions. This is contrary to what was originally anticipated from this project, which was a single prioritised list of agrifood tech for implementation on a single demonstration site.

Following the filtering process, four key recommendations were made. These were identified as being the most effective at eliminating barriers to adoption, while still providing quick wins in terms of concrete adoption outcomes.

The first recommendation was that ***Common Infrastructure*** services are needed to support agrifood tech selection, trialling and information collection and sharing in the Australian Wine Industry. Once established, this Common Infrastructure, will support the repeated design and implementation of a set of technology engagement models designed to drive widespread adoption of agrifood tech in the Australian Wine Industry. These engagement models are: 1) Focus Vineyard; 2) Collective Action; and 3) Competitive Cluster.

A ***Focus Vineyard*** is a regionally based demonstration site, used to bring together selected technologies, solving pertinent local challenges in ways that are clearly communicated and provide quantitative results to drive adoption, while meeting the particular adoption needs and constraints of participants in the region. The site can be a local operating vineyard or winery established with the support of Wine Australia's existing Regional Program partners. Following the recommended selection and filtering process will ensure that the Focus Vineyard is tailored to the industry challenges that have been selected by the particular region and filtered for the adoption profiles of its target audience.

Where the results from this engagement require further development, from not being technically or commercially feasible (e.g. there were still concerns about functionality, ROI, etc.), or the Focus Vineyard engagement model is not deemed to be the most effective at increasing adoption, two additional engagement models were recommended. The first is designed to encourage collective access to technologies through ***Collective Action*** where adoption barriers still remain, particularly for smaller growers. The second is designed to encourage collaboration between agrifood tech companies and startups, by forming ***Competitive Clusters***, charged to develop more powerful solutions for industry, in situations where available solutions are not solving for identified industry challenges.

1 Introduction

Globally, the development of agriculture and food technology solutions (agrifood tech) is rapidly accelerating and is increasingly creating value for producers internationally. In the Australian grape and wine industry, however, limited value is currently being realised. Wine Australia is developing a strategy to increase the value of agrifood tech for grape and wine producers. A core element of this strategy is supporting increased awareness and adoption of existing agrifood tech solutions.

Digitisation of grape and wine production in Australia has the potential to bring significant economic, environmental and social benefits. If digital agriculture is fully implemented in Australia, this would boost the value of agricultural production, including forestry, fisheries and aquaculture, by 25% (compared to 2014-15)[2]. This is a $20.3 billion boost to the gross value of agricultural production (GVP) and an estimated $706M increase in GVP for the grape and wine sector specifically. Broadly, 'agrifood tech' here is taken to mean digitised and technologically enabled agricultural and food production, which typically involves both the collection and analysis of data to improve both on-farm and off-farm decision making, leading to better business outcomes[1].

1.1 Adoption barriers

The technology adoption process is understood to have five phases: awareness, interest, evaluation, trial, and adoption.[3] A key focus of this project is on adoption barrier cases where producers have gained awareness of specific technologies, but have not progressed to evaluation. This breakdown between awareness and evaluation occurs for two main reasons: either the technology does not pass the interest phase; or the technology is not able to reach the evaluation phase.

Barriers in each case are outlined in the table below.

Barriers to adoption where the technology does not pass the interest phase	Barriers to adoption where the technology does not reach the evaluation phase
• There is a lack (or perceived lack) of a strong value proposition, for example the technology lacks sufficient maturity. • The technology is outside of the viable price range. • There is a lack of information relevant to Australian conditions and/or buyers.	• There is a lack (or perceived lack) of availability in Australia. • There is a lack of resourcing available to evaluate and trial the technology.

Not all of these barriers are within the scope of this project. Specifically, the structural challenges and causes leading to products being interesting but not available in Australia, and the product-specific barriers of weak value propositions and cost prohibitiveness, are excluded.

THE PROJECT THEREFORE TARGETS THE FOLLOWING BARRIERS TO ADOPTION:

- Products not passing through the awareness phase;
- Products not passing the interest phase due to lack of information relevant to Australian conditions/buyers; and
- Products not reaching the evaluation phase due to lack of resourcing available to evaluate and trial the product.

[2] Accelerating precision agriculture to decision agriculture: Enabling digital agriculture in Australia, Summary Report. Accelerating precision agriculture to decision agriculture project (P2D) (2017)

[3] Rogers, Everett (16 August 2003). Diffusion of Innovations, 5th Edition

The purpose of this project was to drive broader adoption of technology in the Australian wine industry over the long term by addressing these barriers to adoption. To achieve this, a key emphasis of this project has been on identifying opportunities to introduce grape growers and winemakers to innovations in ways that can be readily understood and easily adopted - quick wins. Further, this project looked to tap into the existing knowledge of Australian producers to identify technologies that they are aware of (i.e., that are 'on their radar'), but that did not progress to evaluation or trial due to the barriers described above.

A primary objective of this project is to define a mechanism(s) to increase industry technology engagement, including a database of market-ready agrifood technology solutions, that will enable the matching of grape grower and winemaker needs to currently available technology solutions, to address key barriers to adoption, namely lack of awareness and/or information for evaluation.

The pace of change of technology always presents a challenge in terms of communication and adoption. It is difficult to keep registers of technologies up to date and people feel that the pace of change poses a risk to their ability to select appropriate innovations. It is therefore also an objective of this project to avoid the pitfalls of information overload and resistance to innovation adoption.

2 Methodology

Factors affecting engagement with, and adoption of, technology in the Australian wine industry were investigated through interviews, surveys, and a desktop scan of commercially available agrifood technology solutions in the grape and wine sector globally. This section provides more detail on the methodologies used.

During the project, approximately 30 interviews were conducted with a wide range of Australian grape growers, winemakers, consultants and contractors. Domestic experts in both viticulture and winemaking were targeted as part of the interview selection process. International interviews were also conducted with a selection of industry experts and producers from New Zealand, the USA and Portugal, including E & J Gallo in the USA.

Answers to the following key questions were sought during the interviews.

- What challenges do Australian grape growers and winemakers care about to be solved by technology?
- How do they currently look for and find new potential technologies?
- What solutions did they find? What did they adopt, and how did it perform?
- How do they evaluate these solutions?
- Are there any areas where grape growers and winemakers have looked for solutions and did not find any?
- What barriers do grape growers and winemakers face in finding, evaluating and adopting technology solutions?
- What would be helpful to industry members when considering adopting new technologies?

In addition to conducting interviews, two surveys were developed. The first, a "Wine Stakeholder Survey," was developed and distributed to Australian wine industry participants. The goal of the survey was to generate quantitative results to help validate and refine the technology priority areas and effective technology engagement models identified during this project. This survey was completed by 40 industry representatives, including grape growers, winemakers, consultants and industry experts.

A "Regional Program Group Survey" was also launched, targeted at an individual Regional Program group. The purpose of this survey was to gain an understanding of the key challenges that a particular wine growing region faces, and identify the desired attributes of technology solutions that hold potential to address the identified challenges.

Finally, a database of winemaking and grape growing agrifood tech solutions that are available globally was developed. This database is available as a supplement to this report. The technology database was populated based on findings from international and domestic interviews with industry, known providers and sources provided by Wine Australia, and a desktop scan into the key industry challenge areas that were identified as part of this project. Information sources for the desktop scan included industry news articles, magazines, reports, technology expos, technology databases, research projects, literature and international projects.

In conducting research into existing technology solution providers, the objective was two-fold:

- Identify an initial set of relevant technological solutions; and
- Identify factors about those solutions, vendors, and the ways they are applied that will inform the development of a repeatable process to help address the challenge of information redundancy.

