CASE STUDY: THE ADOPTION OF LEAN PRODUCTION IN AUSTRALIAN WINERIES

Using the "Market, Message and Means of Communication" framework to design an extension strategy.



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EXECUTIVE SUMMARY

This report details a case study on the adoption of the Wine Australia supported lean production program by wineries. As part of this case study an extension strategy has been designed, using the "Market, message and means of communication" framework (Hill *et al.* 2015). Use of this framework involves working systematically through a series of questions which guides data collection and analysis to enable the market and target audiences for an innovation, the key messages these target audiences will be interested in and the best means of communicating these messages, to be identified and used to underpin the strategy.

The research conducted for this case study has enabled a number of key points to be identified in relation to lean production:

- Lean production is a management philosophy, underpinned by a suite of principles, tools and practices.
- The main objective of lean production is to produce finished goods that meet the customers' requirements with minimum waste, and hence, most efficiency.
- Lean can potentially be adopted by any size or type of business and deliver value. In most industries it is the medium to large businesses that have successfully adopted.
- Some authors suggest that successfully adopting lean is, or will be necessary for the long term survival of many businesses in an increasingly competitive environment
- Lean can be partially adopted. Many businesses use some of the lean tools, or apply lean to a small section of their business. This does not result in full realisation of the program benefits.
- Lean is difficult to adopt successfully- a number of key criteria (i.e. support of senior management, financial resources, external expert etc.) need to be met for this to occur.

The application of the framework has enabled the following conclusions to be drawn about the most suitable target market, message and means of communication for lean production extension programs:

The market- it is argued that owners, managers or staff from wineries that are 'steady' in business outlook are the main market for the lean production program.
The message- people considering lean production looking for information on the potential benefits that can be obtained and the costs and challenges of implementation, for business similar to theirs.
Means of communication- due to the complexity of lean production and the challenges of implementation on-going interpersonal communication in the form of: expert advice, peer support and development of a learning network is recommended.

An extension strategy has been designed based on desired wine industry participant knowledge and adoption of lean production: 'awareness', 'building knowledge and skills', 'ongoing skill development and implementation'. Recommendations for the development of written, video and web based resources to support these strategies are provided.

INTRODUCTION

In order to increase the effectiveness of extension efforts in the wine industry, Wine Australia invested in a project to identify the drivers for adoption of technology and innovation among grapegrowers and winemakers (Hill *et al.* 2015). In the project a methodology was proposed for developing an extension strategy based on the research findings, incorporated into the "market, message, means of communication" (MMM) framework (Huffer 2012) as an organising mechanism.

The report's authors contend that use of the MMM framework enables the extension provider to focus on the more important aspects of adoption of the innovation, enabling an effective extension strategy to be developed. In this report the MMM framework is applied to the topic of the adoption of "lean production" continuous improvement in the Australian wine industry.

THE APPROACH

In this case study the application of the MMM framework proposed by Hill *et al.* (2015) has been used to design an extension strategy by:

1. identifying the potential market segments and target audiences for an innovation
2. identifying the key drivers and barriers to adoption, and the key messages that related to these drivers and barriers
3. suggesting the best means of communicating these messages to the target market and audiences
4. using these findings to underpin an extension strategy



The MMM framework describes the need to:

- Identify and describe the technology, innovation or desired behaviour change under consideration.
- Identify and describe the potential market and target audiences. A "market" is the population of actual and potential adopters of rootstocks. A market can be identified and divided up (segmented) based on common features. From these market segments, target audiences for extension initiatives have been identified.
- Identify drivers and barriers to adoption. People adopt or purchase something if they perceive there will be a net benefit. Understanding the needs of the market segments and the benefits they might seek, as well as the costs or barriers to adoption, enables target audiences to be selected and effective messages to be identified.
- Select the most effective means, or package of communication tools to convey the relevant messages to the target audiences.

There is additional information on this framework in the "*Adoption of grape and wine R&D outputs. Who, what and why*" project report (Hill et al. 2015).

Table 1 details the questions developed as part of this project. Answering the questions forms the basis for the extension strategy.

Table 1: The "market, message and means of communication" framework key questions.

Q	Relevant concept	Key question	Clarification or examples
1		What is the technology, product or practice change ("the innovation") being considered?	Consider one discrete innovation at a time, otherwise it will become complex and confusing. Map the adoption sub-processes
2	**Market**	Who is the innovation relevant to? Is its adoption likely to be influenced by business outlook?	Who has adopted and is likely to adopt the innovation? Is it capital intensive to purchase? Will it provide short, medium or long term benefits?
3	**Market**	Is it only relevant to vineyards or wineries of a certain scale or with specific biophysical characteristics?	Will adoption provide benefits to small, medium, large or all scale vineyards or wineries? Or cool, warm or hot regions? Are there certain features of the business that make the innovation more or less relevant? For example grapegrowers with unirrigated vineyards are unlikely to use soil moisture monitoring.
4	**Market/ message**	Why would people find or potentially find the innovation useful? What are the drivers of adoption or the benefits that might be obtained?	What are the benefits being sought? What are the key questions someone would ask to ascertain if the innovation would be useful to them? Key drivers of adoption that have been identified are: quality, saving input costs, workplace safety, managerial flexibility etc.
5	**Market/ message**	What are the barriers to and costs of adoption?	Costs can be in terms of: • Financial cost • Risk of underperformance/ lost opportunity cost • Ease of installation, set up and on-going use • Need to obtain or develop new skills or knowledge • Time • Fear or willingness to change Are there barriers in the sub-process required for adoption e.g. availability of product
6	**Means of communication**	Is the innovation high or low involvement? What types of information need to be conveyed? What sources are available?	For high involvement decisions, people generally collect information from a range of sources including their personal network, web, experts, retail and experiential information (they trial or go and look). Low involvement decisions are quicker with few if any sources of information used. Identifying where people seek information may highlight key "influencers", potential audiences to use or spread information (e.g. retailers or consultants)

