Evaluating the Potential of VineAccess to Improve Supply Chain Efficiency in Australian Viticulture and Perennial Horticulture

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Efficiency is….

> "a condition in which, given the state of technology and information costs, the market has the lowest production and transaction costs attainable." Douglass C. North (2005), p15

Abstract

Several years ago some leading winemakers in the Australian wine industry became alert to the need for a more efficient information and communication system to aid management of their supply chains in the sourcing of wine grapes and the satisfaction of retail requirements. Pressures for change included the increasing competitiveness of the international market, reflected in concentrating industry supply chains, and increasing food safety compliance requirements.

An innovative and integrated information and communication system, VineAccess, was developed in South Australia for Australian and international wineries in response to these pressures. Part of the evaluation of VineAccess included a survey of some of Australia's leading wineries about the production and transaction cost savings in the 2004-05 vintage following adoption of the system. Winemakers indicated that the ICT-based system led to substantial savings compared to the traditional system of transacting business between winemakers and winegrape growers in the Australian wine industry as well as satisfying food safety requirements more efficiently. A benefit:cost ratio of 7.3, imputed from the survey, extrapolates to about $4 million per annum for the Australian industry. The potential for the existing modules in VineAccess to evolve and dovetail with other ICT systems in the chain suggests that the imputed benefits may be quickly eclipsed when considered in the whole-of-chain context of global competitors in an international market.

The paper concludes with a preliminary observation about the potential for development and application of VineAccess by other names in in other perennial horticulture industries. The embedding of ICT into wine and agri-food supply chains is also a promising source for intelligence about chain performance and international competitiveness for industry organizations and governments.

1. Introduction

This paper is an exploration of the potential of ICT (information and communication technology) to improve agri-food industry competitiveness via supply chain efficiency and the generation of intelligence to aid policy-makers and industry leaders in their decision-making. The feasibility of a system principally designed to improve efficiency for private businesses collaborating in supply chains and also being of public policy benefit appears to fit well with the perspective that supply chains, being the drive units of industry competitiveness, should be the focus (Dunne, 2001).

Several years ago, one of us (Blacketer) identified the Australian wine industry as ripe for development and implementation of computer software that would improve the efficiency of wine industry supply chains. That idea has culminated in an information and communication system called *VineAccess*, a product of Morton Blacketer Pty Ltd. The paper includes an outline of *VineAccess*, which is being embedded into Australia's wine supply chains to comply with an array of biosecurity requirements in various countries and to improve chain efficiency.

One module in the *VineAccess* system is a web-based market for winegrapes, first trialled in 2004/05. Estimates by participants of the commercial value of the VineAccess electronic spot market module are presented as an example of the economic benefits of adoption of the system on an industry-wide basis.

Meanwhile, the other author (Ronan) has been investigating the feasibility of an information system that integrates economic, environmental and social indicators, enabling provision of policy-friendly reporting in a standard template about the international competitiveness of Australian agri-food industries (Ronan and Taylor, 2003; Ronan and Taylor 2004; Ronan, Sinnadurai and Taylor (2005).[1] In the changing scope of service in government departments like PIRSA, the need for a different style of analysis and reporting systems has emerged; a system oriented to 'whole-of-chain' intelligence and the identification of impediments to international competitiveness in Australian agri-food.

Recent reports by PIRSA about crises in the wine grape and citrus industries give some insight to the need by industry and government for industry intelligence, 'whole of chain' analysis and integrated reporting (SA Government, 2005a; SA Government 2005b; SA Government, 2005c). Ronan, Sinnadurai and Taylor (2005) have acknowledged that the lead Australian agency in this field, ABARE (Australian Bureau of Agricultural and Resource Economics), is the longest-running and most reliable source of Australian agricultural industry analysis, including farm economic surveys. However, ABARE agricultural databases are strong on farm business production and performance, without similar extension along supply chains through processing to retail.

Another important source of competitiveness analysis and economic reporting in the agri-food sector is the Productivity Commission (PC), which typically inquires into the nature of industry crises and possible remedies. Examples in recent years include reports on the pig and pigmeat industries and the citrus industry. PC inquiries, and hence reports, are valuable for their integration of intelligence from many sources along supply chains. However, they are typically triggered by a crisis and therefore irregular and not oriented to routine reporting of the sector's competitiveness.

While it is unlikely that there will be a single reporting system in the agri-food sector that will satisfy the needs of all, there have been some expressions of interest by industry leaders and policy makers that they are looking for routine intelligence in a standard system tailored to their needs. This interest is reflected in some recent initiatives that synthesise areas of complex information: ABARE's *Stocktake* project, launched with the Corish review of rural policy at Outlook 2005, provides industry economic snapshots (DAFF, 2005), while the BRS (Bureau of Rural Sciences) *Signposts* is an ecological sustainable development reporting system (ABARE 2005).

Recognising that the private sector is an increasingly important source of information about agri-business, Ronan, Sinnadurai and Taylor (2005) have suggested that a system which could integrate enterprise performance and supply chain information from both the public and private sector may be the key to achieving the type of industry competitiveness analyses sought by some policy-makers. Consultation by Ronan and Taylor with various government and industry people found interest in the concept, with some concern that it may overlap work in other intelligence integrating projects such as BRS's *Signposts* and ABARE's *Stocktake*.[2]

PIRSA research into winegrape business performance and industry benchmarking (Ronan and Coelho, 2005) brought Ronan into contact with co-authors Blacketer and Sterenberg.

The paper has several purposes. Firstly, to gain insight into the scope and workings of *VineAccess* as a case study in development and implementation of a software system to reduce supply chain and industry transaction costs.

Secondly, the paper considers the feasibility of adapting this type of system to other agricultural and horticultural industries that compete internationally.

Finally, the paper discusses the potential for a system like VineAccess to contribute to a reporting system for industry leaders and policy-makers that could regularly inform them about issues in major supply chains and industry competitiveness.