The database consists of over 200 entries, however is by no means exhaustive as new companies are rapidly emerging, while some existing companies fail or are acquired by others.

3 Results

Results indicate that there are many interrelated barriers to adoption of agrifood tech in the Australian wine industry. Therefore, to accelerate and enable the adoption of high potential technologies, barriers must be addressed through ongoing mechanisms, rather than one-off efforts. In particular, results indicate that technologies must be made relevant in the eyes of users by linking the solutions to recognized industry challenges, and that demonstrating the practical utility of relevant innovations is critical.

More specifically, the results and insights for this project fall into four categories, each of which are described in more detail in this section.

- a set of industry challenges that are common across the industry, and associated categories of technology solutions with potential to overcome them;
- a database of globally available agrifood tech solutions, mapped to the industry challenges;
- characteristics that enable segmentation of grape growers and winemakers; and
- insights on the adoption capabilities and constraints of grape growers and winemakers.

Together, the results and insights from this project inform recommendations (section 4) that are designed to to promote widespread engagement and adoption of technologies in the Australian wine industry in an ongoing way.

3.1 Industry challenges

Ten categories of industry challenges were identified and prioritized through interviews and the Wine Stakeholder Survey[4]. For each of these "challenge areas," the types of technology solutions desired by industry were also identified and are detailed in Table 1 below. Whilst not comprehensive, these results do imply a strong awareness of industry challenges in four key areas:

- sustainability and adapting to climate challenges;
- cost-effective water and irrigation management;
- pest, disease, and weed management; and
- accurate grape yield estimation.

Table 1 Key industry challenge areas and the percent of respondents from the Wine Stakeholder Survey who rated these as a "significant challenge" (5 on a scale of 1-5).

	Industry Challenge	Rating	Solution Categories
	Sustainability & adapting to climate challenges	51%	1) Modernisation of vineyard design and plant materials to optimise yield and quality, including new genetic improvements in plant materials to maximise yield in different growing regions and provide resistance to salt, frost and heat. 2) Environmental sustainability tracking technologies such as to measure carbon-capture in vineyards
	Cost-effective water/irrigation management	45%	Technologies to accurately assess vine water status in real-time and make recommendations or automatically initiate irrigation as required from aerial remote sensing of the canopy and/or correlations with ground-based sensors or imagery.

[4] Results of survey published separatelyp

	Pest, disease and weed management	**45%**	1) Affordable precision spraying technologies. For example, real-time, accurate vine canopy and grape disease assessment technologies (e.g. powdery mildew) using aerial or ground-based imagery, to inform precision spraying activities including timing, location, and coverage of spraying. 2) Affordable, automated solutions to effectively manage and deter pests (e.g. weeds, birds).
	Accurate grape yield estimation	**41%**	Technologies that provide real-time, cost-effective and accurate crop yield estimation and mapping via remotely sourced, non-destructive minimal sampling to inform logistical decision making for vineyard management and precision viticulture. Examples include: yield monitors, sensors, imagery, and mathematical modeling.
	Monitoring and evaluation of vineyard/winery operations	**33%**	1) Automated transfer, collation, and root cause analysis of data from all precision viticulture data sources to turn data into decisions. 2) Winery intake management system using automated tools that can capture and instantly collate and analyse data from remote places, to provide real-time reporting and visibility on the location and status of machinery or equipment for the management of grape harvesting, transport and receival logistics at harvest time. 3) Commercial contract management around the commercial sensitivities between contract grape growers and contract grape buyers to improve transparency of transactions taking place in the Australian wine market.
	Accurate winegrape quality estimation	**31%**	1) Accurate grape quality estimation tools to measure and track grape quality across key points in a season to inform vineyard management practices and assess grape quality prior to delivery to the winery. 2) A standardised definition of grape quality with nutritional metrics, including the development of a grape grade quality index algorithm using grape quality field data, to generate a rating of the vineyards being harvested and recommended programs for that grape to go to based on defined metrics around style by grape product.
	Pruning affordability and accuracy	**28%**	1) Cost-effective,accurate, and automated machine pruning to eliminate the need for physical, handheld pruning. 2) Sensors and modeling/analytics to estimate vine balance metrics and tools to automate the processing of data into variable rate prescriptions for automated pruning and thinning equipment
	Optimisation of winemaking production processes	**18%**	1) Technologies to minimise waste streams and water usage 2) Alternative ways to stabilise proteins in wines (alternatives to bentonite) 3) Clearly defined metrics or a quality matrix to make winemaking wine style-specific 4) Winemaking and bottling technologies to achieve operational efficiencies by reducing downtime and automating processes while maximising wine quality

	Grape harvesting quality and efficiency	16%	Harvesting technologies to monitor and maximise grape yield and quality, while minimising material other than grape (MOG) through optical sorting
	Protecting your brand from counterfeit wine trade	8%	Technologies to assist in the verification of label claims of provenance to deter counterfeiting

Interview results indicated a large degree of variation in the level of concern and distribution of the identified industry challenges across the Australian grape and wine industry. This varied widely due to factors such as region, size and scale of operation, individual personalities, and specific technology needs and constraints.

Results from interviews and surveys also indicated that the Australian wine industry is currently facing more significant challenges in relation to viticulture than winemaking. No information was captured that directly explains this observation, but this difference may simply be due to a higher degree of technological innovation already in use in winemaking, compared to grape growing. Increasing engagement and awareness of technologies focused on addressing challenges faced in viticulture is therefore likely to lead to broader adoption of high potential technologies. It is also important to note that despite the lack of winemaking specific challenges being identified, several of the higher priority challenges directly impact wine making, and often in a more commercially meaningful way than grape growers (e.g., grape yield estimation).

3.2 Technology solutions

The scan of commercially available agrifood technology solutions for the grape and wine sector resulted in a database consisting of over 200 entries. The database is available as a supplement to this report.

Analysis of the technology solutions in the database indicated that there is no suitable objective method for prioritising a single list of technologies in an absolute sense (i.e., for the Australian wine industry to utilise on a solitary demonstration site). This was due to the large degree of variation in the ability of commercially available agrifood tech solutions to address particular challenges and to meet the needs and constraints of individual users.

Instead, the database was designed to enable users to easily search, filter, and update the list of technologies over time. This was achieved by:

- Providing a scheme for categorizing technology in the database;
- Developing a process for creating and maintaining an up to date database of technology solutions over time in conformance with the established categories; and
- Designing the database to be utilised in a larger set of processes that rank and filter relevant technologies for use in a specific intervention or engagement.

Each entry in the database includes the following information:

1. Name, description, country of origin and links to relevant websites and information sources;
2. Mapping to the key industry challenge area(s) that each technology addresses (Refer to Table 1);
3. An assessment, or rating, of the technology's potential to achieve impact for the industry, based on the degree to which the technology solves for the specified challenge(s); and
4. A rating of the estimated level of technology maturity.

The database consists of over 200 entries, however is by no means exhaustive. This is because one of the biggest challenges with applying technological innovation to agriculture is managing the impact of the increasing pace of change. Technological advancements are constant, and the set of vendors offering solutions is in constant flux. These factors often combine to create significant barriers to any effort to catalogue solutions, as the work required to stay current can be daunting.

To mitigate against the risk of the database falling out of date, the database structure is designed to enable filtering, selection and prioritisation of technologies within the context of a project that is targeting a particular set of industry challenges, while remaining sensitive to the adoption profiles of the industry participants who are the subject of the project. Further, guidance for the use and maintenance of the database over time is provided in the "Technology Engagement Playbook" in the Appendix.

