



Process Mapping Within Farm Consultancy Kellogg Rural Leadership Programme Course 50 2023 Chris Beatson

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1. Executive Summary

Producing food and fibre is complex and will only get more complex in the future. The rural professional support network required has increased in both number and complexity. In a farm consultancy sense, this increase in complexity and work demand creates opportunity to expand business and offer high value expert advice. Farm consultancy is unique in that the advice sought is often highly customised and depends on a huge number of biological, human and climatic factors. The experiential learning required to provide sound advice takes decades to develop, however, with the everchanging consultancy landscape, there is no longer years available to craft each skill before offering services therefore the methods for shortening this experiential must be explored.

Process mapping is a method used to document the method of turning inputs in to outputs and is utilised in many industries to standardise outcomes and reduce human resource requirements, however little information is available on the possibility of utilising process mapping as a tool within farm consultancy. The purpose of this project is to investigate how process mapping could be used in farm consultancy, and from the findings establish a method for creating a process map which could be applied in a case study setting.

A literature review was undertaken to establish the what, why, who, how and limitations of process mapping for a range of industries. This literature was analysed to obtain key themes to create a method for developing a process map. This method was then applied to a farm consultancy case study which was reflected on to provide recommendations and compare with findings from the literature.

Key Findings:

- The application of process mapping in other service industries has been successful in showing improvements across business, customer satisfaction and employee satisfaction metrics, indicating potential benefits that could be obtained through process mapping in a farm consultancy business.
- Analysis of the literature provided a framework for establishing a method to process map which could be used in farm consultancy. 12 key steps in process map design have been documented as a framework in this report.
- The case study developed based on the process developed indicates many strengths and opportunities for process mapping in a farm consultancy business echoing the benefits seen in other industries. Although there are significant benefits and opportunities to process mapping, there are also weaknesses, threats and risks.

Key Recommendations:

- Get started: although a sound process map is required, the key to efficiency finding is to start with a process, and then continually improve the process over time.
- Of the 12 steps to developing a process map, it is recommended emphasis be placed on ensuring clarity of the purpose of the process map, ensuring all stakeholders have input, developing KPI's and providing a framework for continuous improvement.
- There are strengths and opportunities identified in this report which could be beneficial to a farm consultancy, awareness and development of strategies to overcome the weaknesses and threats documented is fundamental as part of any process mapping undertaken to ensure business objectives continue to be met.

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3. Introduction

The complexity involved with food and fibre production has led to a significant increase in the number and specialist skillset of rural professionals required to support farming businesses. These rural professionals are tasked with assisting farming businesses to manage risks and thrive in a time when change is occurring at ever increasing rates. The increase in demand for rural professionals has provided opportunity for businesses to provide expert services and scale up to meet this demand, however demand for expert advice is not easily met through the supply of professionals due to the complex nature, ever changing requirements and experience required to know and be trusted to provide reliable advice.

Farm consultancy is unique in that it involves advising on dynamic biological systems which rely on climate, animals, physical and human resources to produce saleable product. Advice is often highly customised and differs between businesses, and within the same business from year to year. Farm consultants spend many years developing skills and experience to advise clients on their area of expertise and to hone skills to identify opportunity within these biological systems. Traditionally, farm consultants have carried this significant knowledge of their clients' businesses and biological systems 'in their head' as they have been operating in an individual setting rather than a team servicing approach. Garland, C (2005) documented in 2005 that "the services required by the farm business of 2020 will most effectively be provided by a team servicing approach rather than by one individual". This prediction has played out and will continue to play out in future years.

As the demand for consultants increases to support farmers deal with constant change and assist them to head in the direction asked of them by consumers and the community, there may be opportunity to utilise systemisation of experiential learning through process mapping to train aspiring rural professionals and utilise scale to improve productivity and financial returns within a consultancy firm through utilising a team approach.

Industries such as food and fibre production itself, manufacturing and other advisory services utilise process mapping in different ways. At a high-level, systemisation via effective process mapping allows businesses to build capability quickly (McKelvey & Frank, 2018), scale up to service more customers or produce more product and to standardise a product or service to maintain quality and give every customer the same experience (Kuhlang et al., 2011).

The purpose of this report is to investigate the ways in which process mapping could be utilised within farm consultancy to assist with both internal and external processes, to establish a method for processing mapping within a farm consultancy business and to apply this method as a case study to provide learnings and recommendations.

4. Aims and Objectives

There is little information available specifically on process mapping within farm consultancy therefore the purpose of this project is to establish key factors to consider when processing mapping which could be applicable to a farm consultancy business to improve both internal organisational performance and enable better customer outcomes. To achieve this purpose, the following objectives are sought:

- 1) Understand the fundamentals of processing mapping.
- 2) Understand how processing mapping is used in different industries.
- 3) Establish the key principles of an effective process map which can be applied to a farm consultancy business.
- 4) Develop a process map for a service product within a farm consultancy firm which can be used as a case study to apply the key principles found in this study.
- 5) Through reviewing the case study, identify and document the strengths, weaknesses, opportunities and threats of utilising processing mapping to create recommendations for rural professionals.

5. Methodology

To achieve the aims and objectives stated above, the following method was undertaken:

- 1) Completion of a literature review to document the current information and data available on processing mapping.
- 2) Analysis of the literature to establish a method for developing a process map which could be applied to farm consultancy. From the analysis of literature, establish a method for farm consultants to establish process maps.
- 3) Utilising the method for creating a process map, development a process map as a case study for a process carried out by a farm consultant utilising the key points established in this study.
- 4) Reflection and analysis of the case study via a SWOT analysis.

This methodology follows the "DIKW model" which was developed to represent and allow visualisation of the transformation of data and information into knowledge and then the conversion of knowledge to wisdom. Under the DIKW model, Information and data given context is turned in to knowledge, when this is applied to an area such as farm consultancy, this creates wisdom which can be utilised (Conger & Probst, 2014).