7	**Means of communication**	Who are the target audiences?	These will be market segments and/or key influencers or providers of information for those segments.

To adequately answer the framework questions, information needs to be gathered from a range of sources such as:

- the researcher's or extension provider's own knowledge and experience
- interviews with topic experts (by phone and in person)
- interviews with grape growers and winemakers
- web-based written resources
- industry and research articles and publications

Data is collected until it is considered that sufficient information has been obtained to adequately answer the questions and hence develop the extension strategy. For this case study 14 individuals with expertise on lean production, wine industry experts, winemakers, production managers or wine personnel were interviewed by phone or in person between July and November 2015.

CASE STUDY: LEAN PRODUCTION

Background

Lean production is a management philosophy, underpinned by a suite of principles, tools and practices. The main objective of lean production is to produce finished goods that meet the customers' requirements with minimum waste, and hence, most efficiently.

The opportunity

'Given recent increases in global competition, scarce resources and fluctuating economies, it is not surprising that lean production has become critical to the long-term survival of today's manufacturing organisations' suggest Scherrer-Rathje et al. (2009 p. 79). It is now widely recognised that businesses that have successfully implemented lean production have achieved substantial cost and quality advantages over those using traditional production techniques (Rose et al. 2010).

Shahal and Egglestone (1994 p. 51) concur and suggest that 'it appears that it is inevitable that companies must adopt lean production as a working philosophy within their organisations, even if it is in a modified format that best suits their particular business culture'.

While lean production has been used in manufacturing industries for several decades, its uptake by the Australian wine industry, prior to 2015, has been low (McIntyre 2015 personal communication). Wine Australia, in consultation with industry, identified the potential value of lean production to industry and commissioned the development of a lean production guide and workshop program tailored to the wine industry by 2XE consulting. To date, there have been 60 participants from 26 winery businesses and three regions (Murray Valley, McLaren Vale and Riverland) in the workshop program, with more workshops to be run in 2016.

Wine Australia is seeking the adoption of lean production by Australian wineries in order to maximise the value of investment in R&D and the transfer of benefits to industry in a highly competitive global marketplace where efficiency gains are essential to sustainability.

This paper works through the development of an extension strategy, and some ideas for building on existing work and considering the longer term delivery of lean production programs, using the "Market, message and means of communication framework" as described above.

Defining the innovation

Q1. What is the innovation?

Lean production was initially developed by Japanese manufacturing organisations, particularly Toyota, and has been widely known about and implanted since the 1960's (Rose et al. 2010). An integrated management philosophy, lean production is a system comprised of universal principles, operationalised by a number of tools and practices. According to Rose et al.,(2010) lean production can be implemented anywhere and in any company.

The main objective of lean production is to produce finished goods that meet the customers' requirements with minimum waste, and hence, most efficiently.

The Wine Australia lean production for Wineries program takes the general lean principles, tools and practices and contextualises them to the wine industry. As part of the existing lean production program the Lean Production Guide (2XE Consulting 2014) was written. In addition the following workshop program was developed consisting of:

- A three-hour workshop in a nominated region where participants are provided with information on lean concepts and tools and identify a specific project to work on in their winery business
- A winery visit or phone call with the consultant to encourage and check on progress
- A follow-up meeting one month later (whole group)
- If the winery then wants additional consultant or formal program support they then self-fund or seek additional support e.g. via government programs

Of the sixty participants to date thirty two have fully completed their initial project, and it is estimated by the program convenor that at least fifty additional projects have been identified and implemented by these participants. Six participants have partially completed their initial project while twenty two did not complete their initial project (McIntyre, 2015 personal communication).

According to Sohal and Egglestone (1994) the core characteristics of an organisation where lean production has been implemented would include:

- Team based work organisation, involving flexible, multi-skilled operators taking a high degree of responsibility for work within their areas
- Active shopfloor problem-solving structures, central to kaizen or continuous improvement activities
- Lean manufacturing operations, which force problems to be surfaced and corrected, manifested by: low inventories, the management of quality by prevention rather than detection and subsequent correction, small number of direct workers and small-batch, just in time production
- High commitment human resource policies which encourage a sense of shared destiny within the organisation
- Closer, shared destiny relations with suppliers
- Cross-functional development teams
- Retailing and distribution channels which provide close links to the customer and permit a make to order strategy to operate

Lean production is a management philosophy underpinned by tools and practices. The Wine Australia/ 2XE program introduces participants to lean production. Full adoption and implementation of lean production results in a number of business structural and cultural core characteristics being evident.