3.3 Industry participant segmentation

Results indicate that certain characteristics of industry participants correlate with their likelihood to engage with technology. Understanding and factoring these characteristics into the design of technology engagement models, is therefore key to their success.

Analysis of the interview and survey results generated several insights into key characteristics of industry participants that have an impact on their likelihood to engage with technology, including:

- The size of the winery and whether or not winemaking is done internally or contracted out;
- The region in which the vineyard or winery is located (e.g. warm inland regions or cool/temperate coastal regions); and
- The size of the vineyard (e.g. small or large grape grower[5]).

Results demonstrated that there is a large degree of variation in these characteristics from region to region and business to business, and subsequently a high degree of complexity involved with defining and correlating adoption factors of industry participants in the respective segment. Rather than devise an absolute approach, the conclusion was to recognize specific variables of a participant, either at the individual or organisational level, and then reflect that variable in the design of an effective technology engagement model.

In particular, results indicate that the following variables are important to consider when designing a technology engagement model:

- The degree to which the specific key industry challenge resonates;
- Access to, and scale of, capital available to support the adoption of innovation; and
- The range of technical skills and capabilities within the organisation.

Rating these variables (e.g. on a scale of 1-5) as part of the technology selection and filtering process will enable Wine Australia to match the specific challenges within a region to relevant technologies, as well as help to ensure that the technology engagement model delivers results that are relevant to the local context and have high potential to significantly improve technology adoption.

3.4 Adoption capability and impact

Analysis of the interview and survey results generated several insights about the adoption capabilities of grape growers and winemakers and the potential effectiveness of technology engagement models

For example, grape growers are more likely to reach the adoption phase when they can be certain that the technology in question will suit their specific region and individual constraints. To reach the necessary level of certainty, local evaluation and trialing of technologies needs to take place, with consideration given to the region's specific challenges and individual grower's unique adoption constraints.

Adoption is also more likely to occur when the results from the local evaluation and trialing of technologies are clearly communicated in an engaging manner, with quantitative results provided about the benefits, costs, and limitations of the technology.

A shortage of necessary resources available to locally evaluate, trial and communicate results about the benefits of technology, and a lack of consideration given to individual regions constraints in the past, has been a significant contributor to this breakdown between awareness and evaluation of new technologies. Solving for this will be a key aspect of engagement models that drive long tem adoption of technologies in the future.

Results also indicate that there can be a wide range of 'acceptable solutions' to the same challenge, depending on the producer or winemaker in question. This means that there is no such thing as a "one-size-fits-all" solution. Results indicated that growers and

[5] less/more than 500 tonnes of fruit/year

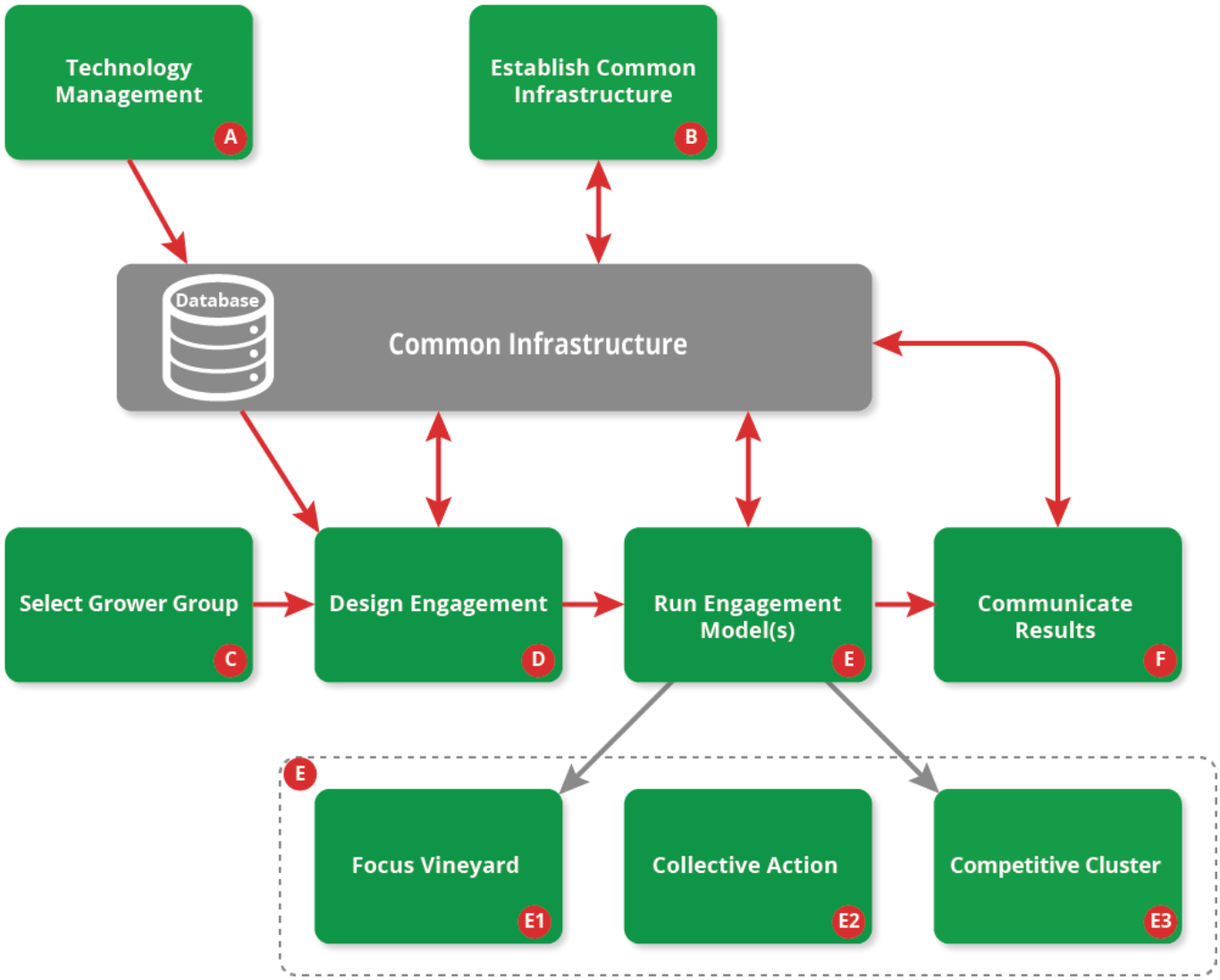
winemakers with the same challenge would often accept or refuse the same solution, depending on their particular budget, business model, or other individual preferences or constraints.

These differences were evident when comparing small capital-constrained operators to much larger operators who were relatively unconstrained, as well as between technology and commercially sophisticated producers compared to more risk-averse or less technologically-advanced producers. For example, for a small grower who contracted out their pruning, a half-million dollar autonomous pruning machine, while perhaps well-suited to the task, would not be an appropriate solution due to budget constraints.

In summary, these insights indicate that a localised selection and filtering process to match the specific challenges within a region to both participant's capability levels and relevant technologies is required, rather than a single prioritised list of technologies and a single demonstration site.

4 Recommendations

The results of this project indicate that to achieve meaningful increases in rates of technology adoption for the Australian wine industry, raising awareness of available technology solutions is not sufficient. Currently, growers are aware of technologies, including how they work and the associated benefits; however, simply being aware of solutions that could add value does not drive growers to adopt them. Instead, interventions - or engagement models- to increase adoption need to both support growers to move from awareness of relevant solutions to action, as well as address real and/or perceived commercial barriers to adoption.