Figure One: The DIKW model representing the progression from data and information to knowledge and wisdom.

6. Literature Review

6.1 Introduction

A literature review was undertaken to understand what process mapping is (the what), the benefits to using process mapping (the why), industries utilising process mapping (the who) and considerations when incorporating a process map into a service business (the how). Limitations of process mapping was also explored to ensure awareness as to the risks of implementing process mapping in an organisation.

6.2 What is process mapping?

Each day, every human undertakes a process in some form or another both in working and personal life. Often these processes are known and happen without the need for documentation or planning (Kaplin, 2009) therefore the steps undertaken are not formally established. Processing mapping is a term widely used to describe and document tasks and steps a business or organisation may go through in its delivery of a product or service. Processing mapping is formally defined by Hunt, (1996) as a series of steps designed to produce a product or service and by Madison, (2005) as a group of activities that leads to an output or result, the means by which work gets done and a mechanism to create and deliver value to a customer.

Conger, (2011) further establishes that a process in its simplest form consists of:

- Input: data, information or materials to be used in the process.
- Process steps: The process to transform or manipulate the input.
- Output: a good or service that results from the process.
- Feedback: Monitoring and metrics on output quality that are used to regulate and improve the process.

Which can be visualised in figure two below.



Figure two: Simple form of a process. Conger, S (2011).

Hunt, (1996) continues that process mapping can occur between a single person or department, or across several different people and departments. Regardless of the scale an effective process map has the ability to streamline processes. Processes can occur at a customer process level where the process results in a product or service provided to an external customer, or an administrative process which produces a product or service which are invisible to the customer, but aid in the background to produce a saleable good or service and are crucial to the effective management of the business.

Damelio, (2011) and Farris, (2012) established three different types of process maps which can be utilised for different functions within an organisation. These three process maps are visual diagrams which can look the same in their design and the fact that they assist with an overarching goal of turning supplies in to saleable product or service. However, these

three process maps differ in that they describe different levels of organisational performance ranging from the process for how an organisation operates with suppliers and customers (relationship map), the process for operations between departments within an organisation (cross-functional map) and the process undertaken in each department to complete a value-add task (flowchart).

6.2.1 Relationship Map

A relationship map is a type of process map which shows the way in which an organisation engages with their suppliers and customers to carry out business practices. Examples of a relationship map could show the process for taking orders, ordering supplies and getting feedback to gain customer satisfaction. A relationship map does not outline the actual way in which work is completed but highlights the overarching process for engagement. An example of a relationship map is shown in figure three below. This shows the link between suppliers, an organisation which is part of a bigger system, and a customer. Following the example through, a customer order or need enters the subject organisation. This requirement is then managed by an organisational department "C" which combines resource from a supplier and possibly other departments to create a product or service which is provided to the customer. In some cases, suppliers can supply the whole solution/service which is applied to a customer order, or part of the solution which is utilised by an organisation department to provide the product or service.

In the context of a service industry such as farm consultancy, a relationship map could be utilised to:

- Establish the way in which a consultant or consulting business engages with farmers and any suppliers which provide resources to support the farmer.
- This could include the process for onboarding clients, the process for utilising the customer relationship management software provided by a supplier, or obtaining information required to complete the job and obtaining feedback from clients on delivery.
- The process for communicating each type of service offered or output supplied, and a process for how that service is delivered to clients.



Figure three: An example of a relationship map (Damelio, 2011)

6.2.2 Cross-functional Process Map

A cross-functional process map is a process map which shows the way departments work with each other on a customer outcome linking from supply of the raw product/information, through to the good or service to be sold. These maps give a blueprint for how a product/service moves through an organisation and each departments input to achieving the customer outcome. The cross-functional process map outlines a high-level overview of the tasks to be completed without providing detail on the exact process to completing those tasks. Figure four below shows an example of a cross-functional process map showing a product or service being delivered from customer inception, through different departments of an organisation (entity) to delivery back to the customer. Each number in the diagram represents an individual process and the links between each number highlight the part where a process moves along a department, or between departments. "A" shows the overview provided to the customer, "B" shows the process a product will move through without outlining the exact process for each task, and "C" documents the decision points or completion points at which the piece of work moves to the next department.

In the context of a service industry such as a farm consultancy business with several different departments, a cross-functional map could be utilised to:

- Highlight what services each department completes and the contribution of that service to achieving a desired client outcome.
- Establish the point at which customer work is handed over to a different team within an organisation.
- Illustrating to a client the process a job may go through to create the desired outcome and the point at which the customer will be communicated with.



Figure four: An example of a cross-functional process map, (Damelio, 2011)

6.2.3 Flowchart Process Map

A flowchart provides the exact process that will be completed for each task along a crossfunctional process map to achieve the desired outcome. A flowchart provides further detail on each step outlined in cross-functional process map. It provides a visualisation of work activities to be carried out to provide or create a single unique output therefore is often granular in detail. It includes both the value creating process, and the non-value creating activity of delivering the good or service. Often a flowchart is more linear than a relationship and cross-functional process map in that one step is carried out after another, and the next step is dependent on a successful previous step. Figure five provides an example of a flow diagram for completing an individual task within a cross-sectional process map. This shows in a good producing setting the process that is undertaken from starting the production (A) and completing the value-add piece, to the non-value add process (B) through to delivery of the good.

In the context of a service industry such as farm consultancy, a flowchart is considered the most common process map as it depicts the granular step by step tasks undertaken to complete an outcome which is often the reason the consultant was engaged initially. Less emphasis is placed on process mapping the customer, organisation, supplier relationship and between department process.

Often in farm consultancy, the piece of work which could be process mapped as a flowchart is considered the value proposition and what the client engages the rural professional for. It is also often the piece of farm consultancy in which the consultant has expert knowledge, which is innate, built on many years of experience, and can be highly variable depending on the client's business, farm system and current climatic, economic and industry conditions making it difficult to standardise and make repeatable.



