



Growing your Profitability

Through Value Chain Management

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Introduction

Critically evaluating your business and/or a value chain can seem a daunting prospect. If you are unfamiliar with concepts such as Lean Thinking, Process Improvement, Six Sigma, or Statistical Process Control, we have only one request. Please, do not let yourself be intimidated.

Completing the activities in this workbook might seem overwhelming, particularly when you're unlikely to be in a position where you can set time aside to work primarily on "creating a value chain". Therefore, this book has been designed so that anyone, regardless of his/her familiarity with the concept of Value Chain Management, can benefit from using this guide. Even spending an hour a day on it over a longer period of time can help you make incremental changes to your business.

To help you systematically identify and implement improvements, the workbook has also been designed so it can be completed for an individual business (*whether a farm, a processor, a retailer, etc.*), for part of a value chain, or for an entire value chain. This means you have the opportunity to become familiar with each of the tools and concepts before moving on to the next step, or working through the same step again with a larger group of people or businesses.

To enable you to apply value chain management principles to your business, the body of the workbook provides only clear, practical activities and information. Additional information is included in the Appendixes if you'd like more detailed information on any of the tools or suggestions, to help you understand the theory supporting our suggestions. To this end, each section may include:

1. Overview of Objectives;
2. Background/Theoretical Information and Examples;
3. Practical Activities and How-to Information;
4. Additional Resources.

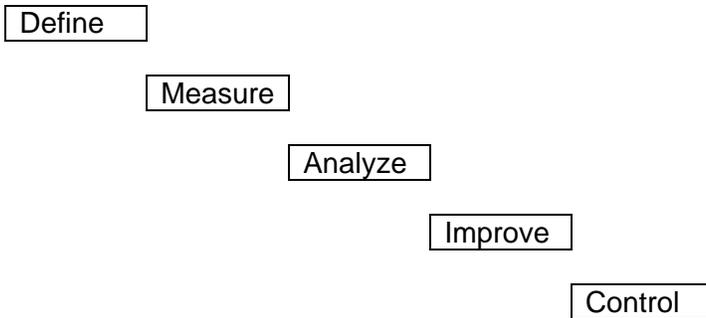
The activities will help you collaborate with partners, to agree on what needs to happen and when, and decide who should be accountable for various implementation and monitoring responsibilities. An overview forms Appendix 8. The activities in this book are also detailed. We recommend that you work through them with *one* product in your mind at a time.

To help you apply the models and ideas to your business situation, we have included real examples to show how these theories have been used for commercial gain. For consistency, examples from the red meat sector are referred to through the workbook. Examples from other sectors are also provided to add depth and benefit the wider agricultural and agri-food industry.

We hope that these examples and the additional resources listed in the Appendixes will motivate you to work towards joining the ranks of those who have benefited greatly from using the tools described.

We guarantee that it was not their level of education, age, background, sector, or experience that enabled the people described to succeed; it was their curiosity and determination. That you are an owner of this workbook demonstrates that you are curious. You will prove your determination by completing the workbook.

As an introduction, the illustration below describes the workbook's overall layout. These sections are described more fully below in "About DMAIC".



The focus of this workbook includes understanding:

- What factors can you control?
- How can you limit the impact of things that you can't control?
- What factors are critical to control?
- How can you better manage the critical factors than you currently do today?

You may have to collect information or even your thoughts before you can complete a section. That is to be expected. It is not reasonable to have all of the answers to hand. If you are unsure or don't know something, leave it blank. You can come back to it later.

Completing this book will take time. However, the return on your investment of time will include the creation of greater value, leading to increased consumer satisfaction and increased sales and revenues. Better management of the value chain and its associated processes has been proven to reduce operating costs and risks, as well as the volatility of revenues when output is sold off as a commodity.

If you aspire to make changes to the way you do business, to improve your profitability and long-term security, we hope that you use this workbook: write in it, review it and of course, apply it!

Clarification

Before getting started, let us clarify the three terms referred to throughout the workbook:

The **Value Chain*** is a series of connected activities that transform raw materials into a product (or service) that is of value to a consumer.

A **process** is a series of tasks that support or enable the value chain to function, such as setting up a machine, ordering material and supplies.

Customer/Consumer: Every business has customers. Every business also has a role in producing an end product that is purchased and eaten (or used) by consumers. As this workbook has been designed to be used by any business, regardless of their position and role in the value chain, we do not differentiate between Customers and Consumers. Satisfying them both is equally important to the success of your business.

**We purposely do not differentiate between value chains and supply chains. In our view, attempting to make a stark differentiation between supply chains and value chains is a meaningless exercise. This is because such attempts fail to recognize that management is the key differentiator of success. They also fail to acknowledge that management is a reiterating and evolutionary process, so a supply chain doesn't just morph into a value chain overnight. And what do you call a chain that is part supply chain, part value chain? We therefore use the term value chain throughout the workbook.*

About DMAIC

No amount of determination or gut instinct can overcome a lack of planning or the failure of the partners to agree on the way to proceed. Therefore to be successful, any effort invested into increasing the performance of a value chain (or creating one in the first place) requires that you follow a well thought-out methodology.

This workbook follows the Lean/Six Sigma methodology because it has successfully guided improvements and delivered proven results across many sectors, including agri-food. It achieves this by using value chain knowledge, data and facts as the basis of designing and implementing improvements, includes a number of logical phases and it focuses on the customer or consumer. The five phases of a Lean/Six Sigma projects are **Define, Measure, Analyze, Improve** and **Control**.

While the term Six Sigma may conjure up images of complex statistical tools, this workbook uses only very basic tools that require just value chain knowledge and/or basic arithmetic to complete. It does not require that you possess a PhD in Mathematics or Quantum Physics!

We also prefer the DMAIC methodology because as you continue to improve your business and chain in the future, it will allow you to apply more advanced statistical analysis without having to change your methodology. This means that you can simply 'bolt-on' more complex statistical tools as your proficiency increases.

In the same vein, while we have included a reasonably extensive **Improve** chapter. This is largely intended for the design, testing and roll out of big complex changes rather than the 'just do it' improvements, of which you will likely find many, as you start analyzing your business.

As an introduction to DMAIC and Six Sigma, each of the phases on which this workbook is based is described more fully below.

In the **Define** phase:

- Know your customer/consumer
- Know how satisfied your customers/consumers are
- Define and measure quality
- Draw your current chain
- Determine how well your current chain address customer/consumer needs
- Identify the inputs that you can control
- Define the undesirable effects of the current value chain
- Define your current processes
- Identify and prioritize opportunities
- Outline how 'Just do it' opportunities will be captured using an action log
- Establish a project charter for more complex opportunities

In the **Measure** phase:

- Develop a more specific understanding of the inputs and outputs you need to control
- Map and measure in detail the performance of your business and value chain
- Understand, identify and plan methods for reducing waste
- Assess the adequacy of process controls for reducing risk
- Create a data collection plan and collect data

In the **Analyze phase**:

- Determine what the data collected during the measure phase tells you about the performance of your business and the value chain
- Determine if the data indicates that further analysis is required
- Conduct a final analysis of the current state of your business and the value chain
- Develop a future state vision of your business and the value chain
- Based on what we've learned from the data analysis, determine what should or could be the future performance of your business and the value chain
- Determine how you will manage and measure change in your business and the value chain

In the **Improve phase**:

- Set out the case for change
- Design an improvement plan for the future state value chain
- Pilot and test the future state value chain
- Validate the improved performance
- Roll out the new value chain

In the **Control phase**:

- Develop and implement a value chain documentation and control plan
- Develop a communication plan
- Develop a training plan
- Establish key performance indicators and reporting processes
- Establish information and communication flows
- Conduct post implementation follow up audits
- Establish a monthly management review process

Introduction Activity: Why do you want to complete this workbook?

Before you formally start working through the DMAIC approach to improving your business, we believe that it is important for you to begin by defining why you are completing this workbook. What are the purpose, goals and objectives that you see this workbook helping you to achieve?

To help you through this introductory process, we have listed a few questions below. In Appendix 5 you can learn of the objectives set by a farmer owned co-operative at the start of what became a successfully project.

In the space provided below, write a statement or list of outcomes that you would like to achieve from the project you are about to undertake. Hopefully, this will include a statement about what success will look like.

Do not feel that you have to have perfect insightful answers. You don't! The purpose of this exercise is to provide an initial target for you to work towards. By the same token, don't be afraid to think big. On many occasions we have seen where, partway through their improvement process, businesses have identified far larger opportunities than they once imagined possible. Some of those, such as a \$50 million reversal in financial fortune and a 40% reduction in operating costs, are described in the examples we have provided.

Questions to help guide your thoughts:

- What would you consider to be a successful outcome of completing this workbook?
- What is the main purpose or objective for you?
- What do you want to change or improve in your business?
- How do you think Value Chain Management can help you to improve your business?

1. Define Phase

Objectives of the **Define phase** are:

- 1.1 Know your customer/consumer;
- 1.2 Know how satisfied your customers/consumers are;
- 1.3 Understand your current chain;
- 1.4 Define quality;
- 1.5 Evaluate your chain's performance and establishing priorities;
- 1.6 Identify the inputs that you can control;
- 1.7 Know the undesirable effects of the current value chain;
- 1.8 Define your current processes;
- 1.9 Identify and prioritize opportunities;
- 1.10
 - a. Outline how 'Just do it' opportunities will be captured using an action log;
 - b. Establish a project charter for more complex opportunities.

This section is lengthy and will take you considerable time to complete. Don't get discouraged. Making the effort at this stage will avoid working on the wrong things later. So spending the necessary time on this section will pay dividends later!

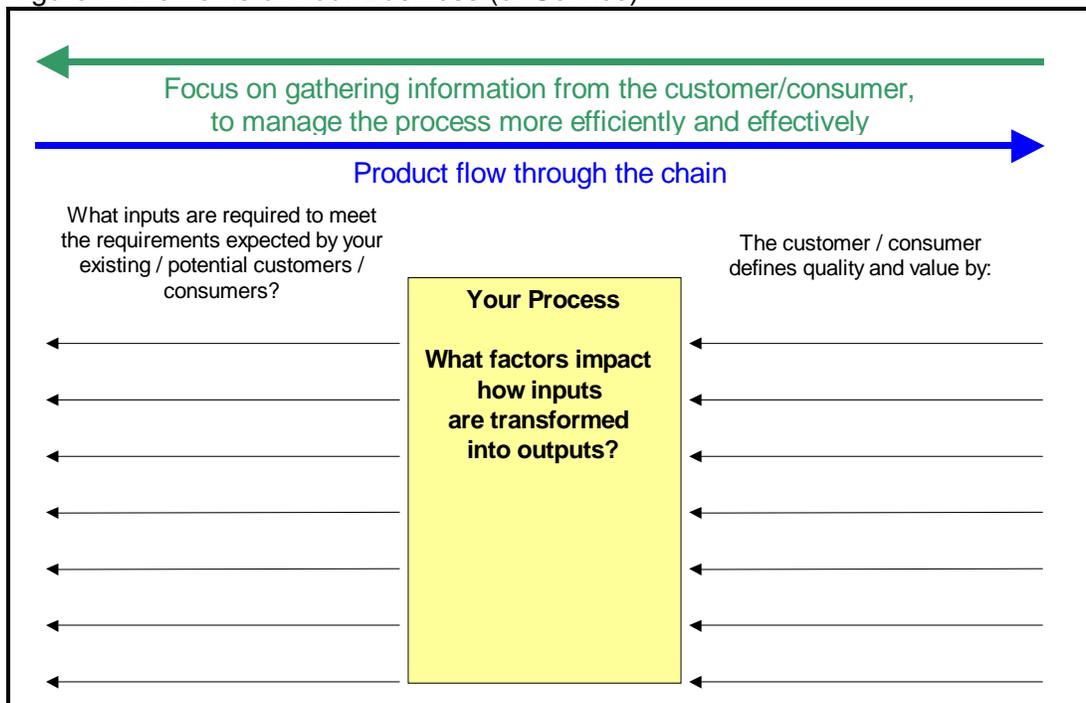
The activities in this section relate to the Figure 1 (below), which you will be asked to complete later. It presents a very different perspective than most people consider when evaluating their business. It shows that unless you have sufficient information about what constitutes value from the perspective of your customers and consumers, you will be unable to clearly identify how you can improve the performance of your business.