The results of this research indicate that local, relevant demonstrations of effective solutions will help to drive adoption. Growers want to see technologies being used in similar conditions, as well as observe how data are collected, the required practice changes, and the ROI that can be achieved. Trials are relevant because they focus on familiar industry challenges that are faced by the target audience, and showcase high potential solutions. Trialling only technologies that match the adoption capabilities of the target audience in the region further increases the likelihood of adoption.

Based on these insights, there are four key recommendations: first, the establishment of ***Common Infrastructure*** that serves to support and enable adoption across the industry; and second, ongoing design and implementation of three technology engagement models- ***Focus Vineyards, Collective Action, and Competitive Clusters.***

Common Infrastructure services are needed to support agrifood tech selection, trialling, and information collection and sharing across the Australian wine industry. These services will assist with the agrifood tech selection and matching process and help ensure that: project goals are quantified and results are measured; project results are clearly and professionally communicated; and project outcomes remain accessible well after the project has been completed.

Once established, the Common Infrastructure will support the repeated design and implementation of a set of technology engagement models that are designed to drive widespread adoption of agrifood tech in the Australian wine industry. These engagement models are: 1) Focus Vineyards; 2) Collective Action; and 3) Competitive Clusters.

A ***Focus Vineyard*** is a regionally based demonstration site, used to bring together selected technologies with potential to solve pertinent local challenges while meeting the particular adoption needs and constraints of participants in the region. A key aspect of this engagement model is providing and clearly communicating quantitative results on the performance of the technology. The site can be a local operating vineyard or winery established with the support of Wine Australia's existing Regional Program partners.

In cases where a technology is not ready for commercial, mainstream use (e.g., because it did not demonstrate a return, lacked features or functionality, or because it required more mature adoption capabilities), one of two additional recommended engagement models may be required to provide a pathway to adoption. These two models, detailed below, are called ***Collective Action*** **and** ***Competitive Clusters***.

The first, ***Collective Action,*** is designed to encourage at-scale (i.e., "collective") access to technologies where adoption barriers still remain, particularly for smaller growers. The second, ***Competitive Clusters,*** is designed to encourage collaboration between agrifood tech companies and startups by incentivizing them to develop more powerful solutions for industry, in situations where available solutions are not solving for identified industry challenges.

Taken together, the recommendations operate in two phases: maintenance of the common infrastructure, including the technology database, and the repeated design and implementation of engagement models. The diagram below shows an overview of the key elements and their relationships.

Each of the recommendations is described further in the subsections below, and a step-by-step Technology Engagement Playbook is included in the Appendix to guide the implementation of these recommendations.

4.1 Common infrastructure

To drive broad adoption, wine industry participants need to see specific and well-delivered information. Capturing, managing, and disseminating information is time-consuming work and requires special skills, such as managing technical project data and utilising modern media and/or communications best practices. Regional groups often lack adequate resources to do work of this kind. It is therefore recommended that Wine Australia establish a common set of resources that will be available to all projects focused on agrifood tech adoption. Such resources could be implemented through a centralised service (i.e., within Wine Australia), and staffed by dedicated resources with domain-specific expertise in three key areas:

- Technology familiarity, to manage and maintain the agrifood tech database and assist in matching technologies to projects;
- Trial project experience, to support the design and implementation of engagement model projects, as well as set out, collect and manage the resulting project data; and
- Marketing and communications skills, to disseminate scientific/quantitative results from projects as well as case study information in engaging and modern ways.

Each of the core areas of responsibility within the Common Infrastructure are explained below, including example implementations where relevant.

> "Access to a tech database would be very helpful, categorised by problems, because things are new and it is difficult to know where the best place is to look. Help with the tech selection process other than from the tech company trying to sell it would also be beneficial and give confidence"
>
> ***- Langhorne Creek Grape & Wine Inc***

4.1.1 Technology database management

As described above, the technology database is not a static resource, as technology improves and changes constantly. The database must therefore be updated and analysed over time as new products and vendors arise or disappear. The collection and analysis process will take many different sources of information into consideration. This should result in a database that covers innovations available on an international basis, but suitable for Australian operation. Each item in the database must also be further analysed to assess the impact it can have on the key industry challenges. The analysis will also take the cost profile and relative complexity of the technology into consideration.

Further, to make the database an effective source of solutions that can be deployed in an engagement model project, the information also needs to be analysed after it is collected. This analysis task should be undertaken periodically, and focussed on making the list comprehensive as well as fit for the needs of the subsequent stages of an engagement model project. For example, each entry must be searchable and filterable by impact and association to industry challenges, as well as cost and complexity of implementation.

4.1.2 Project measurement & metrics support

Wide adoption is most likely when project results show specific, measured improvements in farm and/or business operations. To ensure that each engagement model project delivers results of this kind, the setup and operation need careful thought on what will be measured and how information will be stored and displayed. Doing so requires specific expertise that is unlikely to be found within Regional Program groups. Further, as this expertise will be required in all engagement model projects, it can be centralised and shared across them. Centralising this expertise, for example within Wine Australia as a dedicated resource, will lower the overall cost of project operation and increase effectiveness of the projects by ensuring information

is meaningful, as well as captured in a flexible, durable system where results can be used for comparison and further analysis well after project completion.

4.1.2.1 Example implementation

No direct example implementations of a similar nature have been identified. However, the use of the Appticon Pairtree[6] system in the MLA Carwoola Red Meat[7] trial serves a similar purpose. The system collects large amounts of internet of things (IoT) data from a wide range of different vendor's devices, and stores the data in one place for project stakeholders to review.

4.1.3 Project communications support

Results indicate that local demonstrations of relevant solutions helps to drive adoption. Further, results indicate that engaging stakeholders who many not attend the project site directly is also critical.

The modern world is full of information, and there is considerable skill required to design and deliver communications that will attract the increasingly scarce attention of growers. The research results are also clear that this effort is needed as interview and survey participants confirm a strong desire to receive timely, concise, and actionable information from innovation trials.

Unfortunately, Regional Program groups are not equipped with the required communication skills and resources. Investment in shared resources that will directly support projects with the design, development and publication of targeted and engaging content based on project progress and results is therefore recommended.

In addition to keeping stakeholders engaged during the progress of the demonstrations and/or trials, this shared service will also ensure that detailed material on the progress and results from these continue to be available for discovery well after project completion.

4.1.4 Example implementation

Much inspiration for this recommendation has been drawn from an international project called Efficient Vineyard[8]. The project has made extensive use of many different forms of communications to engage growers in project progress and outcomes. These include short videos, podcasts, and social media engagement.

6 http://appticon.com.au/pairtree/
7 Agri 4.0 - Connectivity at our fingertips, 2019, Case Study - Darren Price, page 21, https://home.kpmg/au/en/home/insights/2019/05/agri-4-0-connectivity-digital-innovation-australian-farming.html
8 https://efficientvineyard.com/

4.2 Regional Program Focus Vineyard

The Focus Vineyard is the first and most important of the three recommended engagement models that build upon and utilise the Common Infrastructure described above. As the cornerstone recommendation, the Focus Vineyard is intended to demonstrate practical, relevant innovations in a regional setting in a way that is well matched to the innovation adoption profile of the target audience.

4.2.1 Regional setting

Interview subjects and survey respondents expressed a strong preference for local demonstrations as the mechanism to receive detailed information about potential innovations to adopt. Findings from the research also indicated a strong tendency for some industry participants to not want to leave their respective regions to engage with new technologies. The Australian wine industry is already well set up to provide regional Focus Vineyards through its Regional Program[9]. By leveraging these existing regional groups, the Focus Vineyards will have the direct support and sponsorship of established networks with regional connectivity and focus.