Figure Five: An example of a flow diagram, (Damelio, 2011)

6.3 Benefits of Process Mapping (Why do it)

The benefits to process mapping differ between organisations and are dependent on the exact process mapped. The benefits also differ depending on the type of process map utilised as outlined in section 6.2 above. This section investigates literature which summarises

the reasons why process mapping is beneficial across a range of organisations producing both goods and providing services.

- 1. Increasing clarity and understanding: Fiore & Schooler, (2004) established that process mapping can visually represent a process from start to finish, making it easier for individuals and teams to understand how a process works. It provides a clear and concise overview of the steps, tasks, and activities involved to ensure teams have a shared understanding of the full process an organisation will undertake to complete an outcome. This shared knowledge ensures less time is spent communicating and discussing the process which will be completed.
- 2. Identification of inefficiencies: By documenting a process map, organisations can identify bottlenecks, redundancies, and areas of inefficiency (Hines & Rich, 1997). This allows for targeted improvements to enhance the effectiveness of the process. Hines and Rich, (1997) described process mapping as one of seven tools to identifying waste and inefficiencies. A process map can be utilised to identify inefficiency through scrutinising each part of the process map, identifying the wasteful aspects, consideration as to whether the process can be arranged or changed, consideration of a better flow pattern to minimise resource use and then finally analysis of each stage of the process map to check each step is necessary and contributing in a value-add way to the outcome.
- 3. Standardisation and quality control: Process mapping helps establish standardised procedures and best practices within an organisation leading to more consistent higher quality work being produced which is easier to monitor. When everyone follows the same documented process, it reduces errors, inconsistencies and enables and ensures predictability to meet target timeframes (Kuhlang et al., 2011). Standardisation also sets a level of expectation on performance to be achieved to guide employees on the optimal outcome for a client or customer (Kuhlang et al., 2011). This reduces uncertainty from employees on if they are completing work to the correct standard.
- 4. Training and onboarding: Process maps within a service industry can be beneficial for training and onboarding in two ways:
 - a. McKelvey & Frank, (2018) documented that a standardised process map for onboarding employees increased understanding and reduced time spent getting up to speed on company processes. They also documented that employees had better clarity on their role within an organisation.
 - b. Process maps are also valuable for training new employees or team members. They provide a structured way to introduce individuals to the steps and requirements of a specific often complex task or outcome. For example, Mclaughlin et al., (2014) documented that the development of process mapping within a neurosurgical department allowed the department to take on new nurses faster and allow interns to rotate through departments as training could be sped up and trainees could contribute to the functioning of the department within a more palatable timeframe for management revolutionising their recruitment strategy.

- 5. Resource allocation: Kenley, (2014) summarised that an effective process map allows the correct resource allocation to optimise production through better planning and understanding both the amount of work that is required in each step in a process and the timeframe to complete that work. This allows organisations to allocate personnel, time, and resources more efficiently to each step of the process and highlights which part of a process may require more resource at a certain time to ensure the remainder of the process can be continued and is not sitting idle and creating waste.
- 6. Continuous improvement: Process maps create the foundation for continuous improvement programs such as Lean Management which was introduced and documented through Toyota's Production System (Liker, 2001). They provide a baseline for identifying areas where improvements can be made and assist with measuring the impact of changes over time. The role of process mapping in continuous improvement is analysed as a case study in section 6.3.1 below investigating the "Toyota way to continuous improvement".
- 7. Compliance, regulation, and risk management: Process mapping can help identify potential risks and vulnerabilities in organisations producing goods or services, as well as standardising and ensuring regulation is adhered to ensuring business compliance in facets of health and safety, employment law and financial law etc. Balachandran, (2009) established that the use of process mapping in the way in which data was stored within a business meant it was readily available and used for processes such as audit. The use of a process map in this case meant the organisation followed the law and documented exactly the right information in case processes were challenged. These solid processes resulted in a lower risk profile for the business and relied less on legal input for small queries resulting in less money spent through a legal/audit process.
- 8. Documentation: Born, (1994) established that a benefit to process mapping is the documentation of a constant method that can be referenced and updated over time. This documentation can be made alongside any visual diagram and provide a historical record of how a process has evolved and changed over time. This contributes to organisational knowledge. This documentation over time can also illustrate what didn't work in the past to ensure past mistakes are not re-made.

6.3.1 Why use process mapping - a case study

The section above outlines eight reasons for why process mapping is beneficial in an organisation. These eight reasons are linked to reducing waste through requiring less human resource, reducing errors and reducing risk of non-compliance. Identifying and reducing waste points to the uptake and development of "lean management" within an organisation (Charron et al., 2014).

The operations of Toyota have been studied since the 1950's. Serval publications describe and investigate the Toyota Production System. The Toyota Production System is accepted as creating and incorporating "Lean Management" in their operations since 1950 as a response to Ford's mass production systems (Liker, 2021). The Toyota Production System outlines the methods Toyota utilise which has seen them be regarded as the world's premier car manufacturer. Liker, (2001) documented 14 principles which contribute to Toyota's success. These are:

- 1. Build a long-term philosophy: Management should focus on extended sustainability rather than short-term financial gain. Fostering a sense of purpose in employees is also part of this principle.
- 2. Create a continuous process flow: The thinking behind this principle is that the right process will produce the right results. Continuous improvement is promoted by eliminating the seven wastes known as *Muda* in Japan, these are: overproduction, waiting, unnecessary transport or conveyance, overprocessing or incorrect processing, excess inventory, unnecessary motion and defects.
- 3. Use pull systems to avoid overproduction. This involves minimising the work in progress. It relies on initiating production based on downstream demand or signals.
- 4. Balance the workload. This is sometimes referred to by the Japanese word *heijunka*, which means "levelling." It aims to reduce unevenness "*Mura* in a production process and mitigate the risk of overburdening "*muri*" parts of the production system.
- 5. Stop to fix problems or get quality right the first time. Companies should build a culture where problems are addressed immediately. Any employee can halt production when a problem is detected. The thinking behind this principle is that quality drives value. *Jidoka* meaning "machines with human intelligence" is the foundation for building quality into a system.
- 6. Use standardised tasks and processes for continuous improvement and employee empowerment. Stable, repeatable methods should be used wherever possible to maintain predictable timing and output.
- 7. Use visual controls to illuminate problems. Visual indicators should be easy to understand so employees can determine whether they are in compliance with standards.
- 8. Use reliable, thoroughly tested technology. Technology should be used to support rather than replace people. This can be done by working out a process manually before applying technology to expediate it.
- 9. Grow leaders who teach the philosophy to others. Leaders should thoroughly understand the work and the philosophy behind it to effectively teach future leaders about it.
- 10. Develop teams that follow the philosophy. A strong company culture features teams of exceptional people who champion the company's philosophy, values and beliefs over many years.
- 11. Respect extended network. Treat partners and suppliers as extensions of the business so they grow and develop as well.

- 12. Solve problems by going directly to the source. This principle is sometimes called *genchi genbutsu*, meaning "go and see" in Japanese. Go and personally observe, verify and speak based on personally verified data.
- 13. Make decisions deliberately and by consensus. Consider all options, decide carefully and implement decisions quickly.
- 14. Continually learn and become a learning organization. Use continuous improvement and relentless reflection to address process inefficiencies and apply countermeasures.

These 14 key principles have then been framed up in the "4P" model (Liker, 2001).



Figure six: interpretation of the Toyota Production System Liker, (2001)

The 4P's of Toyota's Production System are outlined in figure six above. This framework shows that of the 14 key principles, there are four common themes which are: problem solving, people and partners, process and philosophy. Particularly of focus in this report is the third 'P' – Process. Liker, (2001) credits principle two through to eight as having a focus on process optimisation. Principle two through to eight align with the eight key reasons of why

organisations should utilise process maps in section 6.3. This similarity is summarised in figure seven below. The diagram illustrates that there is significant overlap between the Toyota Production System and eight key reasons for processing mapping established from other literature. The diagram shows that many of the Toyota Production System principles are useful and assist with more than one key reason for process mapping. From this diagram it can be established that an organisation could utilise process mapping for one or more reasons and obtain benefits in operations and efficiencies.

It is important that organisations determine their reason for process mapping and chose the applicable level of process map whether it's a relationship process map, a cross—functional process map or a flow chart process map which will allow them to execute the purpose of the process map.



Figure seven: Miro board showing the relatedness of the Toyota Production System and the eight key reasons for process mapping established from other literature.

6.4 Industries utilising process mapping (The Who)

Process mapping is undertaken by every business or organisation in some way, however there are industries which lend themselves more comfortably to implementing comprehensive process mapping. These businesses tend to produce goods, rather than provide services. The following table outlines three industries (one good producing and two service providing) which utilise process mapping with the aim of identifying benefits in efficiency and client outcomes which could be applied to farm consultancy. The benefits to farm consultancy are discussed in section seven below.

Table One: Industries utilising process mapping and the benefits to these industries.

Industry	High Level Benefits
Manufacturing	• Standardisation of product produced ensuring customers receive the same quality good every time whilst ensure the lead time to production is minimised (Rahani et al, 2005). Quality control also ensures compliance with regulation where relevant.

	 Highlighting waste across a production line creating efficiencies for every product produced (Melton, 2005). Reduction in specialists required as tasks can be standardised and the difficult parts scrutinised to make the process more simple, or technology utilised to remove the human factor (Liker, 2001).
Healthcare	 Utilised to unpick both the patient pathways to treatment, and service processes (Taylor, Randall., 2007). Highlight unnecessary handovers and delays (Aathi, 2014). Reduction in drug storage requirements. Suryani et al, (2017) documented a 47.2% reduction in storage costs of drugs within a hospital due to utilising processing mapping to have the right drugs at the right time. Reduction in treatment time in from 187 days to 60 days (Taylor et al., 2015) for comprehensive treatment and a reduction in waiting times at emergency departments of 16.4% (Firman et al., 2019).
Financial Services	 Improved customer onboarding process providing clarity on services and the process that will be undertaken. Baag and Sarkar, (2019) identified that the introduction of process maps reduced customer wait times, reduced stress levels for employees and increased customer satisfaction. Hidayati, et al., (2019) established that the development of new processes reduced the number of tasks undertaken in a financial firm from 21 activities from customer query to delivery, down to 16 activities to get the same outcome which reduced the processing time from 8 days to 4 days. Enable faster training of new team members to scale up operations through outlining the tasks a more experienced team member would complete then getting assistance from other team members to reduce the bottleneck (Jenkins, 2022). Mapping the non-value add components of the business functions reduced time spent on non-chargeable time by 16.25% (Kusrini et al., 2019).

6.5 Considerations when implementing process mapping (The How)

There is literature stating what process maps are, why they are important, and examples of process mapping being used in a service industry which could be applied to farm consultancy. This section examines the considerations required when developing a process map within an organisation.

6.5.1 Define Process Objectives

The definition of activities to be performed in the process and their objectives are essential to ensuring a successful outcome. The objectives of the overall process and each task intended to accomplish the objective must be clearly understood by all parties. This ensures that any activities outlined in the process should assist with getting to the outcome, and if they are not assisting with that outcome questions as to why they are included in the process map should be raised. Having an objective ensures the process map will be effective and adds value to an organisation rather than creates more work.

The reason for selecting to process map in the first place is also important (Hessing, 2013). The reason could include that the process is not performing to standard, a new service is planned or there is now added compliance requirements to a task.

6.5.2 Define Process Scope

Cobb, (2004) states that before initiating any process map or process design, the scope and boundaries of the process should be clearly understood. This can be checked by defining the following:

- What are the outputs of the process? How can the end of the process be identified?
- What are the inputs to the process? What event or activity causes the process to start?