It also shows that there are three elements to every business, whether it is a farm, a processor, a retailer, a restaurant, or any other business. The three elements are Inputs, Outputs and Processes. The Processes are the activity you undertake to transform Inputs into an Output(s) that should be valued more by your customers and consumers than it cost you to produce.

The tools described in this and subsequent chapters focus on helping you identify then continually improve the relationship between these three elements of your business. In doing so, you will also acquire greater insights into how your business relates to your customers and suppliers; and your customers' customers and your suppliers' suppliers.

Once you have this powerful array of information you will be able improve, and continue improving, the success of your business by making purposeful management decisions that reflect the needs of the overall chain(s) in which you operate.

Figure 1: Elements of Your Business (or Service)



1.1 Know your Customer/Consumer

Why do it?

- The customer/consumer is the person who buys from the value chain and thus is partly responsible for it's being, and certainly its financial well being.
- Unless we are focused on the customer/consumer, we are likely focusing only on satisfaction within the chain, missing out on opportunities to sell additional value, and may allow the competition to overtake us.

The exercises in this section will help you define:

- Who your customers are
- What they want
- What inputs you need to focus on in order to provide what your customer wants
- Processes that you can manage to produce customer defined outputs, more effectively and efficiently than you are at the moment

The main purpose of this section is to help you identify what you need to control, not how you are going to control it.

For many of the activities in this section, you will need to conduct some research. For any analysis to be meaningful, actual consumer data must be used. However, you can start immediately with what you know now and do the research later, once you are more familiar with the content.

When you are ready to do the research, you have several options open to you. While a market research company is often the preferred route to construct, administer and analyze a survey, it not always possible to hire professional researchers. If you are willing to do the work yourself, there are

many ways to collect data to better understand your customers/consumers. Some research suggestions include:

- Read online research related to consumer trends and consumption completed by others. A list of websites to consider is provided at end of this chapter.
- Ask for relevant research, reports or information from any publications or industry associations you subscribe to or are a member of. Look on their websites and call them to see if there is anything additional they can tell you on the phone or send to you directly.
- Conduct your own primary research
 - Consider hiring a research company either on your own or with like-minded partners.
 - If you would prefer to do the research yourself, be prepared to talk to customers and suppliers. **Rather than thinking you know what is important to them, ask them directly.** Ask them questions such as;
 - What do you require of our product?
 - How well does it serve your needs?
 - What could we do to make it better?
 - Have you had any cause to be dissatisfied with our product?
 - Would you recommend it to others – if not, why?
 - In addition to speaking with existing suppliers and customers/consumers, also target customers and suppliers you would like to work with but aren't currently.
 - Ask friends/family what they think.
 - Ask permission to visit a retail grocery store (or similar) and ask their customers about what they like/dislike/want and how well their needs are currently being met.
 - Be sure to make notes when you speak to others so you can review and compare information at your convenience.

For the activities in the workbook, you will need to know the following:

- Who are your existing customers?
- Who are your potential customers? Are there competitors who are supplying others that you are not? Do you want that business?
- Who are your customers, customers?
- If this is not the consumer, who is it?
- What are the needs of your customer(s)/consumers?
- How do they define quality?
- How do they measure value?
- Out of all of their needs/demands, which ones are the most important? Rate their needs on a scale of 1-10, where 1 is low importance and 10 is critically important.
- Are they currently getting what they want? Measure how well their needs are currently being met, using a scale of 1-10 (where 1 is the need is not being met and 10 is totally satisfied).
- Are his or her needs being met because of something you are doing, or because of something someone else is doing (i.e. a competitor or someone else in your chain)?
- Who is in your current chain?
- What do they currently do? What could they do differently or better?

Please Note: *If you complete some of the activities before you research your market or physically walk your chain, be sure to review your work and update what you can with real data before progressing to the Measure phase.*

1.1.1 Background Information

Quality (and thus value) is ultimately defined by the consumer. Depending on your relationship with others in your chain, and if you have done research in the past, you might be well informed on how your customer and the end consumer defines quality. Or maybe you really don't know what is important from your customers'/consumers point of view.

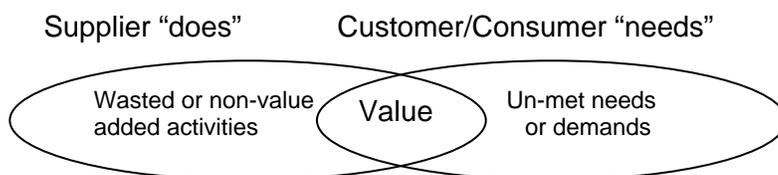
In the illustration below, each company might be “**doing things right**”, but by working independently of each other they are missing opportunities to create value.

Figure 2: Doing Things Right



In contrast, in the illustration below, the companies are creating value by working together to “**do the right things**”.

Figure 3: Doing the Right Things



Must do 'X' to meet customer needs 'Y'. Anything else is waste and/or missed opportunities.

Not all supplier activities will create value for your customers/consumers. Some activities will occur because they are a necessary for enabling your business to maximize the value that you create for your customers/consumers. Because un-met demands may cause the customer/consumer to shop around and/or the competition to move in, having the correct enabling activities in place is an important part of your business.

It is equally important that you identify any activities that do not create customer/consumer recognised value, or impact your ability to create value. As you will see from the examples featured throughout this workbook, an inability to identify and commit to doing the right things is a common problem facing businesses, wherever they are in the value chain.

As you progress through this stage of analysing your business, give consideration to whether someone else is doing something that directly impacts your own ability to create value. Any activity that does not create customer/consumer recognised value, or is not required to create value, or impacts your own ability to create value, is simply waste.

Wasteful activities create unnecessary costs and therefore reduce the efficiency of your business. Below are two examples where wasteful activities were found to be occurring in agri-food value chains. Their discontinuation markedly improved the performance of both chains.

1.1.2 Examples: The importance of identifying wasteful activities

Red Meat

Selling animals through a sales barn provides producers with little consumer information on which they can base their long-term business decisions. Processors are left guessing about the uniformity of animals, the availability of animals, and the extent to which carcasses reflect specific market demands. Businesses along the entire chain commonly make decisions based on assumptions rather than facts. The resulting fluctuations in volume and quality lead to overly high inventories, which processors offer to retailers on a deal to clear.

Unfortunately, in this situation, everyone misses opportunities to reduce costs and increase revenue, partly from having to dispose of products that should never have been in the system in the first place. It also results in an attitude of adversity. Each party supposes that they can only win when the other(s) lose(s), and no one takes responsibility for the chain's performance.

Our example is of one processor who decided this model was not enabling them to “do the right things”. They needed a new business model. By purchasing directly from producers rather than through the sale yards, they were able to involve farmers in their planning process (often months in advance of the sale of their animals) and provide them with distinct performance criteria, and sufficiently reward them for providing specific quality while penalizing those suppliers that under performed.

Overtime, the under-performing suppliers either improved their performance or extracted themselves from the system. By working collaboratively with this preferred group of suppliers, both the processor and the remaining suppliers have greater opportunity to establish themselves as a long-term strategic partner to an important retail customer.

The result is a win for every participant along the value chain. They all have greater opportunities to reduce costs and increase revenue by doing the right things. This model also provides the opportunity to objectively weed out producers who are not committed to the system and increase costs for everyone involved. Having under performers in your midst also reduces the opportunities to grow revenue.

Potatoes

Until they undertook a study to identify the relationship between their inputs, outputs, and processes, a supplier of peeled ready-to-use potatoes had been sourcing commodity potatoes from the open market.

Because they believed that their profitability came from managing their current operations as efficiently as possible, they thought they were doing the right thing by primarily basing their purchasing decisions on price. However, after connecting the chain of operations from procurement through to processing and finally marketing, the supplier identified that in following this strategy they were in fact creating considerable unnecessary costs for themselves.

By establishing a relationship between what they were buying (Inputs) and what they were producing (Outputs), they could track the performance of their operations (Process) over time and discovered that less than 40% of the potatoes that they sourced from the commodity market were sold to their retail customers.

By sourcing more appropriate potatoes for their plant and customers, they were able to substantially reduce waste, which reduced their operating costs and increased their overall revenues. Even though their raw material purchase costs could be higher than they previously were, the processor found that it paid them to reward producers for supplying the type of potatoes that would enable their plant to operate to its maximum level of efficiency and effectiveness.

No longer would potatoes be sourced, or suppliers be paid, solely on price per tonne. Rather, potatoes purchased need to meet a fairly basic benchmark for quality. The company soon found that “doing the right thing” meant sourcing specific potatoes for specific markets, and tracking the performance of the both potatoes and suppliers over time.

Activity 1 Identify your customers and who they serve

It is important to identify the relationships between your Inputs, Outputs, and Processes with the needs and expectations of your customer(s) and consumer(s). This is illustrated in the examples you have just read (Section 1.1.2).

The first step in identifying relationships between your Inputs, Outputs, Processes, and opportunities to improve performance, is to determine your customer(s) and the end market(s) that they serve. Those end markets are the consumers.

Remember that every time you make a step closer to understanding the consumers that use your product(s)/service, you will increase the opportunities to improve the performance of your business.

Who are your Customer(s)?	What end market(s) or who do they serve?

At some point you should complete this exercise for each of the businesses in your value chain.

1.2 How satisfied are your Customers/Consumers?

Once you have identified your customer(s) and the market(s) that they serve, choose the one that you believe that you'll get the most benefit from working with. You may well not choose to work with your largest customer. It may be the customer with whom you have the best relationship and therefore feel most comfortable working with to improve both your own and their performance. You may decide that the time to approach your larger customers is when you are more familiar and comfortable with the process of value chain management.

Before we move onto identifying what your chosen customers and consumers consider most important (which will enable you to begin identifying relationships between Inputs, Outputs, and Processes), we suggest you read the following examples on why have this type of information is such a critical part of successfully managing value chains.

1.2.1 Examples: Why it is critical to identify and understand customer/consumer needs

Red Meat

Many believe agriculture to be such a unique industry that it cannot gain by learning from other industries. In reality, analysis has shown that this is not the case, and success in agriculture relies on many of the same factors as occur in other industries. Analysis has also found that the few factors that are unique to agriculture make it more (not less) important for businesses operating in the agriculture and food industry to coordinate their operations compared to other industries.

For example, the three factors that are unique to red meat and make coordination critically important in success are:

1. It is a disassembling industry, dividing a whole raw product into many separate products.
2. Long cycle times, from conception through to production and consumption often takes years; and many more years of breeding to alter genetics to achieve a specific outcome.
3. Environmental impacts, how weather and geography impact the outcome of genetics.

The factor that the meat industry disassembles an entire carcass and operates on long cycle times means that it is vitally important to identify how closely the attributes of the live animal reflect the needs of customers and consumers. One reason for this comes from studies that have shown that inconsistency in carcass characteristics can be a huge issue for downstream stakeholders through creating unnecessary added costs and missed market opportunities. This in turn limits the returns that producers can capture from producing a live animal.

However, an over reliance on remaining competitive through consistency and cutting costs can impact the value that consumers perceive a product offers. For instance, studies show that focusing on reducing costs rather than creating consumer recognised value is an important reason for why pork is losing market in the North American market. This situation is exacerbated by a hog pricing model that has little if any correlation to consumer demands. It results in a generic hog that produces fresh pork, which does not satisfy consumer demands as well as other meats.