4.2.2 Relevant innovations

The Focus Vineyards will be made relevant to regional groups by selecting one or two key industry challenges that are relevant to that region as the subject of the demonstration/trial. A combination of a survey and a workshop is used to identify, from the technology database, industry challenges and the specific set of technologies that will be tested during the project.

4.2.3 Incentive design

An important feature of the design phase for each Focus Vineyard project will be on incentive design. As the primary purpose of these projects is to catalyse wide-scale adoption, it is important that the design takes into account how that adoption will be achieved. For example, it would not be sufficient to select technology into the demonstration/trial that could only be afforded when taking additional project budget into consideration. Match funding and other forms of cost sharing, as well as the design of down-stream adoption activities, must be taken into consideration to ensure that the project's results are highly likely to result in adoption of the demonstrated innovations.

4.2.4 Example implementation

The term "Focus vineyard" has been based on the SA Central Regional Program Focus Vineyard series which utilised benchmarking data from the Sustainable Winegrowing Australia program to showcase best practices in the region.

The Integrated Vineyard Precision Control System Pilot Project[10] is also an example of a Focus Vineyard. The long term ambition of this project is to create a digital vineyard guidance system that is designed to facilitate cost-of-production-savings for Riverland growers.

> "The SA Centrals Program, Focus Vineyard Series uses data collected from the Sustainable Australia Winegrowing Program (SAW) - Which has now evolved to be Sustainable Winegrowing Australia (SWA). This data helps identify gaps in knowledge as well as top performing vineyards to inform topics, presenters and host vineyards for the activity. In the 2017 – 18 growing season 72% of McLaren Vales winegrapes were grown on vineyards which used the SAW program to assess and improve practice's"
>
> - ***Mclaren Vale Grape Wine and Tourism Association***

9 https://www.wineaustralia.com/research/regional-programs
10 Integrated Vineyard Precision Control System Pilot Project

4.3 Collective Action Program

When seeking to address adoption inhibitors that are commercial in nature (e.g., when prices are too high for some prospective users), it is important not to use government or industry funds to address what may be an inherent market failure or mis-matching of existing commercial service offerings. There are cases, however, where the commercial impediment is only transient in nature, and once removed, would unlock access to existing, high value commercial services and/or products. The Collective Action Program, the second recommended engagement model, provides direct support for a group of stakeholders to help them overcome transient commercial barriers to adoption.

The program would operate in a similar fashion to existing grant funding programs, and would require specific commercial justification (i.e., an application process). Successful applications would receive funding in the form of direct contributions to project costs. It is recommended that careful consideration is given to incentive design, including requirements for cost sharing and other forms of matched funding to demonstrate that applicants have 'skin in the game'.

Though this engagement model may apply directly to growers, it is recommended that consideration also be given to funding intermediaries. For example, findings from the research indicate that advisors and contract buyers are well suited to encourage small growers to adopt new technologies. Some advisors in the industry are already providing subscription based access to new technologies and support to assist with adoption.

Smaller contract growers are also known to have benefited in the past from having larger wineries in the region who share information with their contract growers.

Collective Action Programs must therefore also consider participation by intermediaries such as advisors and contract buyers.

4.3.1 Example implementation

An example of a Collective Action Program would be for a regional group of small, contract growers to form a cooperative that sought to attract funding for, install, and operate a LoRAWan network. This collectively owned asset would then enable individual growers to operate small-scale, low-cost sensor networks on their own vineyards that would allow them to access innovations relating to water use efficiency and effective grape yield and quality control solutions. Without the collectively created backbone, it is unlikely that the small growers could individually afford the density of IoT deployment needed to make meaningful vineyard management changes.

"We provide soil moisture probes to clients on a subscription per year basis and we help maintain them for the growers. It helps us provide a better service to our clients because we can help with irrigation advice. If we didn't offer this service for our small to medium growers, it's likely they wouldn't have bought them due to the large upfront cost"

- DJ's Growers Services

"Growers can benefit from having larger and corporate vineyards in their region. Research or trials often happen at the corporate sites (due to resource capability) and there is a flow on effect across the industry."

- Langhorne Creek Grape & Wine Inc

4.4 Competitive Clusters

Adoption can also be held back by a lack of integration between systems or because of a lack of features missing from otherwise suitable solutions. The final recommended engagement model, Competitive Clusters, is designed to address these situations.

To be clear, Competitive Clusters are not intended to compensate for a failure of existing commercial service provision. Instead, a Competitive Cluster is a process to encourage a level of collaboration between existing vendors to undertake a one-time piece of work to create a new set of features that address an unmet need.

The recommended process for implementing a Competitive Cluster occurs across three phases:

1. Establish the overall objective of the cluster, including detailed specifications of the deliverables and a clear definition of the ongoing ownership and operating responsibilities;
2. Undertake a competitive, open application process where existing vendors, individually or in partnership, would submit responses detailing the costs and benefit of their recommended approach; and finally
3. Award a project, and associated resources, to the selected cluster for execution and ongoing operation.

While Collective Action projects target growers, this engagement model is designed to get existing vendors directly involved in removing adoption constraints. The fact that the results of the cluster are owned and operated by the cluster addresses a common project failure condition where results are not owned by any specific entity, and tend to fall into disuse.

4.4.1 Example implementation

This engagement model was inspired by INNO'VIN[11], a unique structure in Bordeaux, France that brings together a cluster of wine industry businesses to support them to respond to the challenges of the industry with innovation projects.

Frustrations among grape growers and wineries over technologies failing to solve problems as well as they would like, or failing to integrate with one another to provide meaningful data for decision making purposes, were observed throughout the project research.

Existing startups and agrifood tech companies also expressed an interest in collaborating with one another to better solve industry challenges and strengthen the value propositions of their existing solutions for their customers.