2. VineAccess: a spatial, vineyard management, web portal

When Blacketer looked at the Australian wine industry several years ago he saw:

- an inefficient and costly information and communication system;
- some of Australia's leading wine companies managing complex information about thousands of blocks of vines in spreadsheets;
- a variety of incompatible systems;
- growers without good information systems;
- lack of agreed information requirements and formats across the industry;
- lack of use of modern IT communication methods;
- multiple re-keying of information and
- non- searchable information stores.

VineAccess was developed to overcome these problems by implementing 'world best' ICT in the Australian wine industry. The economic subtext has been to further improve the economic efficiency and international competitiveness of the supply chains that drive the industry.

With increasing pressure on margins, there has been global consolidation of players in the wine industry. This trend is mirrored in the Australian market, with currency fluctuations and a sudden fall in wine export sales - focusing attention towards cost savings. In addition, there is increasing pressure from customers to consistently produce grapes to specification.[3] Making viticulture operations more efficient and effective is a matter of perennial interest, with extra contemporary imperative.

Despite having an international reputation for innovation in wine making and production[4], much inefficiency remains in the Australian wine industry. Most of Australia's winemakers currently use spreadsheets to track the activities of 7000 growers. Manually collating this information means that forecasting can often take weeks and coordinating harvest activities is just as laborious. It costs large wineries anywhere from $700,000 to $2 million a year to manage their grape procurement process – there's a lot of money to be saved!

Spreadsheets are also commonly used by grower associations, which manually update vineyard data and grape availability through surveys and phone calls to their grower membership.

VineAccess uses leading edge software to cut the cost and guesswork out of viticulture management. As a web-based system, wineries can use VineAccess from anywhere to communicate, plan and manage their grape intake. The internet provides a low cost way to service large numbers of customers the world over. VineAccess can become the industry standard in viticulture logistics management, saving the wine industry millions of dollars in production efficiencies.

2.1 VineAccess concept and development

In August 2003, Morton Blacketer saw a market need for better viticulture management and consulted with the top 30 wineries[5] to understand and devise a solution to their mutual problems. With the engagement of these players, Morton Blacketer were granted $187,000 by AusIndustry Research and Development for the development of VineAccess software.

Some of the best known names in the Australian wine industry joined the VineAccess Development Panel to help direct development, including Southcorp, Taylors Wines, two of Australia's largest growers, FABAL and Kirribilly Vineyard Management, and the CSIRO. Based on their feedback, additional modules have been developed, including HACCP certification, with precision farming, environmental management, industry statistics collection and industry benchmarking under way.

In 2004, Morton Blacketer was presented with the winning certificate in the Business/Industrial (Software) Solutions category of the Secrets of IT Innovation Competition 2004 for VineAccess – winning $10,000 funding from Austrade.

During 2005, the Federal Government granted a consortium of industry players a $200,000 grant to enhance and develop tools on the VineAccess web portal to make HACCP compliance easy. The grant was awarded under the ITOL Program (Information Technology Online), provided through the Minister for Communications, Information Technology and the Arts. Working with Morton Blacketer, are Hardy Wine Company, McGuigan Simeon Wines, Orlando Wyndham, Fosters Wine Estates, Riverland Winegrape Growers and Murray Valley Winegrape Growers Inc. Collectively, this group represents more than 60% of the Australian, national crush.

2.2 What is VineAccess?

VineAccess is a web-based, viticulture management system that uses the Internet to facilitate vineyard supply chain and logistics management. By addressing the needs of each market player (winery, grower, and harvester, crusher and carrier contractors), VineAccess enables optimisation of grape and contractor resources, allowing information to be shared throughout the distribution channel and lowering operational costs. By using VineAccess:

1. Wineries are able to consolidate timely information from all blocks contributing to wine production, reducing the cost of data collection and facilitating production planning, forecasting and activity scheduling. The system is particularly advantageous to wineries in the systematic collection of spray diary and forecasting information from contracted growers. Wineries are able to quickly locate additional grape resources to specification via the online spot market and elect to share vintage statistics with industry organisations.

2. Growers are able to use viticulture management tools to forecast, plan activities and manage their vineyard. Grower use of precision farming tools (in VineAccess) can improve viticulture management. Any efficiency gains in identification, measurement, analysis and management of performance variability in their vineyards can help to optimise yield, attain consistency in crop quality and lower operational costs. Growers can respond to winery harvest scheduling bookings online and elect to share vintage statistics with industry organisations, reducing paperwork associated with annual reporting requirements. The online spot market provides a valuable marketing tool to promote and sell uncontracted/excess grapes.
3. Harvester, crusher and carrier contractors can publish equipment schedules, enabling clients to plan harvest requirements and book online, reducing administrative overheads.
4. Industry organisations can tap into the system to add to their existing data or sources or replace them to satisfy their need for industry statistics and forecasts. Wineries and growers can tag selected information to be automatically released to registered industry organisations - without the need to complete annual surveys. Industry organisations can then release aggregate figures, providing up-to-date insights of regional vintage statistics. These may include rolling demand and supply forecasts, harvest peak demand periods and actual harvest statistics. This type of information will be beneficial for local, regional and national planning, trouble shooting and in allocation of, for example, harvest resources during periods of peak demand.

VineAccess is part of the new generation of web-based services, enabling automated sharing of real-time information between the VineAccess database and other winery systems.

2.3 Modules

A staged product release and aggressive pricing were devised to support early adoption of VineAccess. Both strategies aimed to quickly gain a high market share, increase barriers to entry for competitors and make customer-switching costs high.