Introducing a pricing and production model that results in a hog designed to meet specific consumer demands could increase the consumption and perceived value of fresh pork to a large body of consumers.

Stone fruit

For many years, it has been assumed that traditional three litre stone fruit baskets denote a local source, which commands a price premium.

Extensive research found that for a number of reasons, this is not true. Three litre baskets are viewed with suspicion by many consumers who do not like to change their purchasing, handling, and consumption habits for a relatively short period of the year when the baskets are used. Consumers also reported that the fruit in the baskets provides inconsistent eating and keeping quality. The main reason why consumers purchase stone fruit in the traditional three litre basket is because they are cheap. Rather than commanding a premium as previous thought, Canadian stone fruit was found to regularly sell for less than half the price of imported stone fruit.

The primary reason why imported fruit sells for more than local fruit was found to be the superior consistency in size and quality of imported stone fruit. Another attribute offered by imported stone fruit and valued by consumers is the functionality that comes from being able to purchase individual

pieces of fruit. This is important because most consumers do not purchase a large volume of one (or two) fruit(s). They purchase small volumes of numerous fruits.

The three litre baskets were also found to negatively affect the attitudes and behaviour of retail staff and executives. Training and motivating staff to deal with high volumes of product that is packed differently to that which they handle for the majority of the year is a difficult process. This is especially true when the fruit inside the baskets is an inconsistent quality.

Dealing with the costs created by the high levels of shrinkage of local compared to imported fruit, along with the largely adversarial relationships that exist between the retailers and many suppliers, also negatively impacts retail executives' willingness to view local stone fruit as a highly valued item. In fact, the research found that they view the primary value of local stone fruit to be its use as a loss leader. Stocking and promoting local stone fruit encouraged consumers into stores and led to them buying other products.

The overall lesson provided by the research was that for too long producers and their stakeholders had based their decisions and behaviour on assumptions. Suppliers of stone fruit thought they knew and understood their customer/consumer needs. However, research found that these assumptions were incorrect.

1.2.2 Background Information

To identify opportunities you need to:

- Understand how satisfied customers/consumers are;
- Identify what attributes consumers need (value); and
- Identify the level of importance of each need attribute (criticality).

Using the knowledge you have gained from your research and Activity 1, list the attributes that are important to your customer/consumer. Moving forward, these will be referred to as Critical to Satisfaction (CTS) attributes.

For each CTS attribute, the extent of consumer satisfaction also needs to be determined. Rate how important each attribute is to the consumer, using a scale of 1 to 10. A very low score (1 to 4) means of little to no importance, while a high score (8 to 10) is a deal breaker. If a deal breaker attribute is not met or not provided, consumers will not consider purchasing. A suggested scoring guide follows:

8, 9, 10	Deal Breaker: if not available consumers will not buy the product
5, 6, 7	Very Important: consumers may buy once if they have no other choice
1, 2,3,4	Low Importance: but an opportunity to “delight” consumers by addressing, perhaps in some unique manner. E.g. zip lock poly bags for frozen vegetables.

To understand the relationship and hierarchy of needs, the Six Sigma methodology applies the information from Activity 2 into a CTS Tree, which is a configuration similar to a family tree. Examples for tray packed beef and bagged salad are shown below.

At 'Tier 1', the tree starts off with three primary attributes; shelf appeal, quality and price and availability. The second and third tiers include specific attributes that feed into the primary attributes that are sought by consumers. This approach ensures that you thoroughly understand what consumers mean when they talk about issues such as 'quality' and 'value'.

*When have completed this exercise for consumers, you will be asked to also complete it for each of the businesses which, together with your own business, comprise the value chain that you are analysing.

**If for any reason you are unable to map a consumer CTS Tree, map a CTS Tree for the business that operates closer to the end consumer. Remember however that every time you make a step closer to understanding consumers, you will increase your opportunities to improve the performance of your business.

Figure 4: CTS Tree Example illustrating Tray Packed Beef

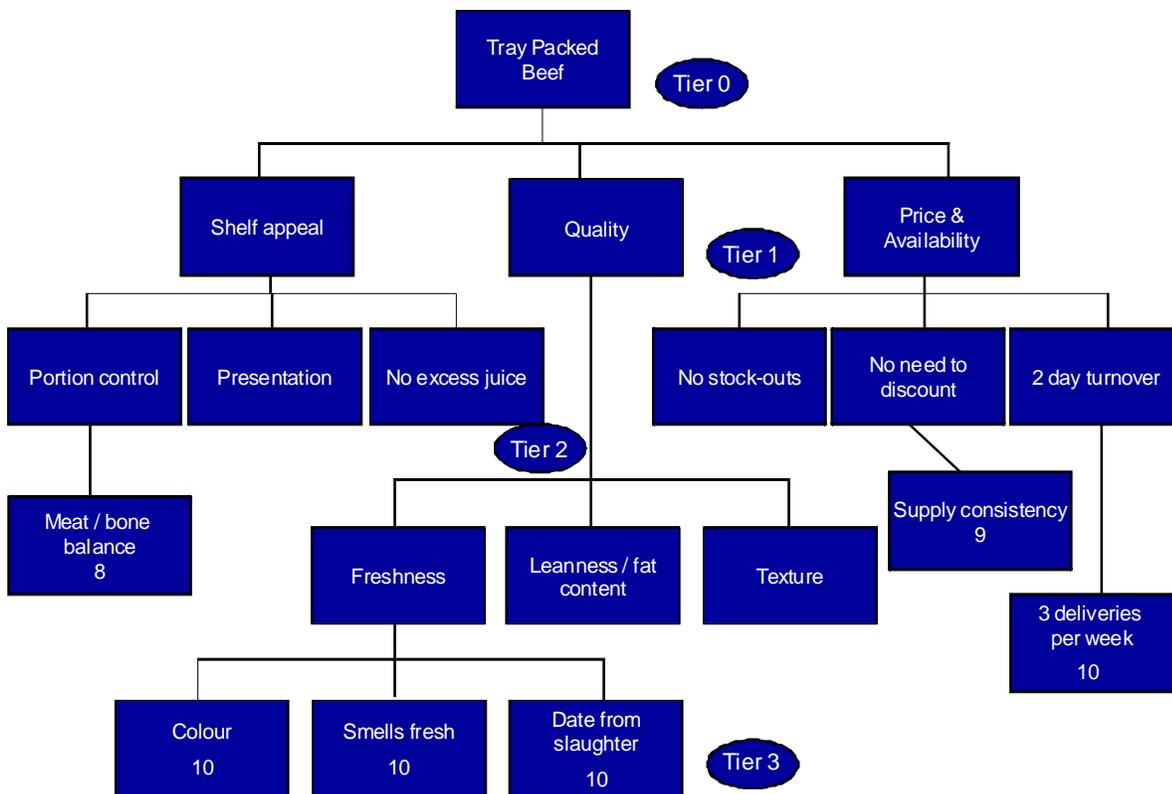
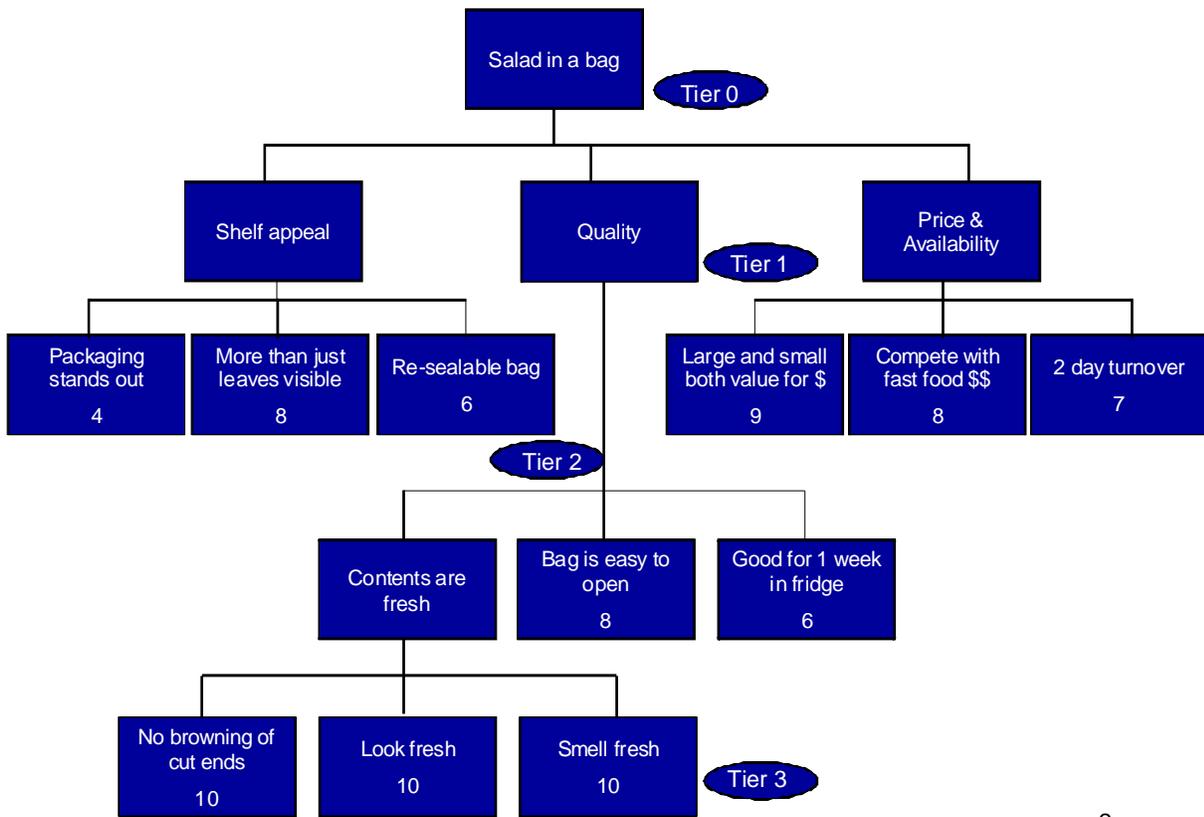