11 https://innovin.fr/index.php/en/the-cluster/les-missions-en

Conclusion

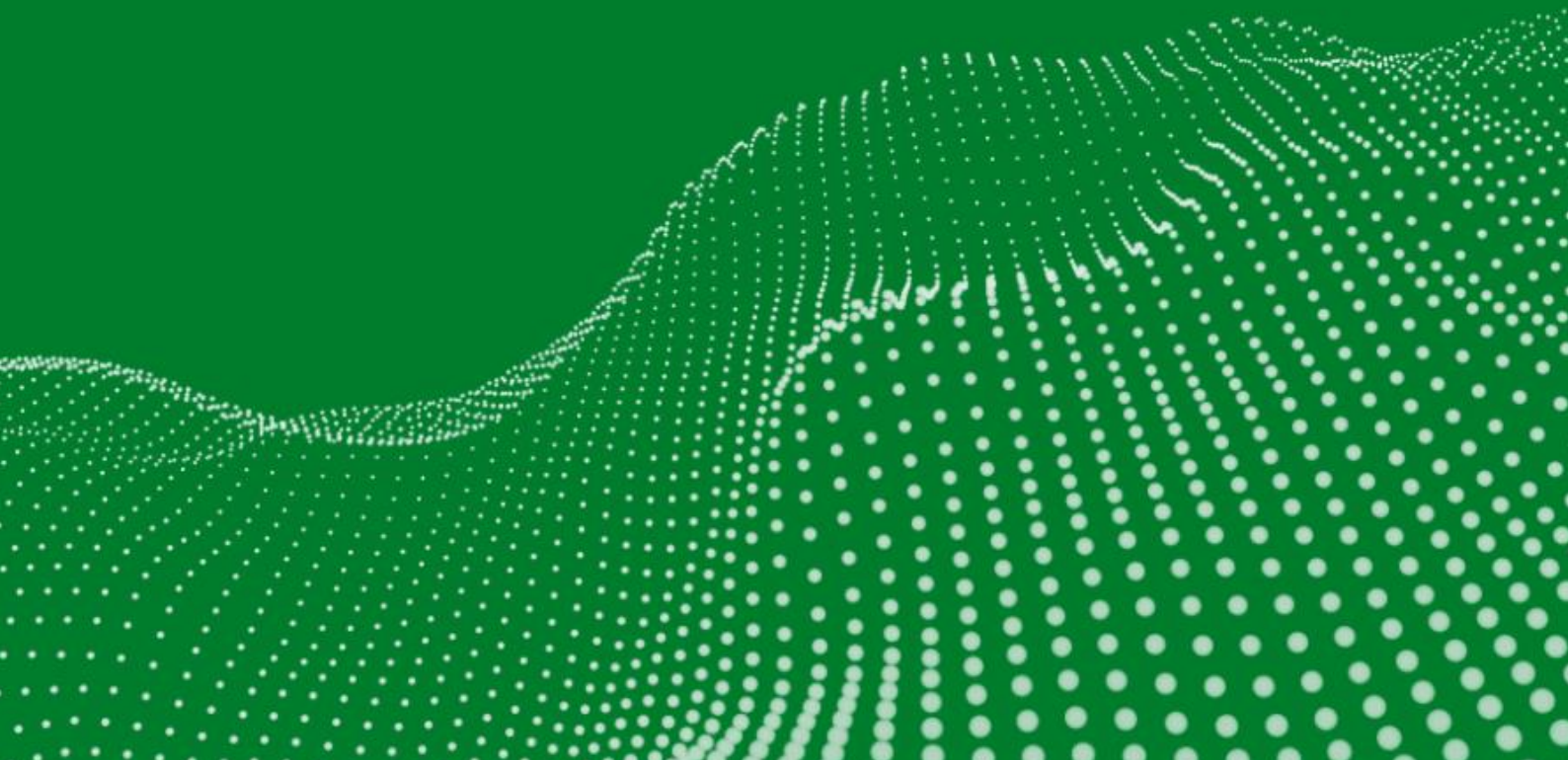
The primary objective of this project was to identify opportunities to introduce grape growers and winemakers to agrifood tech solutions in ways that can be readily understood and easily adopted - quick wins.

Findings from this project indicated that there is no such thing as a single list of “one-size-fits-all”agrifood tech solutions that are able to meet the needs of industry, nor is there a single engagement model with the potential to solve the adoption barriers present in the industry. In particular, given the broad range of industry challenges and technology solutions, as well as the varied needs and constraints of individual users, a solitary demonstration site will not be effective to drive adoption.

Based on the results and insights from this project, a localised selection and filtering process is recommended to match individual region’s unique challenges with participants and agrifood tech solutions, for implementation within one of three recommended engagement models. These recommendations have been designed to overcome barriers to adoption in the industry, while still providing quick wins in terms of concrete adoption outcomes in the near term by leveraging existing programs and structures.

To support the implementation of these recommendations, a detailed, step-by-step “Technology Engagement Playbook” is included in the Appendix.

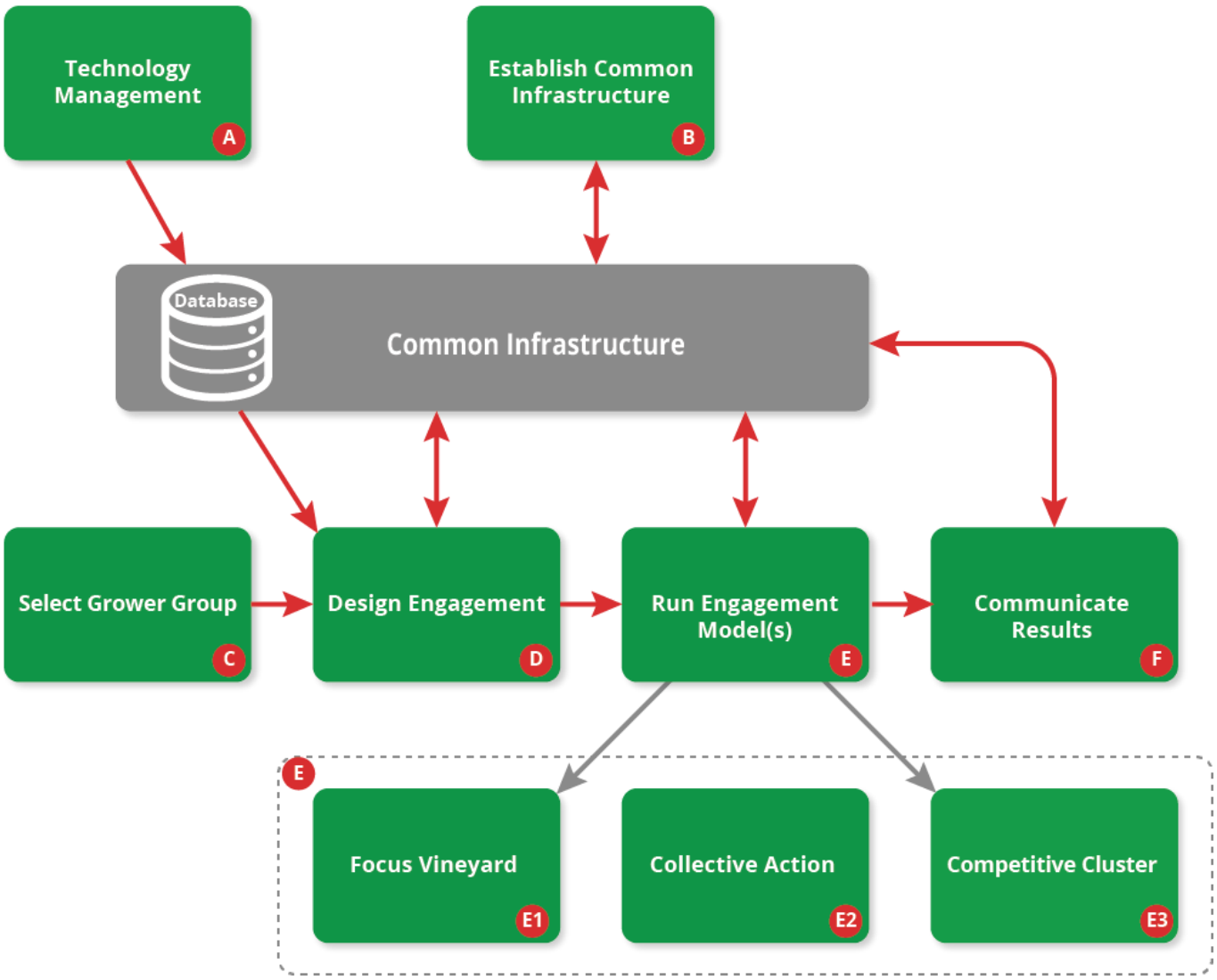
Technology Engagement Playbook



Overview

This section outlines a step-by-step methodology that Wine Australia can follow to implement the recommendations described in this report and ultimately drive widespread adoption of agrifood technologies in the Australian wine industry. This playbook assumes knowledge of the report and recommendations.

An overview of the core activities is shown below:



Implementation Methodology

2.1 Setup phase

2.1.1 Establish common infrastructure

It is recommended that Wine Australia either develops new and/or increases its support for existing common infrastructure services, to assist with the execution of the recommended engagement models.