The key focus area is inputs and outputs. Any process or subprocess typically transforms inputs into outputs through the addition of value to the product or service. Key to establishing where a process starts and stops is the process map used, and the detail level required. For example, if the full process of a car from ordering to delivery was to be mapped, that same process map would not outline every task to build the car. This would instead highlight the overarching process of manufacture between departments then a separate process map would define the within departmental process to complete each task.

As part of defining the scope and when the process starts and stops, it is important to understand the value in separating the components. Components which are highly interdependent on each other are more difficult to separate so would likely be included in the same process map. An example of this could be a process map for marketing and sales in an e-commerce store compared with an aircraft manufacturer. In an e-commerce setting, the marketing and sales process are difficult to split as the marketing often relates to a direct sale therefore, they are interdependent and difficult to split into individual processes. The start and the end of the process would likely include both marketing and sales. An aircraft manufacturer differs in that the sales and marketing process have very different roles and therefore would be less interrelated. In this example sales and marketing could be split into individual start and stop phases and represented by different process maps. The reason for individual processes is also proportionate on the impact if a mistake is made. For example, as part of the sale process if the customer does not have adequate funding or the customisation is not met, the impact is significant compared with an ecommerce store where the impact of a small mistake such as sending the product to the wrong address has less of an impact on the business making the sale.

Hessing, (2013) stated that organisations must correctly identify the stakeholders who contribute and are impacted by the process map. This could include business managers, employees, suppliers and customers. It is important to verify the impact each of these parties has on creating and implementing the process map and customising the development to each of the parties' strengths and possible blind spots.

6.5.3 Select Mapping Technique

The determination of the type of process map to use as outlined in section 6.2 is an important consideration into how process mapping can be used. Utilising the correct process map ensures full clarity to maximise efficiency, finding faults and continuous improvement (Izquierdo, 2022). Documenting the outcomes for the process map informs the type of map to be used therefore ensuring clarity on scope and objectives before choosing the mapping technique to be used is important.

6.5.4 Identify the Process Steps.

Identifying the process steps is a fundamental consideration and focus area when developing a process map. Documenting each step through utilising and brainstorming with the correct stakeholders should be completed to a level that it's understandable by someone who isn't close to the process. Doing so makes it easier to communicate and train on the procedure (Boi, 2019). Incorporating the Toyota Way to lean management includes going and seeing the process in action to ensure what is being documented is the actual process (Liker, 2004). This is fundamental to ensure the process is realistic and can be utilised within an organisation.

Fundamental aspects to establish when documenting the process steps are:

- The order in which the various steps should occur.
- Where decision points happen along the workflow. And what the effects of those decision points are. Depending on the decision do others within or outside of the organisation require notification?
- Ensuring clarity on whether the organisation is mapping the process as it currently is, or what is ideal is, fundamental to developing the process map and sets the framework on if the process is being used for inefficiency finding, or a standardisation of how a service will be implemented in the future.
- Additional methods of researching the information required to build a process map include looking at existing documentation on the procedures you're mapping as well as interviewing stakeholders.
- Assigning who is responsible for the process step, or the decision/sign off required before moving to the next stage of the process map to ensure quality and work is fully completed.
- Through the documentation of the process map, ensuring terminology and understanding is consistent amongst stakeholders.

6.5.5 Document the process

Documenting the process follows developing each step in the process. This involves putting each individual process step in to an easy-to-understand diagram or map which stakeholders can easily understand. Izquierdo, (2014) summarised that it is crucial to avoid assumptions when linking the individual steps and to ensure there are clear decision points. This includes what ifs for decisions which are required to be made and clear checks and balances for when the process can move to the next stage.

There are multiple tools available to assist with documenting the process. Miro Boards are one piece of software which could be used. The software/tools which could be used range from post-it notes, free software which provide basic process mapping technology through to fully customised software for individual organisations which cost in the tens of thousands. The software that should be used depends on the complexity of the process map, the number of stakeholders who may need to see the software and the risk of failure if the process map is not followed. More simple or lower risk processes could be documented for a start with a cheaper software to trial the process whereas a higher risk process may not be able to be implemented before full detail and customisation is complete which may require a more comprehensive software from the outset.

6.5.6 Implementation, Monitoring and Improving the Process Map

Implementing the process includes communicating the process to stakeholders and training the team members responsible for implementing the process (Izquierdo, 2014).

The level of training required depends on the substantiality of the process map and if this is a significant change from existing work undertakings. A significant change to existing process will require more training and possibly additional resource to ensure a smooth transition. During the training process it is important to identify areas of the process map which may require clarification or refinement and to make these changes prior to extending the process map past training.

As part of implementation of the process map, developing key performance indicators (KPI's) is necessary for monitoring the effectiveness of the process map. KPI's are useful for prompting improvements which could be made in the process (Izquierdo, 2014). Key performance indicators should be:

- 1) Quantitative and linked to the outcome that was established at the beginning of the process to ensure the indicators are measuring the correct outputs (Indeed, 2022).
- 2) Define the metrics which will be measured. Often these include a metric on financial performance, customer outcomes, internal process outcomes and internal human resource growth outcomes (indeed, 2022).
- 3) Document KPI's and measure against the "SMART" framework (indeed, 2022). The SMART framework in a KPI sense stands for:
 - a. Specific: Is the KPI specific?
 - b. Measurable: Is the KPI measurable?
 - c. Achievable: Is the KPI achievable?
 - d. Realistic: Is the KPI realistic?
 - e. Time bound: Is the KPI and reflecting on the KPI timebound?