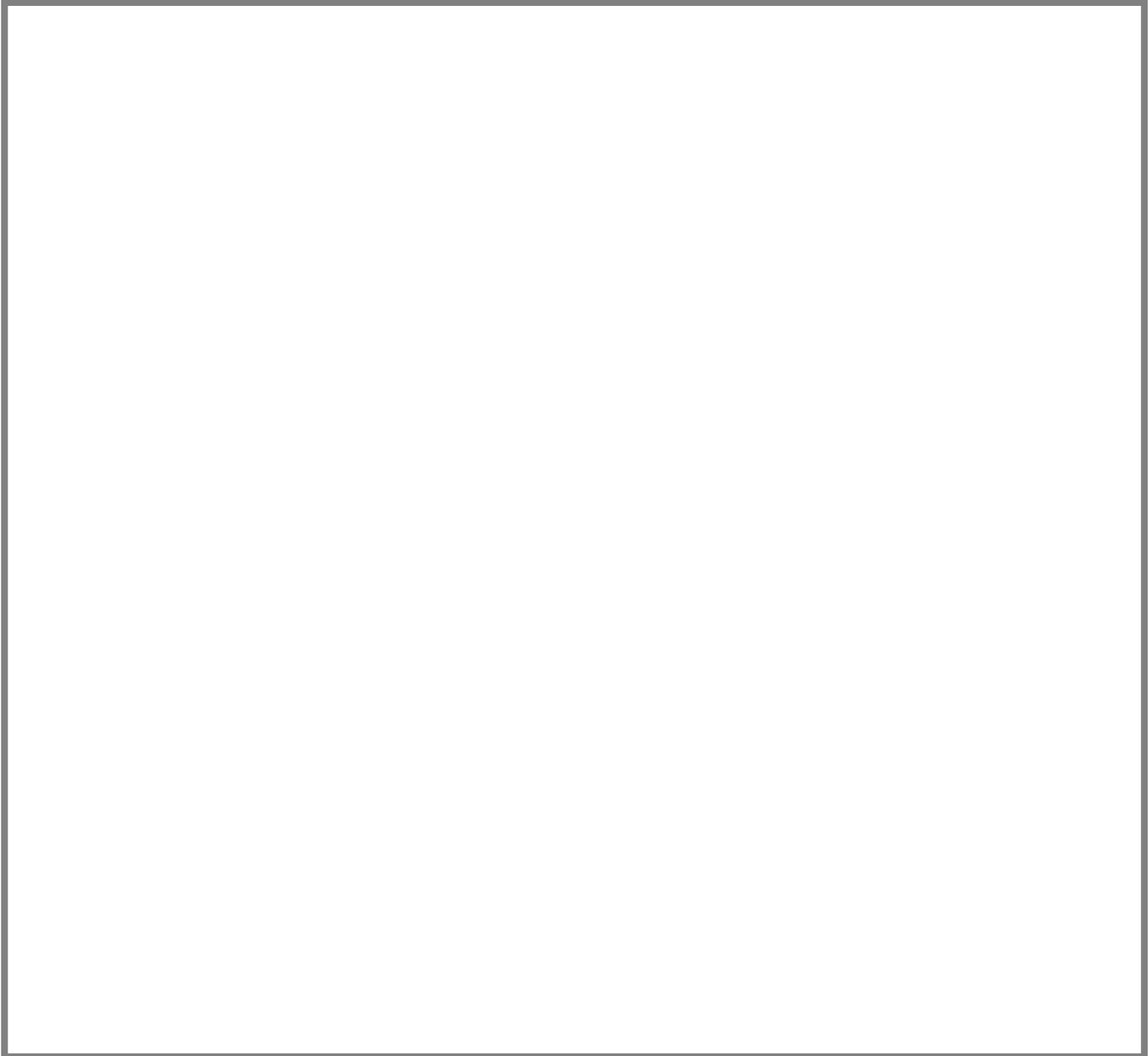
Figure 5: CTS Tree Example illustrating Bagged Salad



2

Activity 3 Map a CTS Tree

Using the information from Activity 2, map out a CTS tree for your selected product or service.



Either now or later on, you should also map a CTS Tree for each link in the chain. Each of the CTS Trees must relate to what each business needs to supply the next link in the chain. In following this process, you will be steadily working up the value chain, which is the opposite direction to which products flowed to the consumer.

In completing this task, do not forget to develop a CTS for your own business. You should provide this to your supplier and, as described in the following sections, make it the basis for future communications about quality and performance.

1.3 Understanding your current value chain

From here on, we will be asking you to more consciously consider your business as part of an interconnected value chain. The further you can move beyond thinking and acting as a series of businesses each doing their own thing, instead focusing on how each of your operations impact the other businesses and eventually consumers, the more opportunities you will have to significantly improve the performance of your business.

Why do it?

- In order to understand how the chain addresses consumer needs and if it is doing the right things by adding value, we need to investigate and identify the key elements of the value chain.
- We should try to identify wasted activities, constraints (bottlenecks) and undesirable effects of the chain.

In Figure 6 below, information flows from producer to consumer in a manner that is designed to inform consumers what to expect. In contrast, Figure 7 illustrates how the consumer receives a product or service through a connected chain where all elements are allied and the primary measures are consumer satisfaction and quality.

Figure 6: Disconnected Chain

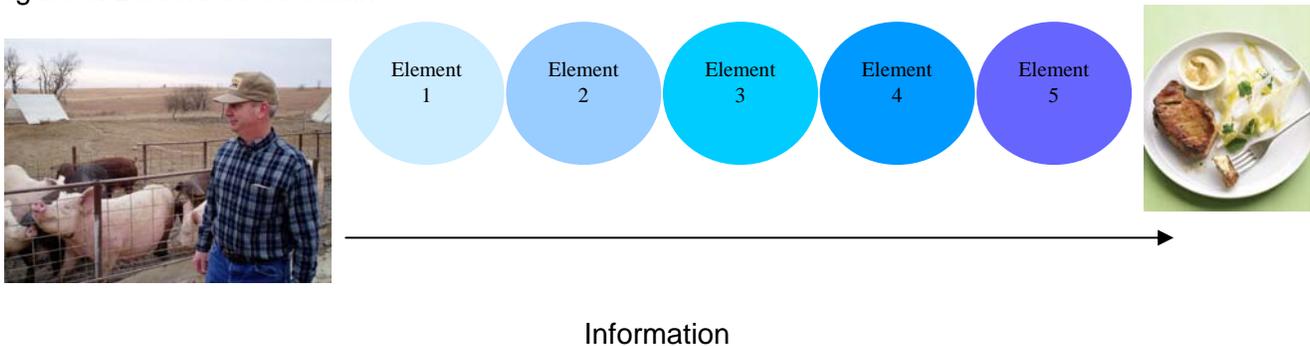
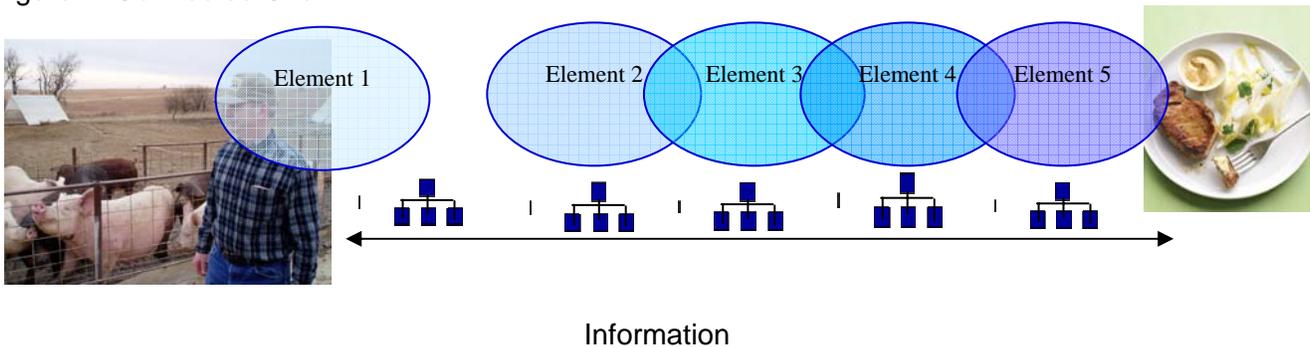


Figure 7: Connected Chain



In the second example, information flows in both directions and is focused on the consumer. All elements of the value chain are aware of how customers and consumers define value and factors that are critical to their satisfaction. Thus, the entire chain is able to constantly adjust its operations to successfully focus on the consumer. In the case of the value chain that this example is based on, a

different CTS Tree was developed for each link in the chain. This ensured that everyone communicated openly, objectively, and were appropriately measuring performance.

Once you know what your customers/consumers value, it is important to consider how your value chain works to deliver that value.

To help get you started, an example of a high level map of pork value chain is provided in Appendix 4. Also provided in Appendix 3 is a more in-depth value chain process map, which shows how peaches flow from orchards through to consumers. The process map also identifies factors that were found to be impacting the value chain's performance.

Before you draw your current chain, take a moment to consider the following:

- What is the product(s) or service(s)?
- Who are your customer(s)? (e.g. processor, wholesaler, retailer)
- Who are the end consumer(s)? (e.g. where are they purchasing from (chain grocery store vs. farmers market vs. fine dining restaurant), any demographic information you know about them?)
- What activities occur along the value chain?
- Who else is involved in your chain? Don't forget to include all of the players that are involved, even if you do not have a direct relationship with them?
- Where is the chain's current structure?
- Which areas of the chain appear to be well connected, and how are they connected?
- Which areas of the chain are not well connected, and why are they not connected?

There are two ways to complete this activity.

- The first is to simply draw out the chain from what you and others with you believe they know about the chain.
- A more advanced option is to gather a team of subject matter experts from along the chain and as a team, map it out.
- Either way, we highly recommend that at your first opportunity, you physically walk the entire chain to validate your understanding of the way it performs. If you do not walk the chain, we guarantee that at least some of your assessments will be based on incorrect assumptions.

Activity 4 Draw Your Current “Chain”

If you need more space, use a separate piece of paper.



1.4 Defining Quality

Now you have identified the attributes that matter most to your customers, you can begin to get specific about what they mean by those attributes and how you can measure performance from an operational and marketing perspective. This process is important for three reasons.

1. It helps you to make sure you have identified all the attributes of your product/service that are important to your customer/consumer.
2. For each identified attribute, you can identify how well you are performing, in relation to customer/consumer expectations.
3. Combining this information enables you to identify where you need to improve the most, and how you can best invest your resources by addressing the most urgent first.

The following examples are real life situations that show the importance of being able to define quality from the perspective of customers/consumers and that, for good reason, those perspectives could be quite different. This means that you may need to develop a different Critical to Satisfaction Tree (CTS Tree) for each link in the chain.

1.4.1 Examples: What defines quality?

Red Meat

The line commonly used to describe why people will chose a particular type of cut of meat, is price. A three-year study of Canadian meat consumers found that this “fact” was merely an incorrect assumption.

The research found that while price is indeed an important influence on consumers’ purchasing behaviour, it’s actual importance compared to other attributes (such as taste, size, ease of preparation, source, and functionality) differed significantly, according to meal occasion and meat type. It also found that some of the cuts valued most by consumers and for which they might be willing to pay a premium, are those commonly sold at a discount by industry. This means that at times, revenue is being sacrificed for the sake of volume.

Among all of the factors encouraging meat purchase and consumption, the research found that the most critically important factor is if, “the entire family will eat it”. If you produce a meat product that the entire family will not eat, your market opportunities diminish markedly.

In this case, a powerful enabler to differentiate a product and increase profitability is being able to identify exactly what it is about a product’s attributes and quality that would discourage members of a family from eating it.

Milk

A supplier of liquid milk to a group of independent retail stores (belonging to a common buying group) believed they knew the key drivers of consumer choice for regular liquid milk. After a period of targeted in-store research, they found that factors that they had not previously considered important were among those that could grab consumers’ attention and preference over competing products.

The ‘delighter’ attributes which the supplier had never considered marketing as a distinct feature of their brand was that the milk came from local producers. The reason for the consumer interest was due to a perception of added freshness compared to competing products. Freshness was of such importance to a segment of the consumer market that they appeared willing to pay a premium for the connectivity that came from knowing that the milk was produced ‘just down the road’.

While being locally produced was a potential delighter to consumers, this attribute was meaningless unless other more commonplace factors were also addressed. These factors included basic product attributes such as the milk is safe to drink and in convenient packaging; and performance attributes such as shelf life, leak-free packaging and taste.

Of particular importance to retail customers (*as opposed to consumers*), was quick cycle time, ease of ordering, and no uninterrupted or late deliveries. Having this level of service meant that retailers experienced less wastage (and therefore incurred lower costs) and did not miss a sale opportunity (maximized revenue opportunities). For any retailer, all these factors are very important considerations.

Knowing which product attributes were ‘deal breakers’ versus ‘nice to have’ from the standpoint of consumers and customers provided a basis for the chain partners to communicate more effectively than they had previously. This enabled each of the involved businesses to devise processes that ultimately resulted in the ability to profitably expand their market share and increase the efficiency of their operations.

Activity 5 Measuring quality and value

In the following exercise, consider how different players in your chain *define* and *measure* quality and value.

- Do not forget that performance is part of value.
- Do your best to put yourself in the position of others to complete this exercise.
- Include both objective measures and/or subjective judgments.