The system is based on the following modules:

- 1.Viticulture management and grower communications (current)
  - Security and authentication to allow differential access to data and system capabilities provided
  - Core of the vineyard management system to record, hold and report on operational data
  - Data sharing to enable exchange of information between wineries, growers and vineyard contractors
- 2.Vintage scheduling and spot market (current)
  - Identification and selection of grapes for crushing, including coordination of vintage scheduling activities between winery, growers and vineyard contractors
  - Spot market to assist in marketing and sales of uncontracted grapes, with an in-built, competitive bidding system, to enable the best price possible to be achieved for growers. The spot market will publish uncontracted grapes and provide a search facility to enable buyers to find grapes to suit their requirements.
- 3.HACCP (Hazard Analysis and Critical Control Points) certification (current)
  - Provide recording and reporting tools for growers to report HACCP certification requirements to wineries with whom they have contracts. This will enable growers and wineries to fulfil compliance obligations with European Union and other international food safety regulations.
- 4.Industry organisation (current)
  - Allow growers and wineries to provide authority for industry organisations to access and use operational data
  - Provide aggregated reporting tools for local, regional and national vintage, current and planned plantings, demand and supply forecasting and actual harvest statistics.
- 5.Precision farming and spatial imagery subscription (planned)
  - A subscription system will enable the cost of satellite or aerial imagery to be shared
  - Represent vineyard operational data and spatial information in a map format. Enable visualization and reporting of geospatial relationships
- 6.Industry benchmarking (planned)
  - By pooling information from each subscriber, data sets can be aggregated for benchmarking and performance measurement. Eg: cost of production in total, broken down by region, ownership type, variety
- 7.Environment management (planned)
  - Assist in the analysis and planning of the vineyard in terms of drainage, soil erosion and salinity control
- 8.Asset management (planned)
  - Linking spatial and aspatial data to assist with vineyard development and design, scheduling maintenance and asset valuation

2.4 The market research behind VineAccess

Morton Blacketer undertook market research on a number of levels to identify the need for VineAccess (a spatial, vineyard management, web portal) to identify the commercial potential and understand the current and future state of the market. This included:

- Interviews with 26 of Australia's top 32 wineries and vineyard management companies.
  - Companies were selected according to total area of vines under management, total crush and total sales of branded wine[6].
  - Representatives included viticulturists, growers, operations managers, winemakers and financial managers.
  - Research identified existing vineyard management systems and shortcomings, spatial projects undertaken, problems with data collection, storage and analysis.
- Literature search
- Interviews with key industry organisations including Winemaker's Federation of Australian, SA Wine, Grape and Wine Research and Development Corporation, Provisor Pty Ltd, Phylloxera and Grape Board of SA, River Murray Catchment Board.
- Interviews and literature search of industry suppliers, including Apogee International and Sinclair Knight Merz (providers of satellite imagery and spatial information system designers), Aerometrex (suppliers of aerial photography) and other imagery providers, KEE Technologies (precision agriculture providers) and viticulture consultants.

From this research, Morton Blacketer found that:

- Vineyard/wine companies have common goals for the use of technology.
  - Most vineyards are managed homogeneously, although there is actually a large amount of variability within blocks.
  - This can be identified through analysing the relationships between operational/viticulture data and their effect on yield and quality.
  - To improve the operational performance of company owned and contracted vineyards through use of spatial technology.
  - To increase the return on investment in vineyard assets.
  - To improve access and reporting capabilities of data collected.
- Vineyard/wine companies have conducted different, spatial projects.
  - Each company has a view on how to improve their performance using spatial technology.
  - There are a number of projects under way, across the companies that have a significant overlap of development effort.
- Recognition of common problems by vineyard/wine.
  - Valuable information is locked up in vineyard management data, which could be unlocked using spatial technology.
- Current vineyard management systems are inadequate
  - The majority of wineries interviewed are recording vineyard information in spreadsheets
  - Compiling and reporting on this information is inefficient
  - Grower information is expensive and difficult to collect (in terms of labour, travel to regional areas and time) and there is limited access to real time information.

Information in provided in paper format or in conversation.

- Vineyard/wineries have limited experience in commissioning custom software development for use in the vineyard
  - Scared of investment in new technology development
  - Comfortable purchasing new software from a prototype/demonstration model
  - Smaller companies want one of the top five wineries to take the lead and would then be happy to follow suit
  - Support from industry organisations is important to provide credibility, longevity and penetration.
- Australia is a world leader in precision agriculture in broadacre applications[7].
  - The wine industry has been slow to adopt these techniques in daily, vineyard management
- Wineries hold the power in the value chain over growers.
  - Technology push can be achieved through demonstrating savings and benefits of improved raw materials management to wineries
- The ability to track quality from grape to bottle is becoming increasingly important due to legislative and HACCP (Hazard Analysis and Critical Control Points) requirements – both in Australia and internationally.

Morton Blacketer concluded that a number of common issues needed to be addressed:

  - 1.Each company knows that there are potentially valuable relationships in their data, both spatial and aspatial.
    - Each company knows they can probably manage grape production better if they could unlock the relationships within their data.
    - There is currently no systematic method for extracting and exploring these relationships.
    - To explore these relationships would require significant research effort, requiring a combination of highly specialised skills and resources to develop a user friendly application.
  - 2.The cost of aerial photography, satellite imagery and remote sensing is a significant inhibitor to exploring widespread use of spatial technology. This is particularly true where imagery is required for multiple wine regions.
  - 3.Building a Spatial Vineyard Management Portal will require a fusion of a variety of specialist skills. These include:
    - Viticulture
    - Vineyard operations management
    - Spatial or GIS technology
    - Remote sensing
    - Systems analysis and design
    - Database design and development
    - Software development
    - Manipulation of information technology infrastructure.
  - 4.Building a Spatial Vineyard Management Portal will impact on in-house systems, including workflow and business processes.
    - Each wine company has its own management system for their vineyards. However, none adequately addresses the significant spatial component of their data.
    - Any system implemented will need to interface with in-house systems.
  - 5.Every company has company owned vineyards and contracted vineyards. Any system developed needs to:
    - Address both ownership models
    - Make appropriate information available to both parties.