As KPI's are assessed, failures or improvements that could be made should be encouraged (Liker, 2004). The Toyota philosophy on continuous improvement is to craft the steps to a process map first. Then continuously improve through identifying waste and fixing the waste to steadily simplify operations (Toyota, 2023). As part of continuous improvement, applying a 'gap' analysis to the current performance compared to the key performance indicator will highlight where performance is missing to obtain the desired outcome. A gap analysis is defined by (Izquierdo, 2022) as:

- 1) Identify the area for improvement through analysis of the KPI's.
- 2) Analyse the current level of performance.
- 3) Define the end goal.
- 4) Identify and quantify the gap.
- 5) Determine the plan of action utilising the SMART framework to close the gap.

6.6 Limitations of process mapping

This literature review focuses on the benefits and methods of process mapping however it is important to also consider and document the limitations of process mapping to ensure full transparency through development and implementation. Knowledge of these limitations allows contingency and checks to ensure the process map does not fall into the trap of failing and being ineffective. Based on literature, the following limitations to process mapping have been established:

6.6.1 Oversimplification:

Process maps often represent complex processes in a simplified manner. This oversimplification can lead to a lack of detail, making it challenging to capture all the nuances and exceptions that may occur (Sharma, 2018). These details may be essential for understanding the entire workflow or for quality control. By oversimplifying, the connections between different stages or components of a process might be inaccurately outlined leading to a flawed understanding of how the process truly operates. Processes, particularly in service industries often have exceptions or variations. Oversimplification might ignore these causing a misunderstanding of how the process operates under different circumstances. Neglecting variations and exceptions creates risks that customer outcomes are not customised or that the small details which have a big impact are missed (Q3edge, 2023).

To mitigate oversimplification in process mapping, it's essential to:

- Utilise stakeholders Involve individuals who are closely associated with the process to gain a comprehensive understanding.
- Account for different scenarios, exceptions, or variations that might occur within the process.
- Employ various tools to capture process intricacies and variations.
- Regularly review and validate the process map with stakeholders to ensure accuracy and completeness.

6.6.2 Subjectivity

Process mapping relies on the input of individuals who may have biases or incomplete knowledge about the process. This subjectivity can lead to inaccuracies in the mapping as

different people may interpret the same process differently. Biases, whether conscious or unconscious, influence how individuals perceive and document a process. These biases can lead to overemphasising certain steps, neglecting others, or misrepresenting the actual flow of the process. Different stakeholders may have conflicting opinions on how a process operates which can create disagreement among stakeholders, making it challenging to create a unified and accurate process map that everyone agrees on (Antonacci et al., 2021).

Mitigation of the subjectivity which could impact process mapping includes:

- Incorporate input from various stakeholders involved in the process to create a more comprehensive and balanced view (Antonacci et al., 2021).
- Use data and evidence to verify and validate the steps in the process map, reducing the impact of subjective interpretations.
- Educate individuals involved in process mapping on the impact of subjectivity and biases, enabling them to recognise and minimise their influence.

6.6.3 Time Consuming

Creating and maintaining process maps can be time-consuming, especially for large and complex processes. This can be a resource-intensive task that may not always be practical, particularly for small organisations (Robertson & Williams, 2006). Some processes are intricate and involve multiple steps, interactions, and decision points. To accurately map a process, comprehensive data collection is often required. This may involve interviews, observations and data analysis which can all be time intensive (Robertson & Williams, 2006). Engaging stakeholders, team members, or experts in the process is crucial for accurate mapping however the time spent meeting, gathering input, and reconciling different perspectives can soak up valuable time resource. If too little time is invested the process map can fail for other reasons as outlined above. Process mapping often involves revisions and iterations as the process map is current at a point in time, but can quickly become irrelevant if processes, compliance or legislation changes. Revisiting the mapped process to make improvements or adjustments also takes time, however is fundamental to achieving a successful outcome especially in larger or more complex processes.

To mitigate the time consumption, strategies such as focusing on critical processes first, utilising software tools for efficiency, and involving a diverse team to expedite the mapping process can be helpful. Additionally, setting clear objectives and scope for the mapping exercise following the processes outlined in section 6.5.1 can streamline the process and prevent it from becoming a time burden.

6.6.4 The Personal Factor

Process mapping relies on a team or organisation consistently following the documented process to be effective, as well as updating the process map when changes occur. Process mapping also relies on engagement from all members of the organisation, not just senior leadership (Eisenstat et al., 2015). If discipline is poor either through resistance to change or poor incentive to follow the process map, the function of the process map can be affected in different ways:

- Inconsistent documentation practices due to poor discipline can lead to incomplete, inaccurate, or outdated process maps. This lack of discipline can result in missing steps, outdated information, or inconsistent representations of the process.
- Without discipline, individuals may deviate from agreed-upon standards, leading to confusion and difficulty in understanding the mapped processes. Consistent adherence to process mapping standards is crucial for clarity and consistency.
- Poor discipline can result in inefficiencies. Repeated revisions or corrections due to lack of discipline in following a standardised process can waste time and resources.
- When discipline is lacking, collaborative efforts to map processes might suffer. Failure to adhere to agreed-upon timelines or processes can hinder effective teamwork, causing delays or misunderstandings.
- Inconsistencies due to poor discipline in process mapping can lead to reduced trust in the accuracy and reliability of the documented process, impacting decision-making and operational effectiveness.

Poor discipline or resistance to using the process maps developed by organisational members or stakeholders can be mitigated by:

- Clearly defining and communicating guidelines and standards for process mapping to ensure consistency and accuracy.
- Carry out training, provide resources and support to individuals involved in the mapping process to improve understanding and adherence to established procedures.
- Implement a system of checks and reviews to ensure that mapped processes meet the set standards and are accurate.
- Foster a culture of accountability to ensure that individuals take ownership of their roles in the mapping process and adhere to established guidelines.