	From your point of view	From your customers point of view	From the consumers point of view	From your suppliers point of view
Define				
Measure				
<p>How are these definitions similar / different? Do the measures support each other or not? How could they be improved?</p>				

1.5 **Evaluating Performance: and where you should invest your efforts to improve performance**

Why do it?

- This section of the workbook is the first step in identifying how well your chain satisfies consumer demand, and which activities along the value chain have the greatest impact on attributes that you identified in the consumer (and later customer) CTS Trees.
- The first concept we discuss is an Association Matrix. This is followed by further analysis techniques.
 - As you become more familiar with the concept of Association Matrixes you can use them to identify how you can most readily invest to improve performance.
- Completing an association matrix allows you to measure the strength of relationships that exist between the players in the value chain, the processes that they perform, and the CTS attributes.
- The results show which processes are most important to satisfying consumer demands and therefore most important to the chain's overall success. Improving these activities will likely have the most (positive) impact on the chain's performance.
- By measuring customer/consumer satisfaction with the performance of each activity that occurs along the chain, you will be able to identify which of the activities are inadequately addressed, or not addressed at all.
- The matrix and subsequent discussions will allow you to highlight if there are activities anywhere along the chain that do not impact customer satisfaction and therefore could be considered waste, and possibly eliminated.

1.5.1 Association Matrix

An Association Matrix can be used in different ways. Two examples are shown below (Figures 8 and 9) but both share the same overall design. Across the top row are the attributes that are critical to consumer satisfaction. Under each attribute is listed the importance score. For your association matrix, copy your findings from Activity 2 or 3.

Activities performed along the value chain are listed in the left-hand column. For your association matrix, use the activities you identified in Activity 5 (mapping the value chain).

In the examples shown below, these activities have been kept at a high level. Appendix 4 includes a broader and more complicated Matrix that was produced from analysing a value chain supplying fresh pork to consumers via a major retailer.

In Figure 8, we have completed the Matrix by using a check mark to show where relationships are believed to exist between CTS attributes and the value chain (VC) activities that are listed down the left column. These check marks are then totalled in both the right hand column and bottom row. It can be seen that cutting is seen to have a relationship to the highest number of CTS attributes. Although three VC activities have a relationship to two CTS attributes (shelf appeal and excess juice), shelf appeal has a higher importance score (10). Therefore, it is comparatively more important to manage the activities that relate to this attribute, rather than excess juice.

Columns with no checkmarks indicate that a CTS has not been addressed by the chain and may allow the competition to move in. An empty row indicates that a value chain element has no association with consumer requirements and may be wasted effort.

Figure 8: Association Matrix

	CTS Attributes	CTS Shelf Appeal	CTS Portion Control	CTS Presentation	CTS No Excess Juice	CTS Meat Bone Balance	CTS Etc...	Total
	Score	10	6	8	6	8		
Value Chain Activities	Genetics	✓						1
	Feed					✓		1
	Slaughter	✓			✓			2
	Handling							0
	Cutting	✓	✓	✓	✓			4
	Packing					✓		1
Total		3			3			9

A more advanced option is to use numbers instead of check marks. Each association is numbered 1-10. A low score represents a low association; a high score equals a very high association or CTS impact. Each association score is then multiplied by the consumer CTS score – this provides a weighting factor.

This was the approach taken in the Association Matrix that is featured in the Appendixes. The benefit of this approach is that it allows you to numerically rank the importance of each activity in relation to CTS attributes. As can be seen in the tables below, Figure 8 showed that meat cutting is critical to the chain’s performance in creating value from consumers’ perspective and Figure 9 shows just how critical it is compared to (for instance) animal handling. This factor appears to have no impact on consumer CTS but is a necessary value enabling activity within the chain.

Figure 9: Advanced Association Matrix

	CTS Attributes	CTS Shelf Appeal	CTS Portion Control	CTS Presentation	CTS No Excess Juice	CTS Meat Bone Balance	CTS Etc...	Total
	Score	10	6	8	6	8		
Value Chain Activities	Genetics	5/50						50
	Feed					6/48		48
	Slaughter	4/40			8/48			88
	Handling							0
	Cutting	9/90	7/42	9/72	5/30			234
	Packing				6/36			36
Total		180	42	72	114	48		368

In subsequent stages of the workbook, aided by the examples presented, we will encourage you to drill down further to identify which value chain activities might be impacting the effectiveness of the cutting. An introduction to this level of analysis is given in Appendix 4.

In multiplying the association score by the CTS Importance score, the total of which is listed in the right hand column, this more complex version of the Association Matrix more intimately illustrates the strengths of relationship existing between different activities and the attribute, and customer(s)/consumer(s) current satisfaction with the performance of that activity in relation to each of the activities. This type of Matrix is almost always developed using a Microsoft Excel template.

Activity 6 Create an Association Matrix for your Chain

Create an association matrix using your own data. Fill in the table by listing the CTS attributes (from Activities 2 and 3) along the top row, and with their importance scores underneath. Then, (from Activity 5) list the value chain activities that you identified down the left hand column.

Rank any value chain activities that are associated with each CTS attribute between 1-10. The higher the number, the stronger the association. Leave areas blank that do not currently have an association. Be critical when completing this. It should reflect existing activities rather than what “should be”.

Multiple the CTS Importance score (from row 2) with each Association score.

Finally, using the multiplied numbers, calculate the total sum for each column and row. These totals allow you to more accurately rank the importance of each activity in relation to attributes.

You may decide to work on a separate sheet of paper or use Excel, if the space below does not suit your needs. **An excel template is available.**

CTS Attributes								Total
CTS Importance Score (1-10)								
Value Chain Activities								
Total								

Activity 6.a Assessing Associations between Activities and “Deal Breakers”

Refer to your Association Matrix. Are there any CTS attributes with a rating of 7 or higher (“Deal breakers”) that are either not addressed, or hardly addressed by the value chain?

These are identified by rows that are clear or have only a few numbers against them; or have a comparatively low total number in the right hand column.

Deal breakers that are unaddressed or hardly addressed could mean:

1. You have underestimated the relationship between that activity and the CTS attribute;
2. The activity could have serious consequences on performance if not managed correctly;
3. The activity may not be necessary and therefore could be eliminated without impacting the chain’s performance. *We return to this possibility in Activity 6.c.*

Consider any “Deal breakers” that are currently not addressed or hardly addressed. Why does this situation exist? What are the opportunities if you correct the situation?

Activity 6.b Assessing Associations between Activities and “Nice to Have’s”

Are there any “Nice to Have” activities that could be exploited? These are represented by a low CTS score (score under 6).

Could you make changes that will result in customers/consumers perceiving additional value to either differentiate you from the competition, or for which consumers might be willing to pay a premium?

Activity 6.c *Assessing Opportunities to Reduce Costs*

Are there any rows with no checkmarks/numbers or low scores?

This indicates that this element has little to no **current** impact on customer satisfaction.

Should or could this element be eliminated or if completely necessary, conducted in a manner that adds more value and/or is done at a lower cost?

Activity 6.d *Activities That Are Critical To Your Success*

The rows with the highest total number in the right hand column are currently the most important to your business or value chain's performance. It is critical that these value chain activities are managed and controlled to the best of your ability.

List the activities that you believe fit into this category.

Subsequent exercises will enable you to determine how you can improve the management and effectiveness of these and other activities that you identified through developing an Association Matrix for your business and/or value chain. The first (Activity 7) is designed to help you identify the determinants of quality, and what you can do to increase the level of customer/consumer recognised that you produce.

1.6 Defining the Inputs into your Business

Activity 7 Define factors (external & internal) that impact the value that you create

<p>As an input to me? <i>An example could be calves that are inconsistent in their health or genetics, or seed that is not first generation certified. Another example could be grain storage bins that are not operating correctly.</i></p>	<p>As an output from me? <i>Any of the factors mentioned under inputs that will result in you producing inconsistent products.</i></p>
<p>List additional factors that impact value and are not managed within the current the value chain? <i>An example of this might be, are producers delivering grain that is not of the same quality or consistency as yours?</i></p>	

Activity 8 Define the Determinants of Quality That You Can Control

From Activity 7, list the inputs that you can control that will improve the quality and value supplied to your customer/consumer?

A large, empty rectangular box with a thin black border, intended for the user to write their answers to the activity question.

1.7 What are the problems with your chain as it currently operates?

Why do it?

- In order to make improvements and prioritize action, we first need to know what is wrong with the current situation.
- Using the knowledge you have gained from the activities so far, what are the problems or undesirable effects (UDEs) within the chain as it currently operates?
- By listing them we can see where 'just-do-it' opportunities exist, as well as larger issues that may need a project to manage them.

1.7.1 Background Information

An UDE is any situation that is:

- Problematic;
- Requires management intervention;
- Causes customers to complain;
- Wastes time, money and effort.

Examples of UDEs are:

- Expired shelf life/best before dates
- Equipment breakdowns
- Customer complaints
- Late deliveries
- Backorders
- Defects, rework, scrap or other losses
- Incomplete or missing documentation or information
- Waiting for material/information/other

1.7.2 Examples: Undesirable Effects

Red Meat

In an effort to reduce the level of waste associated with a top ten perishable product line, a retailer undertook an analysis of the processes associated with the flow of information and materials. This was found to be particularly important for perishable items because storage room comes at a premium due to the cost of installing and maintaining cooling capacity. Additionally, any business will only possess a finite space for holding inventory.

The retailer knew that their wastage levels were unnecessarily high, which was a cost. To alleviate overly high inventory levels, particularly for products whose shelf life was running out, they also knew that they regularly had to discount products to sell them quickly. While the retailer was aware that this routine reduced their (and ultimately their suppliers') revenues, they were not sure what was causing it, or how it could be addressed.

Another factor relating to holding excess stock of one item, and which the retailer had not fully appreciated, is that it means that there is limited room for other lines, which may then go out of stock. This consequence negatively impacts consumers' satisfaction and can lead to them frequent other retailers.

By working through each process where they believed an association might lie between high inventories, shrinkage levels and out of stocks, the retailer identified that their procurement team had a habit of magnifying the orders placed with suppliers. The primary reason for this was found to be that the procurement team did not track consumer purchases over time; nor did they analyze historical changes in purchasing patterns.

Re-designing the ordering process led to reduced inventories, overhead costs, and shrinkage. It also led to fewer out of stocks, less need to discount items, and closer relationships with suppliers.

Tinned Fruit

After suffering financial losses for consecutive years, a farmer owned cooperative producing tinned fruit took a value chain approach to identify opportunities to improve performance. While they had completed an analysis of the processing business on a number of occasions, they had never looked at the value chain as one interlinked system.

The processor (and their farmer owners) knew that the business was losing money and that their overheads were too high. The processor had constantly focused on ways to reduce costs, but had not given sufficient thought to how their pricing model affected farmers' behaviour. They had not considered how the inputs from farmers could lead the processor to experience unnecessarily high costs and poor profitability.

In determining which on-farm processes could directly impact the processor's operations, the researchers realized that clear relationships existed between how farmers behaved in order to maximize their revenue, and the costs ultimately borne by the processor.

The most important association was found to come from the fertilizers that farmers applied a few weeks prior to harvest in order to increase the yield of their crop (as they were paid on weight). Unfortunately, the fertilizer's active ingredient (nitrogen) was leading to the production of acidic fruit that could not be packed in regular tin, but required a more expensive tin. It also meant that the

processor had to use cane sugar to make the fruit palatable to consumers. Both of these factors created very high unnecessary costs for the processor.

In addition, by producing large fruit (rather than succulent fruit), an overly high percentage of the fruit was unable to be processed into premium product. Instead it went for further processing into juice or chunks, which was worth much less. This reduced the processor's revenue, and its competitive position in the market.