It is recommended that the following steps be taken:

Appoint a community technology manager

The purpose of the community technology manager is to provide support to all of the Regional Program partners to execute the recommended technology engagement models.

The following ongoing tasks are to be performed by the Community Technology Manager:

1. Manage and maintain a centralised database of commercially available global agrifood tech solutions for the wine industry by:
    a. Performing a quarterly desktop scan into the ten key industry challenge areas identified by this project, covering information sources including but not limited to:
        i. Internet search engines (e.g. Google)
        ii. Technology databases (e.g. AgTech Finder)
        iii. Industry news articles, magazines, and reports
        iv. Exhibitor lists at technology and industry expos
        v. Relevant research projects
        vi. Academic literature
        vii. Relevant reports from international projects (e.g. Efficient Vineyard)
    b. Updating the database based on continuing discussions with industry members, both domestic and international, including grape growers, winemakers, contractors and experts about any new technologies being used or trialled. Also, add any new technology providers who may directly approach Wine Australia to conduct a project.
    c. When adding technology to the database, each entry must include the following information:
        i. Name, description, country of origin and links to relevant websites and information sources;
        ii. Categorised according to the key industry challenge area(s) each technology addresses as defined by this project (Refer to Table 1);
        iii. Rated according to an assessment of the technologies capability to achieve impact for the industry, based on the degree to which the technology solves for the specified challenge(s); and
        iv. Rated according to the estimated level of technology maturity (technology readiness to adopt).
        v. Rated according the the capital intensity of implementing the technology
2. Update the set of 10 key industry challenge areas as required (Refer to Table 1) based on continuing discussions with industry members. For example by asking about:
    a. What challenges do Australian grape growers and winemakers care about to be solved by technology?
    b. Are there any areas where grape growers and winemakers have looked for solutions and did not find any?
    c. What kinds of technology solutions to they need to solve for the identified challenges?
3. Support the education of Regional Program partners and members about the benefits of running Focus Vineyards, Collective Action projects, and Competitive Cluster Programs in their region. Identify and support training opportunities to assist local implementation of the engagement models.
4. Support the Regional Program partners in prioritising and selecting technologies from the database to trial or demonstrate on Focus Vineyards. This can be done by sorting the database for:
    a. the specific challenges the growing regions wants to solve with the technology;
    b. the capability of the technology to solve for the identified challenges;
    c. the readiness of the technology to be adopted; and
    d. an assessment of the ability for the technology to fit in with any other adoption sensitivities or identified constraints for its target participants from the growing region.
5. Provide advice and support to the Regional Program partners in conducting the trials or demonstrations on the Focus Vineyards, including support on collecting data from the trials.
6. Recognise opportunities for either the Collective Action or Competitive Cluster engagement models to be implemented, to either increase engagement by smaller growers or to develop new technologies to solve problems yet to be solved by existing technologies.

7. Encourage collaboration on technology trials or demonstrations between Regional Program partners to leverage synergies and share learnings and ideas between regions. Part of this support could include championing regular communications (e.g. "Zoom" meetings) between Regional Program partners.
8. Recognise opportunities and provide support for broader industry Focus Vineyard tours, industry symposiums, industry roadshows, or workshops to encourage industry participants from different growing regions to visit and learn from other regions on occasion.
9. Provide data management and analysis support by providing centralised data management, analysis, and reporting support for technology trials or benchmarking exercises undertaken by Regional Program partners or other industry projects where the learnings generated benefit the wider industry.

Appoint project communications and information management support
This would require either forming a dedicated team internally or hiring a 3rd party media team to capture insights and publish educational communications materials from the technology engagement models.

The purpose of the project communications and information management support service is to provide and maintain a centralized knowledge management and educational repository ("a single source of truth") for the industry on commercially available global agrifood tech solutions in the grape and wine sector. This will enable more effective dissemination of information and provide much needed additional support to Australian wine industry members in relation to commercially available technologies available to solve challenges faced by the industry.

The following tasks are to be performed by the communications and information management service provider:

1. Develop a centralised industry website or portal to provide grape growers and winemakers with the information they need to implement technology solutions in their own businesses. Including:
    a. Access to the Technology Database and an ability to suggest updates
    b. Guidance on how to choose and implement agrifood tech solutions
    c. Results from trials or demonstrations undertaken on Focus Vineyards
    d. Information and results from any other projects of relevance (e.g. The Integrated Vineyard Precision Control System Pilot)
2. Examples of the format of published information could include, but is not limited to: webinars, videos, reports, user manuals, and benchmarking reports on different technology solutions.
3. Communicate the ROI of adopting technologies to growers or winemakers, including the pro's and con's of adopting the technology, in all communications material based on data and information provided by the community technology manager.

This shared services example has been inspired by the USA-based Efficient Vineyard project. Examples of media support provided in that project included technology demonstration videos, monthly training webinars, technology implementation manuals, case studies and project progress reports.

2.2 Operating phase

Once the common infrastructure services described above have been established, commence supporting the Regional Program partners in implementing the recommended technology engagement models by doing the following.

2.2.1 Selecting a target group

The following steps are to be performed by the Community Technology Manager:

1. Approach 1 of the eleven Regional Program groups by contacting the primary contacts or program partners from each group to gauge interest in participating in a technology engagement model project.
2. Where Regional Program groups are not interested in participating, share the project communications and information management system (e.g. website or portal) and provide training about the benefits of participating in the program.

2.2.2 Selecting and designing an engagement model

The following steps are to be performed by the Community Technology Manager:

1. Survey the committee of the selected Regional Program group or representatives from the region to gain an understanding of the key challenge(s) faced in that particular wine growing region and the desired attributes of technology solutions to solve for the identified challenge(s). This surveying process could include either:
    a. using the Regional Program Group Survey provided as a supplement to this report;
    b. discussing and voting on the priority challenge areas and desired attributes of agrifood tech solutions at the committee meeting or similar; or
    c. a combination of both of these approaches depending on the preferences of the Regional Program representatives in question.
2. Filter the Technology Database based on the results from the above surveying process by doing the following:
    a. Searching for and filtering for the selected key industry challenge area(s) using the categories provided in the database
    b. Filtering for the required capability of the technology to achieve impact for the industry, based on the degree to which the technology solves for the specified challenge(s) (e.g. Low, Medium or High);
    c. Filter for the estimated level of technology maturity (technology readiness to adopt) (e.g. Low, Medium or High);
    d. Filter based on an assessment of the cost of the filtered technologies, to ensure they are within the budget range required by the region;
    e. Refine the resulting list as required based on a preliminary assessment of the provided shortlist.
3. Once a shortlist of agrifood technology solutions has been selected:
    a. Share the shortlist of technologies with the Regional Program group for their preliminary input
    b. Provide advice on the shortlist of technologies, refine or modify the list of selected technologies as required based on preliminary feedback
    c. Conduct a workshop or conference call with the Regional Program group committee or selected representatives from the region, to better understand the needs and constraints of the region from the selected technology, in order to maximise the success of the project. Preference should be given to doing this step in person rather than remotely and in a central and local location for the growers.