Upon this understanding, Morton Blacketer developed a proposal to develop a Spatial Vineyard Management Portal (SVMP – now called VineAccess) and presented it to 26 wineries and vineyard managers, receiving positive feedback from over 60 percent. Additional research was undertaken to demonstrate the economic benefit of the investment for wineries.

2.5 Preliminary technical investigations, prior work and notable innovations

Morton Blacketer consulted widely within the wine industry to examine the use (particularly the effective use) of spatial technology to assist in management of viticulture operations. They also examined the availability of effective vineyard management systems. Their findings were:

- A significant number of wine companies have experimented with spatial technology
- Most have undertaken one, or a number, of projects that were conducted as an additional task to viticulturists normal duties.
- The projects achieved some good results, and showed that the technology has promise for vineyard management.
- There is already a significant amount of spatial data created and / or captured, but no effective systems available to use this data, particularly not in an integrated manner.
- They were not able to move to the next step and integrate spatial technology into their day-to-day operational management because of the complexity of the task, the breadth of skills required to achieve it, the cost and perceived risk of the project.
- There are very few effective vineyard management systems, with most companies managing their vineyard operations using a combination of paper records, Access databases and Excel spreadsheets
- There are no vineyard management systems that combine spatial technology and the ability to manage company owned and contracted vineyards.

The conclusions drawn from this prior work allowed Morton Blacketer to propose the SVMP which will provide the following innovations:

- The ability for independent growers to effectively manage vineyard operational and financial data at low cost.
- The ability to effectively share portions of that information with interested parties, whilst only maintaining one data set.
- The ability for wineries to cost effectively collate all of the information required to effectively schedule harvest and crushing activities at vintage, across both company owned and contracted grapes
- The ability to identify and measure variability in vineyard performance using spatial techniques such as NDVI, yield mapping and soil profiling, as part of everyday business practice, rather than as a special project.
- The ability to use spatial techniques to manage the variability in vineyard performance such that yields may be improved, quality may be enhanced or costs reduced, as part of every day business practice, rather than as a special project.
- The ability to disseminate spatial technology tools and data widely and at low cost, in an easy to use tool.
- The ability to integrate with existing tools such as FarmScan data capture and precision agriculture tools, soil moisture monitoring equipment and weather data on a routine basis and to be able to capture that data for effective reuse.

2.6 Benefits

The features that differentiate VineAccess include:

- Web delivery
- Data sharing along industry value chain
- Spatially enabled database
- Spatial technology capabilities and analysis tools.

By using VineAccess, wineries can consolidate timely information from all blocks contributing to wine production, reducing the cost of data collection and facilitating production planning, forecasting and activity scheduling.

Growers can implement precision farming to improve crop management. They will be able to identify, measure, analyse and manage performance variability in their vineyards to help maximise yield, attain consistent crop quality and lower operational costs. They can also sell additional tonnage online via the spot market and fulfil contract and HACCP reporting obligations.

Harvester and crusher contractors can take bookings online, reducing administrative overheads.

Industry organisations can easily collect, analyse and report on aggregated local, regional and/or national industry statistics. They can use this information to supply rolling demand and supply forecasts by region by variety, harvest peak demand forecasts by region and the reporting of actual harvest information by region and variety to improve industry planning and resource allocation

Additional benefits include the ability to:

- Identify relationships between viticulture practices and grape quality through visualisation
- Measure these factors and enable quantifiable decisions
- Benchmark performance against collective subscribers
- Measure impact of changes in management on grape outcomes
- Combine vineyard data from company owned and contracted vineyards, enabling more effective scheduling of harvest and crushing activities and quality/harvest metrics.
- Lower the cost of data collection and analysis
- Improve data accuracy and timeliness
- Enable operational data and imagery/infra red technology to be visualised to correlate principal components of grape quality with the sensorial quality of wine.
- Facilitate better transmission of market signals for quality, style and price specifications to grape growers and other supply chain partners
- Create automated compliance reporting for industry stakeholders eg: Phylloxera returns
- Visualise and record environmental impact and influences on both vineyard design and operations by mapping runoff, watercourses, irrigation, topography and nearby, urban development. It is envisaged that this will assist in planning and development, improved water management, minimised soil erosion and, for example, ensure irrigation system design takes into account natural drainage of terrain.

VineAccess achieves cost advantages through:

    - 1.Hosting
        - No specialist software installation
        - Reduced cost of client set up, service and support
    - 2.Client data sharing
        - Reduced administrative overheads
    - 3.Imagery subscription
        - Outright purchase expensive eg: Coonawarra $8000 satellite, $135,000 aerial.
    - 4,Spatial analysis tools.
        - No outright purchase of specialist software licenses
        - No requirement for IT staff with specialist training in geographic information systems.

By providing the tools to measure, manage and benchmark environmental performance VineAccess supports government legislation relating to:

- Environment protection policy on water quality
- River Murray Bill and sustainability of water resources
- Pesticide Code of Practice
- Natural resource management.

2.7 Transaction Cost Savings of VineAccess

A survey of several wine companies yielded best estimates about the cost of administrative operations prior to VineAccess and the savings after installation of VineAccess for a synthesised supply wine chain involving 500 winegrape growers (Table 2).

The data indicates transaction cost savings in the supply chain from grower to winery in excess of $300,000 per annum.

3. Other Potential Benefits

VineAccess has the potential to be applied to a range of other perennial horticulture, which would extend the benefits of embedding ICT systems in agribusiness supply chains, adding considerably to the direct benefits of VineAccess indicated in this paper for the wine industry.