The market

Q2. Is the adoption of lean production likely to be influenced by business outlook?

Hill et al. (2015) examined the relationship between business outlook and adoption of technology. They found that grapegrowers and winemakers could usefully be placed in market segments based on their business outlook (expanding, steady or contracting) and that grapegrowers and winemakers owning, managing or working in expanding businesses were more likely to invest capital in technologies, products or practices that would deliver long term benefits. While those with steady business invested small amounts of capital when it was clear to return short to medium term benefits. People with contracting businesses tended to invest only in the products needed for day to day operations.

Sohal and Egglestone (1994) reported that many Australian businesses had not adopted lean production as they perceived that lean production was too expensive to implement during their start-up (expanding) phase. Comments from winery personnel interviewed for this project suggested that this is likely to also be the case, as those changing their business model or implementing significant change said they were too busy making these changes (i.e. getting vital equipment on-site and operational, designing essential processes and training staff) to attend lean production training and implement any additional changes.

The majority of lean program participants interviewed had businesses that were 'steady' in business outlook. This relative stability in personnel, processes and market meant they had resources available to examine processes and look for opportunities to reduce waste. As one participant said "sometimes you get so engrossed in the same old day to day processes you need to step back and take a look. Otherwise you keep doing what you are doing, and that might not be the best way".

The contracting market segment is unlikely to be willing to invest in any process improvement activities, if they are looking at exiting the industry or are struggling to remain in business. The interviews conducted for this project indicated that people in contracting businesses often feel lethargic towards examining a business that is facing on-going difficulties. One participant suggested that a business would only adopt lean production if its owners "had a long term positive view" about the business. This is reflected in findings by Hill et al. 2015, which found that more than 50% people in this segment felt that improving business productivity was "unimportant" and/ or "unlikely".

Wineries that have a 'steady' business outlook are more likely to adopt lean production due the relative stability in their key personnel, processes and resource use[1].

Q3 Are the principles of lean production only relevant to wineries of a certain scale or with specific characteristics?

The principles of lean production are not scale specific and hence businesses of any scale could adopt lean production (Mirzaei 2011). In a number of manufacturing industries it was found that medium to large scale businesses (over 50 employees) are more likely to than smaller businesses to adopt (Jasti and Kodali 2016, Mirzaei, 2011, Sohal and Egglestone 1994). Yet Rose et al. (2010) provided a number of reasons why small businesses could adopt lean production more effectively. A summary of the strengths and weaknesses of small and large businesses in relation to lean production is shown in Table 2.

[1] Interestingly, McIntyre (2015, personal communication) notes that when a company in a growth (expansion) phase it is the best time to adopt lean production, because when production increases so does waste, and lean production could be used at this stage to optimise the efficiency of the new practices, systems and equipment.

Table 2: Strengths of small and large business in relation to the implementation of lean production.

Strengths of SMALL business	Strengths of LARGE business
Ease and speed of changing organisational culture	Access to resources (i.e. financial, time, staff, contacts) to source and run a lean program within business or group of businesses
Owner or top management makes key decisions (fast decision making). Fewer layers of management	May have experienced and/ or expert staff to lead projects and provide guidance and support
High level of innovativeness and can look for and can use new change initiatives quickly	Often have in-house lean or continuous improvement experience, and hence understand the potential benefits and processes, requirements and challenges of implementation
Simple, clear, direct lines of communication	Better able to make the commitment of human resources – often substantial and ongoing – to develop skills, identify opportunities, collect metrics and implement changes
Close to customers- faster feedback and understanding customers' needs	More likely to have metrics and data available i.e. on energy use, labour, input quantities and costs etc.
Systems that allow innovation, flexibility and speed of response to customer needs	Applicability of tools- with more tools being applicable the greater the number and complexity of the winery processes
Some practices such as creating multifunctional teams, quality circles, total productive maintenance are easier to implement in smaller businesses (Mirzaei 2011).	Greatest opportunity for efficiency gains where processes have not been standardised.
Strong staff loyalty	Negotiating power over suppliers making it easier to develop a lean supply chain

Lean production is relevant to all scale of businesses.

Market/message

This section examines the benefits and barriers of adoption, which further enables identification of the market for an innovation, and the information that will be sought.

Q4 Drivers of adoption (i.e. "perceived usefulness" or "benefits") of lean production

Perceived usefulness of an innovation to the grapegrower or winemaker was identified as the key factor, or the strongest driver of adoption (Hill et al. 2015). While the reasons an innovation was perceived to be useful varied depending on the innovation under study, some common themes around increasing productivity emerged, specifically winemakers sought to:

- Reduce input, including labour, costs
- Maintain or improve grape and/or wine quality or yield
- Increase workplace safety
- Increase managerial flexibility

Lean production should deliver all of these benefits with the additional benefits of:

- Improved customer satisfaction
- Improved product development
- Reduced inventory and defects waste
- Improved productivity of processes and reduction of processing waste (Jasti and Kodali 2016)

An example of lean production delivering these benefits in an agricultural (lettuce) enterprise is provided in Appendix 1.