Over a period of four years and through the introduction of a radically different pricing model, the processor went from losing money to making a considerable profit. Simultaneously, farmers were able to make 25% more on the same volume of fruit and reduce their input costs.

Activity 9 List Undesirable Effects (UDEs)

From your understanding of how the chain currently operates, what would you like to change? A good way to begin is to ask the following question: "If I had 3 wishes, what would they be?"

List the UDEs you have observed.

UDEs affecting the customer	UDEs affecting the chain

1.8 Define your Current Process

1.8.1 Examples: Define current processes (and relationship to UDE)

Red Meat

An analysis of a red meat chain showed that its structure negatively impacted the prices that customers were willing to pay. It also showed that the structure was creating unnecessary costs for almost all the participants. The current situation was found to have the greatest impact on the profitability of producers and processors. Though not to the same extent, retailers' operating margins and profitability were also negatively impacted.

The study found that the primary factors impacting the profitability of everyone along the chain (producers, processors and retailers alike) were inconsistency in quality and volume. Secondary factors impacting profitability included that producers and processors were focused more on maximizing the productivity of their operations (e.g. the number of lambs born per ewe; number carcasses flowing through the processor) than aligning their own and others' processes to create high levels of consumer recognised value. They also had not assessed whether their behaviour was resulting in unnecessary costs, thereby cancelling out any benefit that may have come from selling higher volumes of their products (animals or meat).

While a lack of meaningful communication was seen by many to be the primary reason for why the chain was not performing to its full potential, the analysis found that poor communication was really a symptom of other factors. The entrenched attitudes possessed by individuals from along the chain (e.g. producers, processors, and retail buyers) had the greatest impact on peoples' ability and desire to share information in a meaningful manner. It was also found that selling through sale yards negatively impacted the amount of information exchanged by sellers and customers, and the quality of approximately 5% of animals due to poor handling.

Partly due to attending a workshop in Value Chain Management, producers (in groups and as individuals) steadily began identifying new opportunities. They also began working closer with processors and/or retailers to realise those opportunities. Having greater access to information about the consumer market and how their animals performed in relation to what those markets required, the attitudes of producers' and processes began to change. Most importantly, they saw the value of communication and how they could use information to improve their operations.

This led to some producers marketing their animals differently. Other producers changed their breeding programs. Some did both. Almost all improved the profitability of their farms. Simultaneously, a number of processors and retailers saw how they could also benefit from working closer with farmers.

Tomatoes

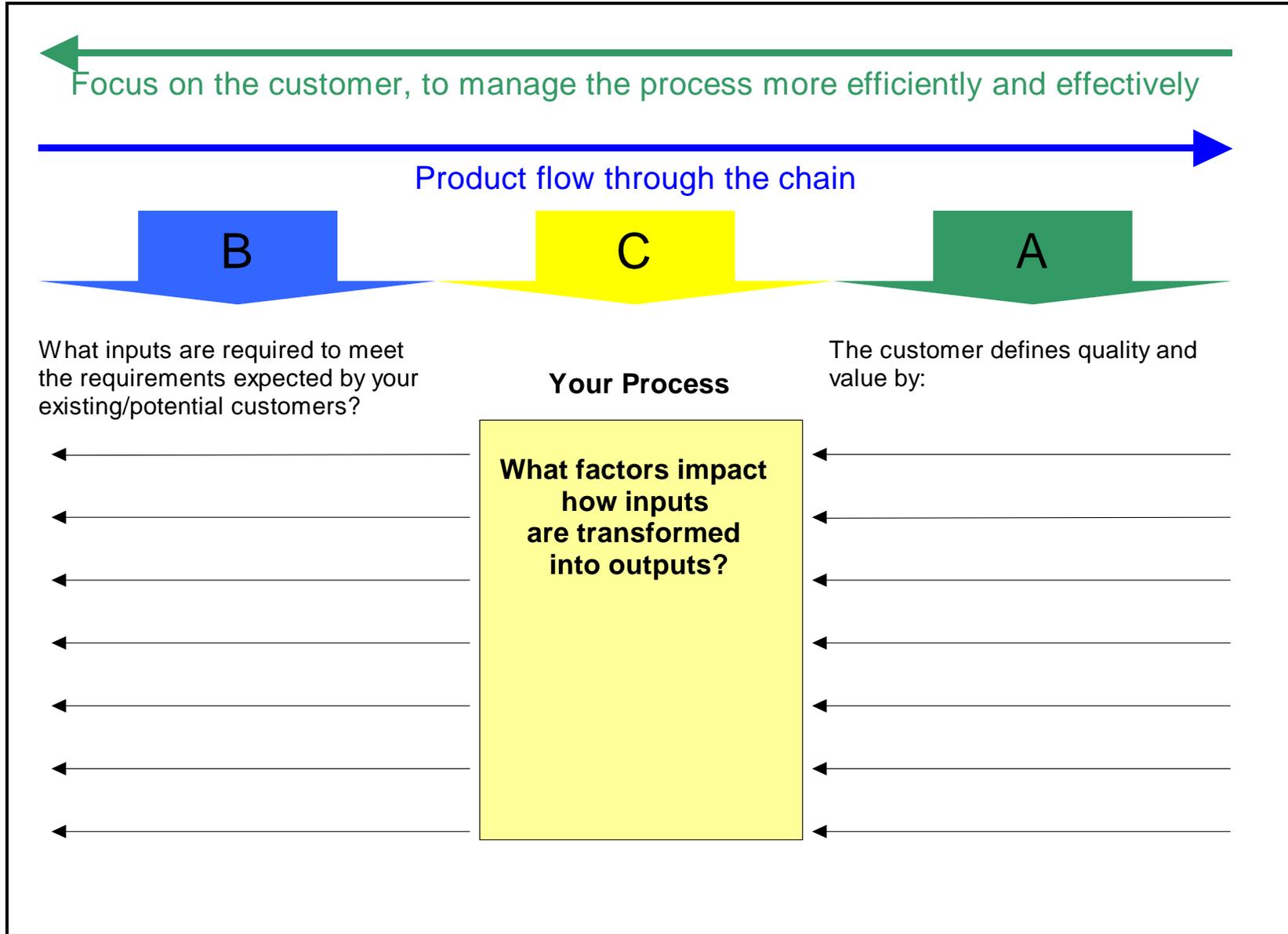
Genetics are a tool that farmers and members of the value chain can use to their advantage. Of course, they do not guarantee success. A situation arose for a major marketer of tomatoes where a group of farmers supplying a distinct type of tomato to the market were all using the same variety, but the eating quality of the tomatoes differed noticeably. As taste was deemed the most important aspect of eating quality and the attribute that appeared most at fault, identifying the cause of the issue was paramount to improving their business.

Through discussions with farmers and the seed breeders, the root cause of the issue was identified as the tomatoes being picked too soon by untrained pickers. This meant that the tomatoes had to be picked out of the packing line, then handled separately so they that could ripen before being re-introduced into the packing process. Beyond the realization that the current situation impacted consumers' satisfaction, the chain participants also realized that separating then re-introducing tomatoes into the system created unnecessary costs and could lead to shorter shelf life through excessive handling.

The issue was addressed by providing pickers with a full-colour laminated sheet, which showed them exactly when the tomatoes should be picked. Instantly, pickers were more informed. Also included on the training sheet were full-colour examples of fruit that would never achieve the required quality and should therefore be picked and thrown onto the ground. This practice ensured that the tomatoes plants were only investing resources into producing fruit that met market requirements. It also meant the farmers' sorting and packing operations could operate more efficiently, further reducing costs of production.

Activity 10 Define your current process

- A. Begin this exercise on the right, by filling in how your customer/consumer defines quality and listing their CTS attributes (what they value). Copy your answers from Activities 2 or 3 and 5 into this section.
- B. Next, fill in the inputs to your process on the left. Copy your answer from Activity 8 into this section.
- C. Finally, consider your process. What activities that occur in my business or the value chain in which you operate impact how inputs are transformed into outputs? Copy your work from the Association Matrix (Activity 6) into this section.



1.9 Defining and Prioritizing Opportunities

Why do it?

It is important to ensure improvement activities are sequenced in the right order. They must look after the customers first, they must be done in a logical sequence and they must be achievable in a reasonable time frame.

The following activities help you to prioritize alternative actions and formalize the roles and responsibilities for action. This will ensure there is understanding and agreement as to what is to be done, when and by whom.

1.9.1 The Need to Define and Prioritize Opportunities

Every business, regardless of their size or the industry in which they operate, possesses only a finite range of resources. To be sustainable, every business has to use those resources wisely. The next section of the workbook guides you through the process of ensuring that you obtain a good return on the resources that invest in addressing a problem.

As you work through this section, it might be a good idea to reread the examples we gave of how the businesses benefited from improving the management of their value chains. Something that every example has in common is that they didn't seek to work on every opportunity that they had identified. For instance, jump forward to Section 2.1.1 and read about the chain that found 232 opportunities to improve their performance. They couldn't possibly work to address all these issues at once. Neither would every opportunity reap the same rewards for a given investment. Therefore they needed to prioritize the problems that they were going to tackle first.

A word of caution: Do not be fooled into thinking that you have to address the biggest highest profile problems first. Unless problems of that type pose an imminent threat to the survival of your business, you would be better off tackling smaller easy-wins first. Taking this approach will build the momentum and commitment necessary for successfully tackling on larger more demanding projects. It will also provide a learning ground on which you can sharpen your skills before tackling projects that could leave you in a worse situation if your efforts fail.

Activity 11 Prioritizing Alternatives

List of all the issues and UDEs identified thus far (from Activities 6.a and 9). Identify where issues should go in the matrix below, as they relate to how difficult they are to resolve and the impact that solving that problem will have on the business.

Impact on Business	High			
	Medium			
	Low			
		Low	Medium	High
Difficulty to Resolve				

Legend:

	Do it Now
	Do it Soon
	Do it Later

Typically, 'do it now' improvements can be done quickly and with little effort. 'Do it soon' are opportunities that have a high probability of success but will require more time and perhaps a team of people to execute. 'Do it later' opportunities may have a lower chance of success and also require more time and people to execute.

List your "Do it Now" Priorities.

Activity 12 Create an Action log for “Do it Now” Priorities

Now that you have identified some “do it now” priorities, you need to ensure there is understanding and agreement as to what is to be done, when and by whom.

For issues that are relatively straightforward to resolve, use an action log to track what needs to be done, by whom and by when. The tool shown below should also be used to track your progress.

Action (What)	Who	When	Status

1.10 Tackling 'do it soon' and 'do it later' Opportunities

1.10.1 Identifying who you need to involve, and why

Initiatives that do not have obvious solutions may only be resolved through engaging a team of people for a period of time. Unless you have a clear action plan and can monitor your progress at every step in your journey, a complex project can come undone very quickly with potentially disastrous results. The Lean Six Sigma methodology uses a Project Charter to ensure that more detailed action plans are successfully carried out.

A project charter should contain the following information:

1. Problem Statement (What is the UDE you are seeking to address?)
2. Objective / Goal (How you are going to address the UDE?)
3. Scope of Project
4. Business Case
5. Champion or sponsor
6. Project Owner
7. Project Leader
8. Project Team Members

1.10.2 Examples of projects that require a Project Charter

Red Meat

Providing a satisfactory eating experience is critical to the success of any restaurant. In studying the steps involved in supplying steaks to a chain of corporately owned restaurants, distinct opportunities were found to improve the performance of operations stretching from primary production through to consumers. Virtually all of those opportunities were unknown prior to the study occurring.

As well, many of the factors which were ultimately impacted consumers' eating experience and had previously been considered as impossible to change, were in fact shown to be symptoms of the way that the chain operated. So they were not impossible to change at all.

For example, before the research, it had been assumed that the restaurants critically needed to be able to order up until midnight (for delivery two days later). The analysis determined that this was not critical.