The launch by Morton Blacketer in late January 2006 of access to selected data within VineAccess to registered industry associations and government agencies is the beginning of a new stream of benefits from VineAccess. While there are a number of sources of wine industry data, none are based on embedded ICT. To the extent that wineries adopt VineAccess and industry organisations subscribe to the intelligence that can be derived from the system, then VineAccess will become more valuable as a source of industry intelligence for government and others.

4. Conclusions

1. The adoption of VineAccess in Australia's wine supply chains is based on the efficiency gains that attach to a superior system of information and communication management. An indication of the benefits of the system are obtained from the field research reported in the paper, which condenses to a benefit to cost ratio of 7 for a mid to large scale winery. The system has application for wineries, and their supply chain partners, of any scale in Australia or overseas.
2. VineAccess is a template with considerable potential for adaptation to other perennial horticulture supply chains in Australia and overseas and adoption in those industries with potential benefits of a similar order to those indicated for wine. These will be particularly forthcoming to industries where food safety and specific crop details are required and/or periodically requested, by end use supply chain partners.
3. The recent launching of the VineAccess system to industry organisations and governments opens up an additional area of potential benefits, where the new source of intelligence has added to existing sources and may be able to replace some of them. Further proving of the private and public benefits of VineAccess and related systems will be synergistic in the sense that the public benefits will be more valuable as private adoption extends. Supply chain information systems of this type have considerable potential to better service the demand for up-to-date intelligence about the drivers of and impediments to the international competitiveness of Australia's agri-food industries.

Attachment 1: A More Detailed Outline of Vine Access

A lot of information needs to be shared, back and forth, along the viticulture supply chain between growers, wineries, crushing contractors, harvesters and carriers. Providing ready access to information between these players is essential to the quality and integrity of the end product and its international competitiveness. VineAccess was created to enable the players to record and provide ready access to the information.

VineAccess is a web-based, information and communication technology (ICT) system utilising innovative software to cut the cost of information sharing in viticulture management and winemaking. The philosophy of *"enter data once to be used by many"* has driven the development of VineAccess to comprise a comprehensive range of information tools, or modules, to aid efficient communication between winegrape growers and their winemaker. The system has been created in partnership with leading wineries and grower organisations as an outcome of private and public investment.

VineAccess is unique; there is no ICT system for wine supply chains in Australia or other wine producing countries. The innovativeness of VineAccess was recognised in the securing of an AusIndustry research and development grant in 2004. A Development Panel of industry experts was established to direct development and ensure that VineAccess truly reflected industry needs. Participants included Southcorp Wines, Taylors Wines, FABAL and Kirribilly Viticulture. The Panel also received support from CSIRO, Tandou and Kingston Estate Wines.

VineAccess goes beyond traditional disparate vineyard management systems. It provides an ICT solution which includes the following modules:

1. Vineyard management
2. Harvest scheduling
3. Grape spot market
4. HACCP
5. Viticulture supply chain communications
6. Industry organisation
7. Environment management
8. Corporate system integration (avoiding double-entry within the one company)
9. Data sharing between approved parties

These modules are linked to a central database, with security options for selection by the client (Figure 1).

Figure 1: The VineAccess Information and Communication Technology System

Features and benefits

Vineyard management

VineAccess records vineyard, block and fruit details, as well as vineyard management activity costs. Block management plans can be devised and translated into activity schedules, and specific tasks can be allocated to selected workers. Sampling and test results can be uploaded, or entered individually, and shared with block owners.

As the growing season progresses, forecasting tools enable production estimates for each block. Growers can elect to share their estimate with winery customers, reducing duplication of effort for both parties. Wineries can consolidate contracted grower, spot and company owned vineyard forecasts to estimate their whole grape intake.

Viticulture information is collected, stored and made available through **VineAccess**. Combined with company reporting functions to compile, dissect, calculate and flag relevant information, management is quickly and easily provided with the information needed to plan and act.

Information sharing

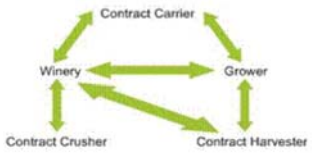

Figure 2: Two-way Information flows in Viticulture-Winery supply

As a web based system, VineAccess supports effective management of vineyard information and eases the exchange of information back and forth along the viticulture supply chain. It can be used anywhere to communicate, plan and manage vineyard, grape and contract resources. The cost of data collection is reduced, while accuracy and timeliness is improved.

VineAccess web, email and SMS communication and information sharing tools provide specific benefits for each viticulture supply chain partner.

1. Growers

A single grower can exchange information with contracted wineries and potential spot market buyers. This can include block details, forecasts, spray diaries, and sample and test results at no charge to the grower. Growers can also respond to winery harvest scheduling bookings online and elect to share vintage statistics with industry organisations, reducing paperwork associated with annual reporting requirements.

2. Wineries

VineAccess enables wineries to oversee their whole grape intake, enabling consolidation of information from company owned, contracted, annual contract and spot grapes. Timely information from all blocks contributing to wine production means more effective forecasting, production planning, scheduling of harvest and crushing activities, and accurate harvest metrics. For grape purchasing, the online spot market lets wineries quickly locate additional grape resources. Wineries can also elect to share vintage statistics with industry organisations.

3. Harvester, Carrier and Crusher Contractors

Contract Harvesters, Carriers and Crushers can display their booking calendar online, facilitating client communications and reducing administrative costs. Clients can review availability and book requirements.

4. Industry Organisation

Industry Organisations can be provided with the authority to reuse existing grower and winery data to for aggregate statistics. Using data that is continually updated for operational purposes, combined with **VineAccess** reporting tools, improves accuracy and reduces survey running costs - data collection, collation and reporting.

Free grower spray diaries

The VineAccess spray diary has help tools to make recording vineyard sprays and treatments easier. A searchable chemical database contains recommended label rates, concentration factors and withholding periods, flagging 'at risk' applications. Growers can set parameters to share spray diaries with contracted wineries and/or Spot Market buyers.