Case studies on the existing Australian wine Industry lean production program (2XE 2014) estimated that savings in input costs of 8% - 10% and savings in production lead-times of over 50% could be achieved. These potential savings are the main driver for senior management/business owners' involvement in the program (McIntyre, personal communication, 2015).

During interviews a number of existing program participants said they found the lean production program provided them with the opportunity and tools to look at their winery businesses with "fresh eyes" and identify projects towards increasing their productivity. Yet they did not report obtaining many of the other potential benefits reported to be achievable using lean production, probably due to the newness of the program, so participants have not yet had time to fully implement and evaluate lean production in their businesses.

Lean production has the potential to deliver many of the benefits sought by people in the Australian wine industry. Using specific examples of where, and how, current participants have used lean production to achieve concrete benefits will be very useful in recruiting future participants and maintaining the motivation of existing participants.

Q5 What are the barriers to, and costs of implementing lean production?

Hill et al. (2015) found that "perceived ease of use" or how easy an innovation is to adopt and use is another factor grapegrowers and winemakers considered when determining the nett "perceived usefulness" or how attractive an innovation will be to adopt. Dimensions of "perceived ease of use" not only include the cost of the innovation, but also factors such as how much mental effort, knowledge and skill acquisition, staff training and time is required to adopt and successfully use the innovation.

Lean production is difficult to implement successfully. For example Baker (2002) reported that less than 10% of UK organisations that tried, successfully adopted lean. Dombrowski et al. 2012 also found that most lean production implementation falls short of expectations.

Jasti and Kodali (2016) conducted an extensive study on the Indian manufacturing sector and identified that the majority of organisations that implemented lean did so in a specific area of their manufacturing operation using only a few of the popular lean tools, rather than following any systematic approach of implementation across the whole organisation or understanding it as a fully integrated management philosophy. This meant that the full potential benefits of lean production were not obtained.

The barriers to adoption and implementation

The barriers, or obstacles to adopting, implementing and maintaining lean production have been identified from the literature, industry sources and wine industry program participants. Some insights are provided in the coloured text below some of the barriers:

- **Lack of support from top management**. Visible and active senior management participation in lean production proved a critical cornerstone for success in a study on a food processing machine manufacturing company (Sherrer-Rathje et al. 2009). Without this support it was difficult for employees to become convinced of the necessity of lean, enable the required resources (i.e.

financial, time) to be allocated, create the required organisation change and delegate authority and empower staff to implement lean (Sherrer-Rathje et al. 2009).

As one employee explained to the researchers "Without (top management) commitment employees will not see the necessity to spend even one minute thinking about the project" (Sherrer-Rathje et al. 2009 p. 85).

Increased exposure to external sources of lean information was found to increase management commitment to lean, and ultimately the extent of lean thinking in the organisation. Sources of information include attending industry conferences, training sessions, touring plants from other companies, permitting tours of their own plant and hosting internal staff workshops hosted by external experts (Boyle et al. 2011).

- **Lack of vision** on behalf of decision makers and staff in regard to where they think their business should and could be in future, and how lean production can contribute to achieving this (Sherrer-Rathje et al 2009, Systems Consulting 2007).

Situational analysis- an assessment of the current internal and external situation of an organisation is essential. Internal assessment scans all organisational attributes such as personnel, facilities, location products and services to identify the businesses strengths and weaknesses to apply lean. External assessment scans the political, economic, social, ethnological and competitive environment to identify opportunities and threats. This analysis helps define the gap between the desired outcome (or vision) of applying lean and the current status of the business. This process will help identify priority areas for lean implementation (Mostafa et al. 2013).

- **Employee resistance** was also found to be a major obstacle to implementing lean in the Indian manufacturing industry, with workers feeling that lean was increasing their workload while reducing their job security (Jasti and Kodali 2016). 'The transition to lean might be one of the most challenging changes manufacturing enterprises are facing these days as it marks a fundamental transition of the enterprise's principles, methods and tools. This change affects each employee in every position' (Dombrowski et al. 2012 p 437).

This was found to be the case in the wine industry as one program participant said ' some of our staff have their own personal ways and knowledge that they see as unique to them and their job. This can clash with the concept of standardising work and making standard operating procedures so that other staff can then also do that job'. An employee's resistance to change will depend on their: personality, past experiences, degree of perceived 'loss' and the level of change they are accustomed to (Systems Consulting 2007).

Dombrowki et al. 2012 suggest that the critical factors for the sustainable success of lean is generally people, rather than technology related. Resistance to lean among managers and employees has usually been found to be caused by lack the lack of lean skills and knowledge, and by employees (not unfounded) perception that successful implementation of lean will reduce their job security.

Lean moves away from the model where workers are obliged to execute the processes that management designs, and instead an attitude of 'shared destiny' and engagement, empowerment and co-operation of employees (Dobrowski et al. 2012, Sohal and Egglestone 1994). Active shopfloor problem- solving and flexible, multi-skilled operators taking a high degree of responsibility for work within their areas are a result of lean production implementation (Sohal and Egglestone 1994).