        The objectives of this step include to:

        i. present high level information on the technology engagement model options available to the growers (as outlined in this Final Report) including information on the common infrastructure support available.
        ii. a deep dive discussion into what has and hasn't worked so far in the region at solving the identified challenges and why? The purpose of this discussion is to gain more detail of the desired features of a suitable technology and engagement model for that technology. Where possible ask workshop participants to provide examples of technologies that have and haven't worked and the reasons why.
        iii. a discussion on ideas for future project(s) based on what was discussed. E.g. would a focus vineyard, collective action or competitive cluster combined with the support of common infrastructure help get your specific project idea off the ground?
        iv. a discussion on what does a successful project look like? Including:
            1. What data/information is needed from a technology trial or project for it to be a success at helping with the identified challenges?
            2. Examples of desired outcomes, specific approaches to help achieve them, ranked by impact and implementation complexity.
        v. If applicable, seek feedback from the key stakeholders of the region about the suitability of the selected technologies to solve its recognised challenges in-line with its identified adoption constraints and individual preferences. Refine and filter the technology list as required based on feedback obtained
        vi. Pick the most suitable engagement model(s) as defined by this project and the best technologies that will solve an adoption constraint for the region long term i.e. not just because it's low cost for the vineyard owner
        vii. Gain confidence that the selected engagement model(s) and selected technology will achieve a permanent adoption outcomes for the industry by either:
            1. Solving for a knowledge issue;
            2. Solving for a one-time commercial issue; or
            3. Create something that technology vendors haven't yet created themselves that is desired by industry to solve specific challenges
4. Select the most effective engagement model(s) to and technology solution(s) to demonstrate or develop to drive permanent adoption outcomes for the industry.

Note: it may be necessary to conduct the workshop and/or conference call with the Regional Program group committee or selected representatives from the region, prior to the process of filtering and selecting a shortlist of technologies. This will depend on the level detailed information obtained regarding the desired technologies and challenges to overcome. E.g. conduct steps 3(c) prior to step 2 and 3(a) and 3(b).

2.2.4 Designing a regional program focus vineyard

If a Focus Vineyard is selected to be the most effective technology engagement model to maximise adoption, the following steps should be followed in order to action this engagement model.

The following steps are to be performed by the Community Technology Manager:

1. Approach the identified Regional Program target group primary contact that have been identified to benefit from a Focus Vineyard
2. If applicable, support the education of Regional Program partners and its members about the benefits of running Focus Vineyards in their region. Identify and support training to assist as required
3. Allow the Regional Program committee or primary contacts to select the final specific technologies from the provided final list to be trialled or demonstrated at a Focus Vineyard in the region
4. Allow the Regional Program committee or primary contacts to select where they will hold the Focus Vineyard in the region
5. Where the Regional Program partners or Focus Vineyard host require additional funding to support the project, encourage them to seek funding support (e.g. submit a grant application) from Wine Australia or local government if required to help implement the Focus Vineyard at the selected location
6. Where possible, support the Regional Program Focus Vineyard organisers to collaborate with other projects from other regions and partner with other relevant industry associations (e.g. local government, research groups) or interested sponsors of the event to increase exposure and encourage further collaboration and support within the region
7. Support the Regional Program Focus Vineyard organisers to set-up the Focus Vineyard demonstration or trial, including support with promoting the project
8. Support the collection and collation of data and information from trials or demonstrations conducted on the Focus Vineyards with a particular focus on data demonstrating commercial outcomes from the project
9. Perform data analysis on the collected data, and provide reporting, communications and information management support for the Focus Vineyard to the Project Communications and Information Management Support provider
10. Review the results of the Focus Vineyard and identify the need for one or more of either Collective Action or Competitive Cluster engagement models to be implemented based on an assessment of results from the Focus Vineyard including feedback from participants.
    a. Where results from the Focus Vineyard technology trials and/or demonstrations show strong potential to solve challenges for industry, however adoption is still constrained, particularly for small contract growers, due to the cost or complexity of the technology, select the Collective Action engagement model.
    b. Where results from the Focus Vineyard technology trials and/or demonstrations show that the identified technology solutions still fail to meet the needs and solve for the particular challenges of the industry, select the Competitive Cluster engagement model.

The following steps are to be performed by the Project Communications and Information Management Support team:

1. Once the data analysis results on the collected data have been received along with any other relevant information from the Focus Vineyard from the Community Technology Manager, commence the steps detailed above at 2.1.1 (2. Appoint Project Communications and Information Management Support).

2.2.5 Implementing a collective action program

The following steps are to be performed by the Community Technology Manager with the assistance of Wine Australia.

The primary goal of collective action is to remove a temporary impediment to adoption of an otherwise viable solution to a challenge experienced by a cohesive group of stakeholders. A defining characterstic of an appropriate opportunity will be that some economy of scale, available to the group, will provide the means to overcome an adoption impediment. These would often take the form of jointly owned infrastructure or the ground combinng together to absorb an initial outlay that is beyond the means of individucls within the group.

If a Collective Action technology engagement model has been selected to implement, the following steps should be followed in order to action this engagement model:

1. Investigate opportunities for advisors or contract buyers to provide collective access to technologies for smaller contract growers.

2. Investigate with the Regional Program group committee and/or selected representatives from the region their willingness to implement their own collective action project. E.g. a LoRaWan network for their area.
3. If applicable, review incentives for advisors and/or contract buyers to undertake one-time activities that enable smaller contract growers to act collectively to lower innovation adoption barriers, examples of support/incentives could include:
    a. Support/fund initial costs for infrastructure purchases
    b. Support/fund administrative costs for collective buying activity: specification, quoting, negotiating etc.
    c. Support/fund grower training/extension to use advisor or contract grower owner and operated infrastructure
4. Approach and present the opportunity to a representative selection of local large wineries (contract buyers) and/or larger advisors in the wine growing region where the Focus Vineyard was held.
3. Support the implementation of this initiative as required (e.g. support education and/or training as required and spread awareness to small growers in the region).

Results from this engagement model are to be published and promoted by the Project Communications and Information Management Support team as required and deemed appropriate at the discretion of Wine Australia.

2.2.6 Implementing a competitive cluster

The following steps are to be performed by the Community Technology Manager with the assistance of Wine Australia.

Where a competitive cluster is deemed to be the most appropriate technology engagement model and/or the results of the Focus Vineyard highlighted the need for a project to develop new technology or integration of technologies to solve a particular problem for the Australian wine industry, follow the following steps to initiate collaboration between existing agrifood tech companies and startups.

1. Call to action on and funding for interested agrifood tech companies and startups in the relevant field to come together and collaborate at a central location to solve a specified problem. Specifically this step would involve:
    a. Developing a shortlist of suitable startups and/or technology companies to solve the identified problem
    b. Approach the shortlist of startups and technology companies to gauge interest.
    c. Prepare and share a project brief outlining the problem and desired solution to be provided to the shortlisted solution providers.
        i. The project brief and associated specifications should clearly state the metrics that will be used to demonstrate successful delivery of the intended solution and clearly outline adoption success factors such as IP ownership and outcomes access.
    d. Provide funding for the startups and technology companies to come together for a workshop to solve for the identified problem.
        i. Consideration would be given to the style of project award structure including RFI, RFQ and competitive biidding.
    e. Support the startups and technology companies with trialling their developed solutions.
    f. Support the assessment of the developed solutions and coordinate the provision of feedback back to the developers for inforporation into the solution.
    g. Repeat these steps as required until a final solution has been developed and proven to solve for the identified challenge(s).
2. Where applicable, provide funding support for the development of:
    a. application programming interface (API) integration points: and
    b. commercialization of data sharing or collaboration systems.

Results from this engagement model are to be published and promoted by the Project Communications and Information Management Support team as required and deemed appropriate at the discretion of Wine Australia.

Contacts

Address
401/10 West Promenade
Manly, NSW 2095

Authors
Georgia Pugh, Matthew Pryor, Sarah Nolet

Contact
hello@agthentic.com
https://agthentic.com
@agthentic