7. Analysis, Results and Discussion of Literature to Establish a Method for Process Mapping in Farm Consultancy

The literature explored in this study investigates the what, why, how and limitations of process mapping across a range of industries. This establishes the fundamental considerations to developing a process map. This section aims to analyse the considerations of process mapping to develop a method for establishing a process map in a service industry namely farm consultancy. This process for establishing a process map was applied to a case study within a farm consultancy business which was evaluated through a SWOT analysis (Strengths, Weaknesses, Opportunities, Threats). This case study was run outside of this project therefore the process itself has not been detailed in this report, the method used to create the process is a key finding which could be applied to any function within a farm consultancy business both in a value add and non-value add process.

7.1 Application of what process mapping is and who uses process mapping.

The key themes established from "what is process mapping and who uses process mapping" are:

- Process maps can be used in good producing and service organisations for turning an input to an output. This conversion of input or output requires a value-add component which is often the reason farm businesses utilise farm consultancy.
- From the literature of organisations and industries who have utilised process mapping, clear benefits in efficiency, customer satisfaction and reduced complexity of the process were identified in manufacturing, healthcare and financial services. Of particular importance were the benefits which were obtained in the complex healthcare systems where there is a range of patient outcomes which may be required. The success in healthcare indicates that process mapping could also be used in farm consultancy despite the complexity of the farm system, business and year in year variations of a biological system.
- There are three types of process maps explored in the literature that can be utilised depending on the level of the organisation at which the mapping is required. These are relationship maps, cross-functional maps or flow diagrams. A farm consultancy business could utilise all three types of process maps in their operations to assist with administrative, customer/supplier relationship management or for providing the advice which they are often engaged for. The decisions of what map to use depends on whether the process map is to be used between organisations, between departments or within departments on specific tasks. Based on the information in section 6.1, the following diagram could be used to decide on the process map to use:



Figure eight: Flow diagram depicting the type of process map which could be used within a farm consultancy business.

7.2 Application of literature on why process mapping is useful.

The literature highlighted eight key reasons for utilising process mapping within organisations. These reasons stretched across all industries in both a good producing and service providing framework. A case study of the "Toyota Way" confirmed that there are links between these eight reasons, and the generational success Toyota has experienced since their processes were documented in the 1950's as they became one of the most respected organisations for establishing efficient business operations (Liker, 2014).

The figure below outlines how the eight reasons for why process mapping (from section 6.3) could be relevant for a farm consultancy business which could be used as a starting point for some initial processes to focus on.



Figure nine: Eight key reasons for processing mapping in the context of farm consultancy

Through synthesising the eight key processes into relevance for farm consultancy, there are significant opportunities for the mapping of processes from both an internal administrative perspective and customer output perspective. It is also clear that an organisation or individual farm consultant could utilise process mapping for some but not all processes and could customise the level of systemisation to suit the organisation and customer requirements.

For example an individual farm consultant may not document the exact steps carried out to turn farm data in to output such as a financial or feed budget, as they will likely be carrying out the work each time and could establish steps within their head. However, they may not have the time resource for onboarding new clients therefore may map and standardise the process in which customers engage them for work to reduce the time required for that administrative side of the business. This may differ from a larger consultancy firm where the process to completing customer work must be standardised amongst many different employees, however the scale allows an administrative employee to be employed who can handle the administrative side and requires less process mapping to carry out these functions.

It is essential that the reason for establishing the process map is established and agreed upon by stakeholders prior to commencing activities to ensure assessment on the success of the process map can be undertaken.

7.3 Application of how to implement a process map.

The key considerations when developing a process map outlined in the literature have been synchronised and tested by creating a method which could be followed to map a process within a farm consultancy business. This is shown in figure eleven below. As part of the process map, awareness on a gap analysis is required, and knowledge of the SMART framework. These have been provided below to provide full clarity of a system to follow within the results section of the report:

SMART Framework: The SMART framework in a KPI sense stands for:

- a. Specific: Is the KPI specific?
- b. Measurable: Is the KPI measurable?
- c. Achievable: Is the KPI achievable?
- d. Realistic: Is the KPI realistic?
- e. Time bound: Is the KPI and reflecting on the KPI timebound?

Steps to complete a GAP assessment:

1 - Identify the area for improvement through analysis of the KPI's

- 2 Analyse the current level of performance
- 3 Define the end goal
- 4 Identify and quantify the gap
- 5 Determine the plan of action utilising the SMART framework to close the gap.

Figure Ten: The SMART action framework and steps to completing a gap assessment



Figure eleven: Miro Board diagram of how to create a process map that could be applied to a farm consultancy process.

The figure above outlines a fully encapsulated method for establishing a process map within a service industry. The aim of this figure is to provide a framework which can be applied to any process within a service industry. The actual steps to document the process make up a small part of this diagram, with requirements to establish the objective, the type of map to be used and KPI's to monitor success also essential to creating an effective process map which will provide value not only in the short term, but also the long term through the inclusion of a framework to ensure continuous improvement.

7.4 Development of the case study

Following the development of a method for creating a process map, a case study was implemented in a farm consultancy business whereby both a value-add, and non-value add process were mapped and implemented. Following the implementation of the process map, KPI's were analysed and the following reflections were documented utilising a SWOT analysis.

Strengths

What were the strengths of using process maps

- The process of developing the process maps meant communication and understanding between team members was increased
- The standardisation in both the non value add and value add meant less human resource was required for processes increasing efficiency whilst still maintaining good customer outcomes.
- Through the process mapping design and implementation, inefficiencies in the way previous processes were undertaken were highlighted, which could then be rectified through the updated processing.
- Between team processes could be visualised assisting other departments to understand what each team within the organisation did, and how the process impacted work undertakings within the business.
- The process map made both management and team members life easier encouraging more process mapping in other areas and an attitude of the improvements which could be made from the process mapping.

Opportunities

What opportunities did the use of process maps create

- Opportunity to execute further processing mapping to capitalise on the progress and momentum from implementing the initial process maps.
- Utilise the process map for explaining the workflow to new team members when they start, and to customers for understanding where their work is at, and the future work which may be required.
- Encourage further continuous improvement and feedback on how we can make processes more efficient from all team members.
- Utilise technology and other mapping software to allow better visualisation and customisation of the process map more quickly.