Communication is also an important factor in successfully implementing lean. Scherrer-Rathje et al. (2009) found that openly communicating tactical and strategic, mid to long term lean goals through all levels of the business helped reduce employee resistance, confusion, insecurity and frustration.

Communication of lean wins from as early as possible in the implementation process was also found to increase support and enthusiasm at all levels of the business. Use of a pilot project to test approaches and demonstrate quick wins is recommended (Scherrer-Rathje et al. 2009).

- **Difficulty of culture change**. Changing organisational culture and attitudes can be very difficult and requires leadership, knowledge, measures, resources and actions over time (Systems Quality Consulting 2007). Successfully implementing lean production requires considerable culture change for most organisations as it is a philosophy and integrated management system.

- **Lack of a systematic approach. I**n their study of the adoption of lean production by Indian manufacturing businesses Jasti and Kodali (2014) found that lack of a systematic, structured approach was a barrier to effective implementation.

A systematic, structured approach might consist of a business setting a list of goals and planning the change in a step by step fashion. To assist this process they suggest that: 'researchers should not only develop a framework comprising the various lean management elements, but also incorporating various steps and procedures to implement lean management principles. Along with an explanation of the relationship between principles' (Jasti and Kodali 2014 p. 201).

Mostafa et al. (2013) p 47 found 'the most successful lean initiatives are those which have been introduced as roadmaps and frameworks. Some of them represent conceptual guideline from providing information the lean structure in both in practices and principles, others provide outlines for the implementation process'.

- **Lack of know-how** to implement lean production, **incomplete understanding of the lean concept and the purpose** of lean practices, and misapplication of lean practices such as 'use of the wrong tool to solve a problem' or 'use of single tool to solve all problems' (Mostafa et al. 2013). This can result in project failure, wasted resources, lost opportunities and lean production becoming unpopular with employees (Scherrer-Rathje et al. 2009).

- **Complexity of lean production and jargon.** Lean production is a complex concept. In a review of lean production literature 101 lean elements, techniques and practices were identified, of which 69 were unique to lean (Justi and Kodali 2016). These elements can be classified into five categories: process and equipment, manufacturing planning and control, human resource management, supplier relationship and customer focus. Lean production can be implemented in 14 key areas of the manufacturing organisation; scheduling, inventory, material handling, equipment, work processes, quality, employees, layout, suppliers, customers, safely and ergonomics, product design, management and culture and tools and techniques (Jasti and Kodali 2016).

With the diversity of the lean production tools comes considerable learning and jargon. While participants in the Wine Australia/ 2XE workshop program did not mention jargon being an issue, the Lean Production Guide (2XE 2014) can be a difficult document to understand. Other studies have reported lean production-associated jargon as a barrier (Jasti and Kodali 2016, Scherrer-Rathje et al. 2009).

- **'We already work smart'**- While most of the small sample we interviewed had heard of the lean program, a number of them did not accept the value proposition that using lean would help them

make their businesses more effective and efficient, suggesting that they already "work smart" and do not need the tools and opportunity participation in the lean program presents.

- **Risk of underperformance/ lost opportunity cost.** Some participants felt there would be a risk of reduced wine quality if lean production was adopted. They were concerned their creativity and flexibility as winemakers would be compromised through the program. In fact, the opposite is usually observed: quality improves due to greater control and greater free time to manage and improve quality (McIntyre, personal communication, 2015). Lost opportunity is significant in the time, energy and resources that are potentially allocated to working on lean production-related activities but would otherwise be spent on other projects. Not to mention the challenge of selecting the correct lean tools and metrics, as one participant said "it took us 3-4 evolutions of trying to identify and measure basic activities to finally get it right".

As part of the process the sub-processes of adoption, or in this case workshop attendance are examined in order to identify additional barriers (table 3).

Table 3: Adoption sub-processes of lean production workshop program.

Adoption sub-processes	Potential barriers to adoption of lean production	Issue raised in interviews?
Attending workshop	Awareness of lean production	Yes
	Acceptance of value proposition	Yes
	Geographical access to program	Yes
	Timing of workshop inconvenient – e.g. close to vintage	No
Initiating project in workplace	Lack of commitment to process	No
	Lack of knowledge among other workers and management	Yes
	Lack of skill, motivation or time of the person who attended the workshop to educate others and/or implement project	Yes
Completing initial project and taking on another initiative without external direction	Lack of management commitment and support	Yes
	Lack of engagement by other workers	Yes
	Lack of a champion to continue to pursue the program's objectives	Yes
	Lack of skills/expertise/resources in-house to identify projects	Yes
Maintaining lean production principles on an ongoing basis	As above	Yes
	Staying motivated and making progress on projects	Yes

There are a number of significant barriers to adopting, implementing and maintaining lean production in the workplace that mainly relate to the skills, resources and knowledge required and the need for culture change. "Without commitment from senior management, clear vision of what the end-state should be, a detailed road map and tenacious follow up continuous programs such as lean production will certainly fail" (Systems Quality Consulting 2007).

Means of communication

Q6 Is the innovation high or low involvement? What types of information need to be conveyed? What information sources are available in the Australian wine industry about lean production?