HACCP (Hazard Analysis Critical Control Point) reporting

VineAccess HACCP reporting helps viticulture partners reduce the cost of compliance. Growers can record and manage their HACCP reporting online, fulfilling the requirements of each winery they grow for. Wineries can monitor HACCP exceptions in their supply chain in a timely and cost effective manner and auditors can undertake online auditing and certification for both wineries and growers. A comprehensive database of agrochemicals enables automated monitoring and exception reporting of agrochemical use.

Food safety and export compliance

The major wine purchasers in Australia's principal export markets are demanding increasingly stringent quality assurance, food safety and environmental standards. This has led the major wine companies in Australia to extend their own quality, food safety and environmental standards systems further back into their viticulture supply chain. Excellent record keeping systems are becoming paramount.

A consortium of wine industry players, including Hardy Wine Company, McGuigan Simeon Wines, Orlando Wyndham, Fosters Wine Estates, Winemakers Federation of Australia, Riverland Winegrape Growers, Murray Valley Winegrape Growers Inc and CCW, are working with Morton Blacketer to enhance the VineAccess tools to make compliance easy. Together, the consortium has applied to the ITOL (Information Technology Online) program for funding. The funding (up to $200,000) is provided on a 50/50 basis, with the Federal Government matching the contribution of consortium members.

The resulting tools will reduce the cost of compliance for each user group. Growers will be able to record and manage their HACCP reporting online, fulfilling the requirements of each winery they grow for. Wineries will be able to monitor HACCP exceptions in their supply chain in a timely and cost effective manner. HACCP auditors will be able to undertake online auditing and certification for both wineries and growers.

A comprehensive database of agrochemicals will enable automated monitoring and exception reporting of agrochemical use.

Spot Market

The VineAccess spot market provides an online marketplace for excess and uncontracted grape sales. It is a valuable marketing tool for growers to list their produce, while enabling buyers to search for grapes to meet specification - by region, variety and a range of quality parameters. In the background, it draws grape and vineyard information from the VineAccess vineyard management system to enable growers to share selected information (such as chemical usage, harvest dates etc) with buyers automatically.

Launched in December 2004, the VineAccess Spot Market quickly grew to list a total of 30,000 tonnes available for sale throughout the 2005 vintage. Growers registered from every major wine growing region, from Tasmania to Western Australia, enabling buyers to search the database to easily locate grapes required to specification.

Web delivery

As a hosted solution, VineAccess does not require installation of specialist software. Users simply open their web browser and log on via a website. This makes the system infinitely scalable, without impacting in-house, IT resources. VineAccess uses Web Services to integrate with current winery and back office systems.

SMS

VineAccess will soon release SMS messaging to enable communications by both email and mobile phone between viticulture supply chain partners. If harvest scheduling is modified at short notice, growers will receive an SMS from the winery almost instantaneously. SMS will also communicate Spot Market bids and expressions of interest, along with forecast and spray diary update requests.

Security

VineAccess user security is enforced with username and password protection. Users within the same company can be set up to have differential access - from simply viewing information to full editing, planning and reporting capabilities. System security is available using either a Secure Socket Layer (SSL, 128 bit encryption), for increased security, or an unencrypted option for faster page download.

Registration

VineAccess is available via subscription by registering online. Registration types are categorised to cater for different user requirements. Attachment 1 shows the features available to subscribers.

Hardy Wine Company implements VineAccess

The Hardy Wine Company is implementing VineAccess to manage grower spray diaries for the 2006 vintage. VineAccess tools will enable Hardy's to easily assess spray diaries through exception reporting and withholding period and chemical usage alerts during the pilot.

Attachment 2: VineAccess Features

Subscriber Feature List Functions	Independent Grower - Contract Returns	Independent Grower - Viticulture Management	Spot Buyer	Small Winery	Winery	Industry Organisation	Contract Crusher	Contract Harvester	Contract Carriers
Administration									
Record company details	X	X	X	X	X	X	X	X	X
Optional Secure Socket Layer (128 bit encryption)	X	X	X	X	X	X	X	X	X
Password protection	X	X	X	X	X	X	X	X	X
Optional dedicated server					X				
Vineyard management									
Record vineyard and block details	X	X		X	X				
Share block information	X	X		X	X	X			
Receive block information				X	X	X			
Harvest forecasting	X	X		X	X				
Record spray diary events	X	X		X	X				
Vineyard activity planning		X		X	X				
Vineyard activity recording		X		X	X				
Vineyard activity costing/budgeting		X		X	X				
Vineyard work schedules		X		X	X				
Record test results	X	X			X				
Record test results performed by Winery				X	X				
Record test results for spot blocks	X	X		X	X				
Import test results from external sources	X	X		X	X				
View Winery performed test results	X	X		X	X				
Request forecasts and harvest information				X	X	X			
Record field assessments		X	X	X	X				
Spot market									
List excess fruit on spot market	X	X		X	X				
View selected details of fruit offered on spot market		Publicly Available							
View full details of fruit offered on spot market		X	X	X	X				
Identify annual purchase grower fruit				X	X				
Purchase of fruit offered on spot market			X	X	X				
Sell fruit on spot market		X		X	X				
View data from spot purchased fruit			X	X	X				
Manage spot contracts		X	X	X	X				
Request field assessments			X	X	X				
Accept field assessments	X	X		X	X				
Contract management									
Enter contract prices					X				
Allocate blocks to a contracting Winery	X	X		X	X				
Accept contract block allocations from Growers/Small Wineries					X				
Allocate annual purchase Grower status				X	X				
Accept annual purchase Grower status	X	X		X	X				
View data from contracted Growers					X				
View data from annual purchase Growers				X	X				
Manage contracts with Winery	X	X		X	X				
Manage contracts with Growers/Small Wineries					X				
Produce contract documentation				X	X				
Reporting									
Report on company owned fruit		X		X	X				
Consolidated reporting of company and spot fruit				X	X				
Consolidated reporting of company, contracted Grower/Small Winery, annual contract and spot fruit					X				
Anonymous release of block/harvest information	X	X		X	X				
Report on aggregate* demand statistics by variety						X			
Report on aggregate* supply statistics by variety						X			