Balancing this supposed need of the restaurants, the processor had previously been forced to coordinate its operations around forecasts instead of confirmed orders, because they needed time to cut and prepare the steaks. The processor was also impacted by animals that were inconsistent in composition.

These factors led to inventories being held, which impacted the freshness of the steaks when they were eventually delivered. This 'freshness' amplified any inconsistencies in how the steaks were prepared in the restaurants' kitchens. Ultimately, the system was needlessly complex and costly.

This and other information was brought together and discussed by a progressive producer, the processor, the distributor, the corporation's head office, and restaurant staff. Together they developed a project charter whose purpose was to produce the Perfect Steak Encounter (PSE). The charter identified how the chain's performance in meeting the PSE would be measured.

From this first metric flowed details on how the operations of each of the participants' organizations (farm, processor, etc.) would be measured. Identifying who was responsible for achieving 'x' outcome, how those expectations would be achieved, and the benefits that they would accrue to each participant from doing so, the chain's performance was improved.

What emerged was also a simpler system that took significantly less effort to coordinate. By taking lessons learned from this project and applying it to other areas of their business, the participants also multiplied the benefits of participating in what on the face of it had once seemed a project with limited potential.

Tinned Fruit

After suffering a sustained period of financial losses, which resulted in it coming close to bankruptcy, a processor recognised that it must modify its management practices to remain competitive. From an analysis of the overall chain, of which it was one (albeit a very important) part, the processor realised that successfully modifying its practices and operations relied on it establishing closer and more cooperative relationships externally with producers and customers, and internally with employees.

Beyond issues directly relating to fruit quality (such as brix, acidity and size), factors found to be severely impacting the processor's profitability included the uncoordinated fashion in which the fruit was supplied. This negatively impacted its operations, particularly during peak periods, through

having to employ costly temporary staff that was untrained and had to overwork equipment to keep up with the volume delivered. This led to it experiencing higher than necessary maintenance costs. From a relationship perspective, it was identified that how the processor interacted with its internal and external stakeholders was exacerbating its problems.

For instance, producers were held at arm's length and not motivated to use resources wisely. No penalties were applied to those producers who kept trucks waiting for 12 or more hours because they had incorrectly anticipated when their fruit would be ready to ship. At the same time, producers were not sort for advice on how fruit could be produced in a manner that aided, not hindered, the processor's operations. Part of the reason for why poor relationships existed with external stakeholders was found to be the way that the processor's HR policies had encouraged a culture of competitiveness to develop amongst employees. Therefore little if any acknowledgment was made of the importance of teamwork to continually improve performance.

With its situation looking increasingly dire, the processor faced a financial crisis and was forced to act. In collaboration with respected expert stakeholders, the business developed a project charter. Forming Appendix 5, the charter identified which stakeholders were participating in cross-functional teams that were created and made responsible for developing solutions to specific problems. It also identified the timescale within which each effort was expected to be completed. A startling realization that came from the analysis was that many of the issues that the processor faced could be fixed almost immediately.

Within two years the processor was once again profitable. A key aspect of the project's success was in how processor incentivized producers. Compared to prior to the project commencing, producers had the opportunity to increase the prices they received by 25% while simultaneously reducing their costs.

Activity 13 Establish your Project Charter

If you are seeking to make only quick or simple corrections, you may only require an action log to establish responsibilities and track progress.

For larger projects, a critically important stage in improving the performance of your business or value chain is to get agreement on where you are going to focus your efforts and what success will look like. This process also helps identify why you are making this effort, which is important for getting others' buy-in. When you have completed this exercise you will have developed a project charter.

Regardless of whether you are developing a project charter or action log, working through the following processes will help you establish the commitment and agreement necessary to see projects through to a successful conclusion.

A word of caution: Do not underestimate the importance of planning your actions and securing everyone's commitment to following an agreed line of action; particularly if this is your first time working with others on a project of this type.

Before completing each of the items/topics listed below, make a short list of two to three initiatives that need to be worked on by a team of subject matter experts over a month or two. Do not make the timelines too long, else you risk creating a blasé atmosphere where nothing gets done or efforts become unproductive due to people investing their efforts ad hoc rather than purposefully.

Activity 13.a State your Problem

What is/are the UDE(s) that you are seeking to address?

- When does it occur?
- Where does it occur?
- How big is the problem? (Use numbers)
- Who is involved or who is affected by the problem?

Activity 13.b State your Objective/Goal

Determine the ultimate aim(s) of your project by agreeing on:

- How you are going to address the UDE(s)?
- What you are seeking to achieve by addressing the UDE(s)?
- The goal(s) are achievable, realistic and measurable.
- Focus on consumer satisfaction, from which business improvements will follow.

Activity 13.c What is the Scope of your Project?

So you do not experience 'project creep', which can result in projects becoming unmanageable and ultimately of little value to the participants, you must avoid trying fixing all of the value chain problems/opportunities with one project. It is far better to have a narrow, defined scope.

List what is in the scope, as well as out of scope for this project.

Activity 13.d State your Business Case

Once the objectives are met, you must determine what you believe success will look like in terms of:

- What are the expected cash savings?
- What additional revenues might be gained?
- What non-monetary operating efficiencies might be achieved?

Activity 13.e Who is your Champion or Sponsor?

Motivation to change and accept the need for change comes from ensuring that people are accountable for their actions. To achieve this, you need to nominate a senior member of the value chain who will:

- Ensure the project is properly resourced;
- Ensure the project stays on track;
- Remove obstacles/objections;
- Acts as a respected advocate for the project (is able to sell the project to others).

Activity 13.f Who is the Project Owner?

Because with ownership comes commitment, you need to identify someone as owning the project. Their commitment to seeing the project through to a successful conclusion will come from their reputation (in part at least) resting on the project reaching a successful conclusion.

To ensure that you place ownership of the project in the hands of the correct person, you need to identify and agree on:

- Who will benefit from the improved performance of the value chain;
- How will each of the participants benefit;
- How will you ensure that the gains are sustained;
- How the business/chain build on the gains made.

Note: this person may also be the Champion

Activity 13.g Who is the Project Leader?

To identify the correct project leader, the person who is ultimately going to be responsible for managing the project and holding people to account on a day-to-day basis, you need to identify and agree on:

- How they will be made responsible for leading the project team;
- What authority will they have to manage the project following the DMAIC methodology;
- How often and through what process will they update the Champion and Project Owner on the project status;
- What resources and approach must they follow to maintain the project file and prepare/share report with the stakeholders?

Activity 13.h Project Team Members

To guide the project's strategic direction and ensure that it continually reflects the changing needs and aspirations of the organizations involved, you must establish a small group of 4-8 individuals to oversee the project and provide advice as required.

In addition to providing strategic advice, this group's role becomes critically important to resolving any conflicts that develop between or within the involved businesses.

So that the group is comprised of the correct people and are able to perform their task successfully, you need to identify and agree on:

- Who has excellent knowledge of the current state of the value chain and is willing to play a key role in making a difference?
 - Those chosen are respected (by the other participants) for their knowledge and attitude.
 - Team members should be senior managers, project owners.
- What business functions are critical to the project's success, and are therefore the functions that the people need to represent?
- Their mandate, regularity of meetings, and scope of responsibilities.

List Team Members and the agreed mandate, responsibilities and meeting schedule.

Now that you have created a project charter for priority opportunities that require more effort, time and resources to resolve, it's time to get started!

1.11 Additional Resources

Among numerous others, current research is often available free of charge to the public at the following Canadian based websites.

- George Morris Centre: <http://www.georgemorris.org/GMC/Home.aspx>
- Value Chain Management Centre: <http://www.vcmtools.ca/>
- Ipsos Canada: <http://www.ipsos.ca/> Look for links on their homepage as well as in sub-sections such as *Marketing Research*.
- Neilson Canada: <http://ca.nielsen.com/>
- Statistics Canada: <http://www.statcan.gc.ca/start-debut-eng.html>
- OMAFRA: <http://www.omafra.gov.on.ca/english/index.html>
- AAFC: <http://www.agr.gc.ca/>
- Canadian media such as: <http://www.theglobeandmail.com/>, <http://www.nationalpost.com/>, <http://www.cbc.ca/news/>

International websites also worth looking at depending on your business may be:

- Department for Environment, Food and Rural Affairs (UK): <http://www.defra.gov.uk/>
- Institute of Grocery Distributors (UK): <http://www.igd.com>
- Centre for Value Chain Research: <http://www.kent.ac.uk/kbs/applied-research/vcr/>
- Supply Chain Research Centre:
<http://www.som.cranfield.ac.uk/som/p1091/Research/Research-Centres/Centre-for-Logistics-and-Supply-Chain-Management/Supply-Chain-Research-Centre>
- Lean Enterprise Research Centre: <http://www.leanenterprise.org.uk/>
- Food and Agriculture Organization of the United Nations:
<http://faostat.fao.org/site/291/default.aspx>
- International Monetary Fund: <http://www.imf.org/external/research/index.aspx>

1.12 Summary

The objectives of this section were:

- Know your customer/consumer;
- Know how satisfied your customers/consumers are;
- Define and measure quality;
- Draw your current chain;
- Determine how well your current chain address customer/consumer needs;
- Identify the inputs that you can control;
- Know the undesirable effects of the current value chain;
- Define your current processes;
- Identify and prioritize opportunities;
- Outline how 'Just do it' opportunities will be captured using an action log;
- Establish a project charter for more complex opportunities.

Before you progress to the Measure phase of the workbook, ensure that you have completed the following activities.

- Listed the reasons why you want to complete this workbook.
- Identified your customers and who they serve;
- Created a CTS tree;
- Know how you and others in your chain define and measure quality;
- Mapped your current value chain;
- Created an Association Matrix, to understand how CTS attributes are supported (or not) by different parts of your chain;
- Know what external and internal factors impact value;
- Identified the inputs that you can you control;
- Identified problems or UDE affecting your customers and the chain;
- Defined your current processes;
- Established priorities for action;
- Created an action log(s) and/or project charter(s) to correct UDEs;
- Researched your customers/consumers needs and satisfaction to ensure that your work is based on real data rather than assumptions.

Assuming you have completed the parts of the Define phase applicable to your situation, you are now in good shape to progress to the Measure phase.

2. Measure Phase

You are now at the point where an important improvement initiative for your value chain has been identified. A project charter has been created and a project team formed.

The purpose of the Measure phase is to help the project team (with their subject matter expertise) thoroughly understand how the value chain really operates. This involves the detailed mapping and performance measurement of the areas of interest. Having understood your chain at high level in the Define Phase, the Measure phase will help you to gain a more detailed understanding, ask critical questions and gather data in order to measure the chains performance. This will enable you to make more informed management decisions.

In the **Measure phase** you will:

- 2.1 Develop a more specific understanding of the Inputs and Outputs you need to control;
- 2.2 Map and measure the details of your value chain performance;
- 2.3 Understand, identify and plan to reduce waste;
- 2.4 Assess the adequacy of process controls to reduce risk;
- 2.5 Create a data collection plan and collect data.

2.1 *Identify the Inputs and Outputs which you need to Control (SIPOC)*

Why do it?

- In Activity 4, you developed a map illustrating the elements of your current chain. Now we need to identify the specific inputs and out puts of each element of the value chain. We use a SIPOC diagram to do this.
- SIPOC stands for Suppliers, Inputs, Process – in this case value chain elements (VCE), Outputs and Customers.
- The purpose of the SIPOC diagram is to identify the value chain stakeholders (customers and suppliers), and the inputs and outputs critical to its operation.
- The Measure Phase also validates the CTS attributes for each customer within the value chain.