When grapegrowers or winemakers made a high involvement decision i.e. to adopt important, expensive or risky technologies or changes, they usually collected information from a range of sources including their personal networks, the world wide web, experts and retailers (Hill et al. 2015). Where possible they went to see the innovation in operation on another vineyard or winery, or trialled it themselves. When implementing these technologies or changes, expert advice, peer support and problem solving input was often found to be necessary (Hill et al. 2015).

While participants said that they had not sought information before attending a workshop, when implementing lean production projects they valued the input of the consultants (experts). In particular the consultants who came in with "fresh eyes" and had the time and the expertise to measure processes and suggest improvements. They also valued the input, problem solving and ideas of their peers, particularly during the winey walk-throughs, seeing and hearing what their colleagues were doing.

Expert team building and input, is one of the nine key factors Mostafa et al. 2013 found to be key to successful implementation of lean production. Use of an external consultant was found to be useful in working with managers to identify possible lean practices that could be used to reach the aspired goals, provide external validation of lean efforts and that a business was progressing on its lean implementation objectives and in helping determine corrective action and maintaining motivation where required (Mostafa et al. 2013). Often lean is new to the winery team and it may take time for staff to fully understand the concepts, so an ongoing relationship with experts is desirable (Dombrowski 2012).

Written information (published and internet-based) is an important type of information when communicating complex, lengthy or detailed concepts (Case 2002). Preferably written information is well structured, relevant, understandable to the target audience and accessible.

While it is not difficult to find information on the internet about lean production manufacturing in general. However, there are so many different terms used to describe essentially the same thing (or related ideas): Just-In-Time, Six Sigma, Kaizen, Continuous Improvement, World Class Manufacturing, Continuous Flow Manufacturing etc. and different definitions, descriptions, tools and sets of principles etc. listed that it is not easy to "get hold of" the essential concepts of lean production manufacturing. Most of the writing on lean production is lengthy and descriptive, rather than being in a practical "how to" form. On the other hand, there are "how to" videos on YouTube, which lack sufficient context or rationale (the "why") to make them convincing.

It is even more difficult to find information that relates the concepts of lean production to wine manufacturing. The Lean Production Guide (2XE, 2014) is the only known source of information (certainly in Australia) that relates the concepts specifically to wineries and bottling lines. While it is a solid resource for the wine industry, this guide is complex and lacks a roadmap on how the principles and tools relate to each other and simple summaries or examples of benefits, costs and challenges of implementation.

Successful adoption of lean production is a complex, on-going process. The involvement of lean experts, experienced peers and access to well-designed written resources will optimise chances of success.

DESIGNING AN EXTENSION STRATEGY

Q7 Who are the target audiences for lean production?

Lean production can be implemented in any scale of business. In any wine region. It was found that people from business with 'steady' business outlook were more likely to participate in lean production than people from 'expanding' or 'contracting businesses'. One method of dividing up a target population is by their knowledge of an innovation (Assael 1998) in this case extension strategies have been designed by dividing the adoption of lean production into three stages (Figure 1) with each stage feeding into and supporting the following stage (Tables 4, 5 and 6). Recommendations are detailed below.



Figure 1: Stages of adoption of lean production.

Extension strategy for creating awareness of lean production

Members of the wine industry must firstly be aware of lean production in order to consider adoption. An awareness strategy will build on existing work done by Wine Australia and 2XE, but will be more widespread and link into the 'building knowledge and skills' program and the web based resources available and learning network.

Table 4: Extension strategy for creating awareness of lean production.

Market	Owners and managers of wine businesses
Aim of extension	Create awareness of lean production programs and resources for the wine industry
Target audience key questions	What is lean production? What will the benefits of participating in this program provide to my business? What are the "costs" of participating? Where do I go next for additional information or involvement?
Message	The types of benefits lean can realistically provide to their business Where to access additional information or involvement
Suggested means of communication	Simple, brief, catchy information on flyers, in magazines, newsletters, through regional associations, business groups, conferences, industry publications and newsletters

Signpost to the web site (recommendation #1) particularly providing:

- a brief, written overview of lean production concepts, tools and benefits
- details of current and upcoming workshops and opportunity to register their details if they are interested but program is unavailable
- a link to more comprehensive information
- endorsement of program by existing participants (i.e. short videos)

Extension strategy for building knowledge and skills in lean production

Once awareness has been created and the target audience have identified that lean production is relevant to them the next phase is to provide access to experts, like minded peers and training materials. Interviewees were strongly supportive of the existing Wine Australia program, it is suggested that a similar format be maintained, possible co-ordinated and/ or supported by regional associations, agribusiness groups or interest groups (e.g. Regional Development Victoria).

If possible cultivate "lean champions" as part of this strategy, in major regions, who would:

- ¬ Identify businesses likely to be interested in a future workshop program
- ¬ Facilitate a workshop program in the region
- ¬ Coordinate an ongoing peer support group
- ¬ Identify opportunities for local assistance (eg government grants) for participating wineries
- ¬ Generate case studies and other "news" to keep lean in people's minds

Table 5: Extension strategy for building knowledge and skills in lean production.