Report on aggregate* planting information						X			
Report on aggregate* vintage statistics						X			
Graphical representation of forecast/harvest metrics		X		X	X	X			
Export data in .CSV, Excel or XML format		X	X	X	X	X			
Scheduling resources									
Publish availability of harvester (internal users)		X		X	X			X	
Publish availability of harvester (external users)								X	
Book harvester		X		X	X			X	
Accept harvester bookings (internal users)		X		X	X			X	
Accept harvester bookings (external users)								X	
Publish availability of truck (internal users)		X		X	X				X
Publish availability of truck (external users)									X
Book truck		X		X	X				X
Accept truck bookings (internal users)		X		X	X				X
Accept truck bookings (external users)									X
Publish availability of crusher (internal users)				X	X		X		
Publish availability of crusher (external users)							X		
Book crusher				X	X		X		
Accept crusher bookings (internal users)				X	X		X		
Accept crusher bookings (external users)							X		
Schedule fruit deliveries				X	X				
Accept delivery appointments to crusher	X	X		X	X				
Enter weighbridge results for company/spot fruit				X	X		X		
Enter weighbridge results for company and contracted Grower/Small Winery/spot fruit					X		X		

Note:

Multiple registration types

One company can hold multiple registration types. For example, if a winery wanted to make their harvester available for external users (eg: Independent Growers) to book online, they would register as a 'Winery' and 'Contract Harvester'.

Dedicated server

This option is often requested by companies wishing to own, and have administrator access to, their own data.

Your company can own a server, located alongside VineAccess servers. Company data from VineAccess is

replicated onto a company owned server. Details are negotiable.

*Reporting of 'Aggregate' statistics can be done by Industry Organisation registration only. Industry Organisations can register for individual or multiple regions (i.e. whole of state)

Attachment 3: Support for VineAccess from leading wineries

1. Rob Glastonbury, De Bortoli

"De Bortoli's sees VineAccess as the way of the future to manage our grower information and we intend to pilot the system this vintage to gain access to the spot market for fruit. De Bortoli Wines are also keen to see growers trialing the use of the VineAccess spray diaries."

The spray diary is available free to users who register as "Independent Grower – Contract Returns" on the VineAccess website: www.vineaccess.com.au.

This registration enables growers to record company and vineyard details; create and share forecasts, spray diaries and vineyard details with winery customers; and list fruit on the VineAccess Spot Market.

Mr Rob Glastonbury, Operations Manager, De Bortoli Wines Pty Ltd, said a driving factor in De Bortoli's decision to trial VineAccess this vintage was to simplify the management of spray diaries.

"VineAccess' on-line spray diary offers a simple, time and cost effective solution to both growers and wineries," he said.

"Growers who supply grapes to more than one winery must currently maintain separate books to record spray data for each winery. However, growers using the VineAccess spray diary need only enter the data once and then release their diary to the wineries to which the grower supplies grapes.

"Also, to gain universal industry acceptance, it is very important that any system we select must be independent of growers, wineries or statutory bodies.

"VineAccess, as a wholly independent, on-line viticulture management system, delivers on these requirements and can be accessed whenever and wherever we need to retrieve or view vineyard data.

"The Spot Market feature of VineAccess is very important to the process as it will create the capacity to self-fund the system and maintain independence."

Mr Glastonbury said that all wineries were under increasing pressure from customers, who were demanding comprehensive information about the product and its history.

"To satisfy customers' request for in-depth information about our wine, we need to have access to good vineyard data," he said.

"Ultimately, we'd like to be able to access and handle information from across the whole landscape, incorporating environmental information, pest and disease management, precision agriculture and remote sensing information.

"VineAccess' current research and development program demonstrates their commitment to providing this type of data."

Rob Glastonbury, Operations Manager, De Bortoli Wines Pty Ltd

2. Alex Sas, Hardy Wine Company

This vintage, Hardy Wine Company will implement a trial of Morton Blacketer's VineAccess spray diaries with a number of growers throughout Australia.

Mr Alex Sas, Regional Viticulturist, Hardy Wine Company, said the winery would supply its growers with a free subscription to the VineAccess on-line spray diary.

"Although a paper-based diary system can supply us with the information we need, our growers, like us, wanted a better solution – one that would make the completion of a spray diary less of a chore," Mr Sas said.

"We have more than 1000 growers supplying Hardy Wine Company, so it is important that we are able to access data quickly and easily and that means spray diaries need to be up-to-date and error-free.

"Sometimes simple mistakes are made with paper-based diaries, such as misspelt chemical names, and because we won't accept the diary until it's perfect, this can be a source of frustration for the grower and field staff.

"We needed a system that would allow us to track spray diary returns faster than we have in the past. It's especially important at vintage because the process of correcting mistakes adds a significant amount of time to the process that we can't afford to waste – it just adds to the frustration."

Mr Sas said the VineAccess spray diaries would allow Hardy Wine Company to access higher quality information on demand, which was important in servicing its customers.

"We know how rigorously our growers maintain their records, but with this increase in demand for information and the expectation that we can supply it quickly, we needed a system through which we could track spray diary returns far better than in previous years.

"Our customers are asking increasingly difficult questions about our food and safety practices, such as the type of chemicals we use and where and when, and we need to be able to access this data quickly and confidently.

"For example, when an international buyer needs information overnight about the use of a specific chemical, VineAccess can help us to provide that answer quickly.

"Tracking information on-line reduces the amount of time our staff spend checking books and data.