Weaknesses

What were the weaknesses of using process maps

- Time consuming; Developing the process map was a time consuming process. The time to document, engage stakeholders and train on the process map meant it was crucial for the process map to be effective, and increase efficiency both to make up for the time invested and to encourage use from the organisation.
- Scheduling time for updating/reflection and maintenance: Discipline to reflect on the process map and hunt out the inefficiencies was difficult particularly during busy periods where customer work was also pressing.
- Complexity of being able to synchronise thoughts and encapsulate all parts of the process was difficult. Also difficult was being able to cover off as many what if's and exceptions to the rule as possible whilst still being able to implement the process map.

Threats

What were the threats from using the process map

- Over-reliance on process map: There is a threat or risk that the process map can become too fundamental and the first principle of why things happen could be lost, which would make it more difficult for staff to identify exceptions to rules or when the process is no longer working
- Outdated processes: Without correct KPI's and discipline to measure these KPI's, there is a risk the process developed becomes outdated and customer outcomes or internal processes suffer.
- Discipline to use the process map: If staff don't follow the process map, the output may be inconsistent or other members of the team don't see it as necessary therefore the standardised process breaks down and the effect of the process map is removed.
- The other threat is that if the process map is not fully accurate, the wrong practices will be imbedded in to processes which is more difficult to unpick once corrections are made.

Figure twelve: SWOT analysis of the process map case study undertaken based on a farm consultancy firm.

The SWOT analysis highlighted many strengths to the process mapping process, these strengths align with the reasons why organisations would implement processing mapping outlined in the literature in this report. The increase in communication and standardisation of processes increased productivity and understanding both internally and with customers on the benefits to completing the work which was undertaken. This will also assist with future work as the process can be communicated to customers before undertaking the work.

Many opportunities were also documented as part of the SWOT analysis, indicating the process mapping process also uncovered other factors which could be executed on top of the opportunities outlined in the literature. The potential for technology to use as part of process mapping should be looked in to further for this organisation and is recommended for any agricultural consultancy organisation from the outset of a process mapping project.

The weaknesses noticed as part of the SWOT analysis aligned with the challenges and considerations found in the literature regarding the implementation of process mapping. These weaknesses have the potential to undo the strengths of process mapping therefore must be mitigated and worked through. Matching the level of detail and effort of a process map to the outcomes which could be achieved is essential to ensure the time-consuming process is worthwhile and results in tangible benefits to the organisation and or industry. A detailed understanding of the processes is important to ensure the complexity issue identified as a weakness can be managed.

The SWOT analysis identified threats of failure for process mapping. These included: discipline of staff to follow process, and a risk of an over-reliance and outdated process causing quality and efficiency issues. The discipline of staff requires full organisational uptake and belief that the process map will assist with better internal and external outcomes. Clear communication and getting input from all stakeholders is essential to mitigating this risk. Over-reliance on process maps is another risk as the purpose of the process map is to aid in efficiency and reduce the communication and waste within the organisation. However, if individuals do not know the first principles for the process they are implementing, the risk of missing what-ifs and exceptions to rules increases which could create the wrong outcome and cause customer dissatisfaction. Full training of staff in the first principles of a process map should assist with overcoming this risk/threat. Out-dated process maps causing the wrong outcomes can be overcome as a threat through the discipline of the process lead to review KPI's and action changes/learnings as part of continuous improvement. This step should not be neglected once the process map is developed to ensure maximum efficacy of the process in the long term.

8. Conclusions and Recommendations

The complexity involved with food and fibre production has led to a significant increase in the number and specialist skillset of rural professionals required to support farming businesses. These rural professionals are tasked with assisting farming businesses to manage risks and thrive in a time when change is occurring at ever increasing rates. The increase in demand for rural professionals provides opportunity for businesses to provide services and scale up to meet this demand, however demand for expert advice is not easily met with the supply of professionals due to the complex nature, ever changing requirements and experience required to know and be trusted to provide reliable advice.

The potential of process mapping to assist farm consultancy businesses with both their value add and non-value undertakings was investigated in this project through the review of applicable literature, analysing the literature to create a method to utilise process mapping within a farm consultancy and the application of this process in a case study to test findings of the literature. Based on this the following conclusions and recommendations can be made:

8.1 Conclusions

- 1) The application of process mapping in other service industries has been successful in showing improvements in customer outcomes and business efficiency, indicating there is a role process mapping can play in farm consultancy which was an objective of this project.
- 2) There are different types of process mapping which could all be utilised within a farm consultancy business, all of which have their benefits and suitability to assist with different functions.
- 3) There are twelve key factors which must be established to create an effective process map. These twelve factors are all essential to ensure good outcomes from a process map and improve efficiency.
- 4) The case study developed based on the process developed in this report indicates strengths and opportunities similar to those outlined in other industries. This further confirms the positives that can be achieved through the implementation of process mapping in farm consultancy. Although there are significant benefits and opportunities to process mapping, there are also weaknesses and threats which could derail the process and result in worse outcomes than not implementing a process map.

8.2 Recommendations

- 1) Consideration into the type of process map to be used to ensure maximum efficacy of the process map will optimise outcomes for a business.
- 2) Although there are 12 key steps to consider in process map design, it is recommended emphasis is placed on ensuring clarity of the purpose of the process

map, ensuring all stakeholders have input, developing KPI's and providing a framework for continuous improvement.

- 3) Awareness and development of strategies to overcome the weaknesses and threats found in the case study is recommended as part of any process mapping undertaken. It is essential that weaknesses and threats are understood as well as possible for each process that will be mapped.
- 4) The final recommendation is to get started. Perfection is difficult to obtain in process mapping from the outset therefore getting started and documenting the process to then allow for continuous improvement will enable gains in both the short and long term as the process is refined.

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