Market	Owners and managers of wine businesses
Aim of extension	To teach participants about lean production and support them to apply lean in their businesses
Target audience key questions	What is lean production? What will the benefits of participating in this program provide to my business? What are the "costs" of participating? Where and how can I optimise the benefits of applying lean production in my business? Where do I go next for additional information or involvement
Message	Overview of philosophy, concepts and tools (including 'roadmap') Evidence that adopting lean production can provide solid improvements in productivity in any business. Examples of where, when and how those benefits have been achieved (i.e. perceived usefulness). The commitment and steps required to obtain those benefits Identification and application of lean production project Where to next and showcase existing resources (i.e. web site, written information, options for funding)

Suggested means of communication	Workshops, follow up visits Form a 'network' of lean production participants

Extension strategy for on-going skill development and implementation

It has been found that comprehensive adoption and implementation of lean production is not a quick process and it is suggested that on-going support be provided. This program would provide on-going training and support for participants through developing a national network.

Table 6: Extension strategy for on-going skill development and implementation.

Market	Owners and managers of wine businesses
Aim of extension	To support on-going implementation of lean production
Target audience key questions	How else can lean production be applied to achieve benefits (additional tools and concepts)? How to overcome lean project application challenges (problem solving)?
Message	Benefits of using lean production (reintegrate and expand on previous program)- concrete, practical examples (i.e. lessons learnt review) Training on additional lean production tools and concepts Additional resources to develop or maintain leadership and staff training Examples of effective communication and lean monitoring and controlling
Suggested means of communication	Interpersonal- Development of lean expert team within businesses, groups or regions. Additional support for 'lean champions'. Develop network of lean production practitioners Web based (see Recommendation #1)

Recommendations

Recommendation #1. Develop a web based lean production resource

This web site or web would fulfil a number of functions:

- Provide a central hub to access wine industry related lean production information, resources access to a network, and expert contacts
- Access to written and video resources – preferably designed as a progressive series of modules that go from the "why" to the "how" – with flexibility in the selection of different tools for learning more about and practical examples of their use. From simple overviews for people who know little about lean production to more detailed, in-depth information.
- Include a portal with links to useful sites containing more detailed information about lean production manufacturing in general, for those interested in conducting serious research on the topic – eg once they have implemented a few initial strategies and are looking to go to the next level.
- Build and manage a network of interested stakeholders and to connect lean production users

- Provide on-line support and problem solving (i.e. chat rooms and forums)
- Provide objective information and data on potential benefits and challenges of implementing lean in the wine industry, including testimonials from existing Wine Australia participants (i.e. 'the message')
- Facilitate access to grants, regional funding or other forms of support
- Provide information on current events i.e. lean study tours, regional association training, conferences
- Facilitate cross-industry information sharing and collaboration. Enable linkages, insights or useful information from other industries to be communicated by participants
- Link to service providers

This web based resource would be able to be accessed by wineries at any time (not just when workshops are run) and in any region – including regions too small to justify the cost of running a workshop program, and would be more cost-effective as a long-term strategy for reaching more businesses.

This site could be publicised by Wine Australia, AWRI, after relevant conference presentations, existing lean production workshops, through newsletters and articles.

There may be opportunities to link this initiative in with existing resources, such as the Horticulture Industry Network (HIN) website and staff (http://www.hin.com.au/). A content manager/ coordinator role would be required to maintain this resource.

Recommendation #2. Identify and streamline the processes for participants to access grants and resources for supporting their on-going lean production program.
People are busy and often do not have the time or interest to search for work out which grants could be most readily accessed to support their investment in training and business improvement. A simple tool (i.e. http://www.vative.com.au/government-grants-eligibility-quiz/) and some guidelines could make training more accessible to many participants. Potential options for funding or co-funding (mostly in Victoria) may be:

- the Business Industry Skills Fund (Department of Education and Training) National.
- Regional Development Victoria
- Wine industry Growth Fund (Victoria)
- Small business Victoria
- To get inclusion into the Victorian Wine Industry Strategic Plan (currently under development in consultation with the Ministerial Advisory Committee).

And/ or incorporate lean production into a broader industry program i.e. Sustainable Wine Grape System program (SA)

Recommendation #3. Rewrite the lean production guide to be more user-friendly and remove tools or information not found to be useful or relevant to wineries to date.

Recommendation #4. Support 'Lean champions'- Sherrer-Rathje et al. (2016) found that appointing lean champions or 'black belts', enthusiastic people who liked to 'live lean' and spread the lean philosophy were important in maintaining the enthusiasm of other staff and colleagues and achieving successful implementation. In the wine industry there are people who enjoy the challenge of leaning about and implementing ideas new to them, and are influential in their communities and industries. If these people are identified and supported to ensure lean production is implemented successfully in their businesses,

providing them with clear benefits the 'message' will flow through the industry network and influence others to consider lean production.

CONCLUSIONS

It was found that while the "market, message, means of communication" framework could be used to guide information collection and the design of an extension strategy, lean production was a challenging innovation to study.
This was because the topic of lean production:

- Is difficult to define as it is often described as a "philosophy" or organisational or culture change, so it can be difficult to measure.
- Is an easily reversible innovation. People may say they use, intend to use, have used, or trialled lean production. They can do lean production and then stop. This complicated ease of data collection and data quality.
- Consists of many tools and concepts. Each will be implemented differently in each business, with varying success. Again this leads to confusing and complex data.