"With the electronic system, growers don't have to type or write the name of a product. They simply select the product from a list and that avoids spelling mistakes – one of the most common errors that we find in paper diaries.

"We also find a number of miscalculations in the paper-based diaries, and because the VineAccess spray diary automatically calculates certain sections, we also expect to see a reduction in errors here too."

Mr Sas said that Hardy Wine Company placed high value on food safety and utilised the services of external auditors to review the diaries, so there was a low tolerance for error – no matter how small.

"All of our growers must have a Hazard Analysis and Critical Control Point (HACCP) plan in place and a critical part of the HACCP plan is a spray diary and chemical inventory.

"The VineAccess spray diary is a grower-friendly system and we believe that, as an on-line tool, it will eliminate some of the most common spray diary errors."

Alex Sas, Regional Viticulturist, Hardy Wine Company

3. Brenton Baker, Hardy Wine Company

"Spray diaries are a critical element of our growers' food safety program. A grower must provide Hardys with a compliant spray diary before we will accept their grapes. We know that filling-in a paper-based spray diary can be a frustrating process for some growers, mainly because of simple errors made. Additionally there is a lot of work for our staff in checking diaries to ensure they have met the food safety requirements.

To make things easier for both the grower and for our staff, Hardys have worked with the team at VineAccess to develop a simple, web-based spray diary that reduces errors and facilitates easier checking for compliance. The diary aims to meet the requirements of other wineries as well. We are testing the VineAccess system with interested growers across Australia this season."

Brenton Baker, Group Manager Viticulture, Hardy Wine Company

4. Steven Cooke, Kingston Estate Wines

" We feel that VineAccess will be a great starting point to source spot market grapes for all regions."

Steven Cooke, Viticulturist, Kingston Estate Wines

Table 1: Winery evaluation of the production and transaction cost savings of adopting VineAccess

		Staff positions	Ave annual cost	Cost per minute	Grower details					
Hours per week	40	Administration	$ 45,000	0.43	Growers	500				
Minutes per hour	60	Grower Liaison	$ 75,000	0.71	Blocks/grower	10				
Total minutes per week	2400	Vineyard Manager	$ 85,000	0.80	Total blocks	5000				
Total weeks per year	44	Management	$ 100,000	0.95						
Total minutes per year	105600									
Savings	Calc Basis	Staff position	No. activities per season	Minutes per activity	Staff Cost	Calls / Faxes / Letters per Activity	Activity medium cost	Total activity Medium cost	Total Cost	Aggregated savings
Typing of grower test results from growers/spot fruit	Block	Administration	15	1	$ 31,960			$ -	$ 31,960	$ 31,960
Faxing colour test results	Grower	Administration	1	3	$ 639	1	0.25	$ 125	$ 764	$ 32,724
Distributing grower spray diaries	Grower	Administration	1	15	$ 3,196	1	20	$ 10,000	$ 13,196	$ 45,920
Distributing grower manual	Grower	Administration	1	0	$ -	1	15	$ 7,500	$ 7,500	$ 53,420
Distributing delivery dockets	Grower	Administration	1	0	$ -	1	6.75	$ 3,375	$ 3,375	$ 56,795
Follow up of spray diary returns	Grower	Administration	4	15	$ 12,784	1	0.25	$ 500	$ 13,284	$ 59,205
Checking / re-typing grower spray diaries	Grower	Grower Liaison	4	90	$ 127,841	1	0.25	$ 500	$ 128,341	$ 187,545
Retyping of grower estimates (tonnes)	Block	Administration	2	7	$ 29,830	1	0.25	$ 2,500	$ 32,330	$ 219,875
Faxing forecast harvest date / booking confirmation	Block	Administration	1	3	$ 6,392	1	0.25	$ 1,250	$ 7,642	$ 227,517
Re-typing vine assessments	Block	Administration	1	1	$ 2,131			$ -	$ 2,131	$ 229,648
Booking harvester via telephone	Block	Administration	1.25	8	$ 21,307	3	0.25	$ 4,688	$ 25,994	$ 255,642
Re-typing harvester data from growers	Grower	Administration	1	2	$ 426			$ -	$ 426	$ 256,068
Internal crusher booking planning	Each	Administration	8800	6	$ 22,500	0	0.25	$ -	$ 22,500	$ 278,568
Organizing outsourced crushing planning & communication	Each	Administration	105	20	$ 895	3	0.25	$ 79	$ 974	$ 279,542
Re-typing outsourced weigh bridge data	Each	Administration	105	3	$ 134			$ -	$ 134	$ 279,676
Check weigh bridge data against booking info	Each	Administration	8800	3.5	$ 13,125			$ -	$ 13,125	$ 292,801
Mail weight note to grower / company vineyard mgr	Grower	Administration	10	1	$ 2,131	1	0.6	$ 3,000	$ 5,131	$ 297,932
	$ 297,932									

Spot market										$ 297,932
Sourcing spot grapes to specification	Each	Grower Liaison	150	30	$ 3,196	0		$ -	$ 3,196	$ 301,128
Annual purchase contracts	Each	Administration	100	5	$ 213	1	0.55	$ 55	$ 268	$ 301,396
Spray diary compliance (per section)	Each	Grower Liaison	300	20	$ 4,261	2	0.25	$ 150	$ 4,411	$ 305,807
										$ 305,807
Reporting										$ 305,807
Weekly reporting	Each	Management	30	60	$ 1,705			$ -	$ 1,705	$ 307,512
Notes:										
Activity medium - fax, telephone, letter										
Average annual cost of staff includes salary, superannuation, car, phone, work cover, taxes										
When **red** text is changed, total costs and aggregated savings will be automatically calculated										

Benefits (=Cost savings) of VineAccess: **$307,512**

Cost of VineAccess Software – First 50 Growers free, then $50 for other 450 growers: **$22,500**

Benefit: Cost Ratio: **7.3%**

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