Application of the MMM framework could be used to provide more detailed, specific recommendations if applied to a small selection of key lean production tools. Finally, the topic of lean production was an interesting one to study, with a number of participants and subject experts being quite passionate about the value of the program and the potential for it to deliver long term benefits to industry.

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CASE STUDY – Hussey & Co.

"HUNDREDS OF THOUSANDS OF DOLLARS WORTH OF ANNUAL SAVINGS"

HUSSEY & CO
EST. 1975

A CASE STUDY ON LEAN FARMING

The challenges for Hussey & Co

Annual savings totalling hundreds of thousands of dollars have resulted from Vative's business improvement and training program utilising Lean farming and Six Sigma. More than 12 months after project implementation, the company has changed the way it does business and its new culture is firmly embedded.

"We have achieved massive improvements right across the board and the return on investment has been far more than expected," says Hussey & Co General Manager, Mark Bell. "We have moved from a less organised system to a well organised one, and we now have the right people in place."

Vative began with a 3-day leadership workshop on Lean farming and staff training to ensure a collaborative approach. A business analysis included observation of current processes, value stream mapping and a value stream design based on best practice Lean methodology. The Vative-Hussey team then implemented solutions in five key areas:

1. 5S WORKPLACE ORGANISATION

A foundation tool of Lean/Six Sigma, 5S provides a cleaner, more organised and more efficient workplace.

2. IMPROVED HARVEST PLANNING PROCESS

Problem: over or undersupply of lettuce transplants; buying in to cover shortfalls; insufficient land for planting because of over orders or over receipt.
Solution: standardised harvest records; weekly records of plantings, orders and harvest estimates.

3. STOCK REDUCTION

Problem: ad hoc ordering cycles fluctuated between too much stock on hand and stock run outs.
Solution: stock control spread sheets with weekly reorder cycle.
Outcome: excess stock and stock run outs eliminated; stock costs cut dramatically.

4. IMPROVED PRODUCTIVITY OF TRANSPLANTING

Problem: significant time and labour wasted.
Solution: transplants now delivered by suppliers direct to paddocks; weekly cleaning and servicing of two transplanters improved planting accuracy.
Outcome: transplant delivery handling reduced, hand backfilling cut, transplanter staff reduced from six to four, planting speed increased.

5. INCREASED PRODUCT FLOW THROUGH THE WASH TANK

Problem: packing shed bottlenecks slowed production; high overtime levels.
Solution: improve wash tank, water supply and conveyor system; install extra spinner.
Outcome: easier management, less

OVERVIEW

INDUSTRY
Agriculture

CUTOMER PROFILE
Established in 1975, Hussey & Co is internationally recognised as a pioneer and innovator of fine gourmet salad mixes. Its 40 staff grow, pack and despatch 19 different types of lettuce from a farm on Melbourne's Mornington Peninsula to domestic and international markets.

BUSINESS SITUATION
Its sector is a demanding one, where major clients push for lower costs, higher quality and faster delivery. Hussey & Co engaged Vative for assistance in boosting profitability and labour efficiency through process improvements that required a major mindset shift and deeper staff engagement.

SOLUTION
Lean/Six Sigma workshops and a comprehensive business analysis revealed that process improvements were required in five key areas:

- 5S workplace organisation
- Standardisation and improvement in harvest planning
- Stock reduction
- Improved transplanting productivity
- Increased product flow through the packing process

> "Hundreds of thousands of dollars worth of annual savings."
>
> **Mark Bell**
> General Manager
> Hussey & Co.

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WHAT IS LEAN FARMING?

To counter increased international competition, agriculture needs greater innovation and improved skill levels, productivity and profitability. Lean farming drives production and operational improvement through elimination of resource and labour wastage, and through value adding to products or services. A number of Lean and Six Sigma business improvement tools are utilised by Vative.



overtime. Efficiencies contribute to 15 cent per kilo drop in labour costs. Mark Bell says the company initially found the culture and process changes difficult.

"You have to take ownership of change, and if you're not ready mentally, it won't happen. You then have to pass it down the line to managers and people on the floor. Some breezed through and wanted to improve their areas, but some hit a ceiling and could not take on the changes." Four key people left, and while this created short-term problems, the company now employs the right people who fit easily into the new culture.

"We were very well supported by Vative right through the process," Mark says. "We got far more out of this than we expected. You think you know it all, then someone looks in from the outside, and helps you implement changes which save you time and money.

VATIVE

Vative achieves significant business improvement for clients through solutions which are simple, realistic and highly effective. Providing consultancy and training services, Vative's 45-strong team includes Lean and Six Sigma excellence coaches with extensive business management, academic, engineering and trade backgrounds.

Mark Bell
General Manager
Hussey & Co.

"We have achieved massive improvements across the board through working with Vative, Lean and 6-Sigma. A new culture has been implemented, and the return on investment has been far more than we expected. This is a fantastic process."

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