2.1.1 Examples: Measurement Phase

The need to measure and how measuring the correct activities leads to the ability to make informed management decisions is highlighted by the following examples:

Red Meat

The old adage goes “*you can only manage what you can measure*”. Two less well known though equally important sayings are “*what you measure determines what you see*” and “*how you pay (incentivize) determines what you get*”.

A number of studies have shown that current pricing models for red meat have little if any correlation to consumers’ perceptions of value. In pork for instance, rewarding for lack of fat, and weight rather than protein and eating quality, produces what many consumers consider to be a low value commodity compared to other fresh meats.

By measuring performance according to cost and productivity, rather than by factors that consumers consider more important than price, entire chains have steadily moved further away from delivering on consumers’ ultimate desire, which is a superior eating experience.

Furthermore, if a chain’s performance is not measured correctly or tracked over time, focusing on productivity and receiver costs ahead of other considerations commonly leads to most if not every business along the value chain incurring unnecessarily high inventory, disposal and operating costs.

A study of a meat chain found that, while the individual businesses thought that their operations were performing adequately, significant opportunities existed to improve performance. To be precise, the number of improvement opportunities identified along one chain totalled 232! While some of the improvement opportunities were small, others were significant. They included:

- The added mileage and stress placed on animals sold through auctions rather than direct to the processor (*which created unnecessary costs and commonly impacted quality*);
- Demand amplification, which simply put is purchasing more animals or cuts than required, led to significant levels of unnecessary discounting and waste;
- Receiving dirty animals increased the processor’s annual operating costs by ~\$400,000;
- Overly fat animals required 7 fulltime people to annually rework 425 tonnes of fat. This incurred a cost of ~\$250,000; and it had cost producers to put the fat on their animals!
- The hide/fleece pullers were misfiring 250 times par day, costing ~\$500,000 annually.;
- Only 27% of the animal’s live weight ended up as a premium item on the retailer’s shelf.

Once the performance of the chain had been thoroughly understood, the participants were able to design an incentive system for ensuring that all the members of the chain worked in unison to achieve outcomes that benefited them all.

At the most basic level, such a system would reward producers for supplying lambs most suited the end retail market, and penalize producers the supplied dirty lambs. To motivate producers to align their operations with the short, medium and longer term needs of both the processor and the retailer, a more advanced system could include providing direct information feed between producers and the abattoir, and rewarding farmers partly on the extent to which they openly shared accurate and timely information.

Tender Fruit

Agriculture regularly measures performance according to volume. This leads to farmers and business managers regularly missing opportunities to improve their profitability. For instance, focusing on 'profit per tonne' and/or 'tonnes per acre' may provide very different (and less insightful) results than measuring profits on a 'per acre' basis.

In fact a study found that those farmers that measured their performance by tonnage could have a level of profitability that was ten times less than those who measured performance on a per acre basis. A subtle change in perspective can produce significant changes in profitability.

Situations such as this can occur anywhere along the value chain. In studying the performance of a retail produce department, researchers found that while the retailer primarily measured performance by volume sold, the department was failing to make a profit. In fact, any profit that the retailer would have made was negated by the costs they incurred from having to dispose of wasted product. They had failed to identify the relation between promotions, which resulted in significant fluctuations in demand and supply, and the waste they experienced due to product that had passed its sell-by date or had reduced in quality to the point that it was no longer saleable.

A study of a fruit chain found that while the businesses situated along the value chain thought that their performance was pretty good, certain factors were severely impacting performance.

- Trying to reduce labour costs by picking every other day rather than every day created significant costs and lost market opportunities for the entire value chain.
- Having to deal with a high percentage of overripe fruit led to downstream elements of the chain incurring considerable costs from having to dispose of overripe fruit (*up to 30% of bulk shipments, along with distribution and in-store losses of packed fruit*).
- 'Lost' fruit and poorly planned picking arrangements also led to the packer needing to employ considerably more sorters on the grading line. It also led to late deliveries.
- Not counting missed sales opportunities, the estimated costs that this situation incurred for the packer during a relatively short season of supply exceeded ~\$250,000.

A method of incentivizing producers to desist from focusing on cutting costs rather than producing consumer recognised value could look like this: Penalize them on the percentage of overripe or under quality fruit delivered to the packer's facilities, and reward them on the factors that mattered to the packers (*such as on-time delivery*), and attributes that mattered most to consumers (*such as taste, visual appeal, and shelf life*).

Note: We described in the Define section, project charters are only necessary for large projects or in situations where the issues to be addressed are complicated and therefore difficult to resolve. In such a situation, the SIPOC tool helps ensure that the project charter is correct and that the project teams are focusing on correctly addressing the identified issues.

In the case of smaller projects or less complex situations, you may choose to use the SIPOC to help you construct a detailed process map of value chain; then use and action log (described in Activity 12) rather than a project charter to keep your project on track.

2.1.2 SIPOC Example of a Peach Value Chain

The SIPOC shown below in Figure 10 was used to identify factors that impacted the quality of peaches from their production through to consumption. As with all SIPOCs, it was developed following the process described below:

- The starting point is the 'Process' section or column. This sets out the high level sequential steps that occur along the value chain.
- The columns to the right of 'Process', identify the key outputs of each value chain element and who receives them (the Customer(s)).
- The third part of this analysis is found to the left of the "Process" column. This area identifies the key inputs for each value chain step and where they came from/who provided them (the "Supplier(s)").

Thus, if a particular process input, such as maturity testing prior to picking were not well or consistently executed, it would be a potential weakness in or threat to the chain.

Figure 10: SIPOC Diagram of a High level Peach Value Chain

SUPPLIER(S)	INPUTS	PROCESS	OUTPUTS	CUSTOMER(S)
<ul style="list-style-type: none"> • Industry • Grower 	<ul style="list-style-type: none"> • Varieties • Density • Irrigation • Spraying • Pruning • Thinning • Age of Trees 	Orchard Husbandry	<ul style="list-style-type: none"> • Size • Volume • Colour • Quality 	<ul style="list-style-type: none"> • Packer • Retailer • Consumer
<ul style="list-style-type: none"> • Grower 	<ul style="list-style-type: none"> • Pressure • Brix • Acid • Colour 	Pre-Harvest Testing	<ul style="list-style-type: none"> • Quality • Shelf Life 	<ul style="list-style-type: none"> • Packer
<ul style="list-style-type: none"> • Grower 	<ul style="list-style-type: none"> • Training • Supervision • Safety • Ladders • Maturity Testing 	Picking	<ul style="list-style-type: none"> • Quality • Volume 	<ul style="list-style-type: none"> • Packer
<ul style="list-style-type: none"> • Grower • Packer 	<ul style="list-style-type: none"> • Handling • Picking Rate • Cool Chain 	Post Harvest	<ul style="list-style-type: none"> • Quality • Storage 	<ul style="list-style-type: none"> • Packer
<ul style="list-style-type: none"> • Packer 	<ul style="list-style-type: none"> • Cool Chain • Fruit Quality • Equipment • Training • Rate of Pack • Grower Interest 	Grade and Pack	<ul style="list-style-type: none"> • Volume • Quality • Reports 	<ul style="list-style-type: none"> • Retailer
<ul style="list-style-type: none"> • Retailer 	<ul style="list-style-type: none"> • Time in Storage • Cool Chain • Demand for Fruit • DC Practices • Receipt Inspection 	Retailer DC	<ul style="list-style-type: none"> • Volume • Quality • Schedule 	<ul style="list-style-type: none"> • Retailer
<ul style="list-style-type: none"> • Retailer • Consumer 	<ul style="list-style-type: none"> • Produce Standards • Display Size • Demand 	Retail Produce Department	<ul style="list-style-type: none"> • Volume • Margin • Customer Satisfaction 	<ul style="list-style-type: none"> • Consumer

2.1.3 Examples: Identifying the impact of Inputs and Outputs and Processes on Chain Performance

The following examples show how systematically analysing the relationship between Inputs, Outputs and Processes leads to opportunities to more effectively manage the determinants of quality.

Red Meat

Many businesses (producers, processors, retailers, etc. alike), believe that profitability comes from maximizing capacity: producing the highest possible volume at the lowest possible cost. While this may be the case for some businesses, it is not the case for most. This is particularly clear when managers fail to acknowledge that you are only able to manage your business if you are measuring the right things.

By identifying what inputs and outputs were critical to their operations, a red meat value chain realized that, in trying to measure many things and not keeping track of trends over time, they had placed insufficient attention on the factors that had the greatest impact on their profitability.

Variability was found to be the key factor that negatively impacted everyone along the chain. In listing the critical inputs and outputs of every process, along with the associated supplier(s) and customer(s), the chain participants identified which attributes they should measure in order to acquire the information necessary to make the management decisions that would lead to a greater percentage of animals and products that successfully met consumer demands. They did not seek to reduce variation simply for the sake of reducing costs. Instead they sought to reduce variation to maximize the consumer-recognized value that their combined operations were able to create. Reducing the cost of production was an important outcome of their efforts, though it was not the primary purpose!

Wheat

Kernel Visual Distinction (KVD) has for decades been used to evaluate the quality of Canadian grain and which varieties can be registered. The primary reason for its introduction and that it has existed for so long appears to be that it is simple test that can be applied across an entire industry. However, in listing the attributes, processes and outcomes that existed along a bakery value chain compared to the demands of consumers that it served, the participants identified that KVD does not necessarily denote quality or value. Particularly when compared to other attributes such as falling number, starch, optimum protein, and consistency, and to which the characteristics measured through KVD may not correlate at all.

Through discussions with experts who possessed intimate knowledge of the science surrounding genetics, processing, baking and consumer preferences, the value chain developed processes for measuring which attributes had most impact on their combined profitability. They were also able to identify how best to identify and measure those attributes, and identify where in the chain they should test to obtain the information necessary to make effective management decisions.

While the value chain is still hampered by the influence that KVD has on which varieties can be registered, it is benefiting from having a structured process in place to test throughout the chain for quality and value in direct relation to consumer demands.

Activity 14 Create a SIPOC diagram for your Value Chain project

A: List your Value Chain Elements. You have already listed these in your Association Matrix.

B: Identify the key outputs, customer(s)/consumer(s) and CTS attributes that are associated with each Value Chain activity (Complete these columns using the information that you identified in Activities 1, 3, 5, 7 and 10).

C: Copy the list of inputs and partners from the work you completed above (Partners from Activity 5, Inputs from Activities 5, 6 and 7).

C		A	B		
6 th	5 th	1 st	2 nd	3 rd	4 th
Supplier / Partner	Input	Value Chain Elements	Output	Customer / Consumer	CTS Attribute and specification

2.2 Detailed Value Chain and/or Process Map

Why do it?

- From our initial value chain map we used the SIPOC diagram to identify stakeholders, inputs and outputs.
- In order to understand how they interrelate and are managed, we need to drill down one more level and create a detailed value chain/process map.
- Getting into the detail of the way a chain or process functions will provide a great deal of knowledge and uncover all kinds of opportunities.
- Generally there are differences between the way the chain or process should function (if it is documented), the way we think it functions, and the reality of how it actually functions.

Based on the knowledge gained from the SIPOC diagram, you will be able to map the value chain in more detail. What emerges is a process map that identifies factors that characterize your value chain, resulting in current performance. Appendix 3 shows a process map for peaches as well as carrots.

2.2.1 Examples: Detailed Value Chain and/or Process Map

Described below are two examples of where a process map was used to identify improvement opportunities.

Red Meat

Looking for a way to improve margins and profitability, a hog farmer identified an opportunity to supply pork that offered distinct high quality eating characteristics to a specific segment of the retail and foodservice industry. While the ability to supply guaranteed tenderness, colour and taste appeared to offer the best opportunities, the farmer considered that following practices common to the hog industry would mean that the cost of supplying these attributes would be greater than the premiums that consumers (along with processors and retailers/restaurants) would be willing to pay.

Not one to shy away from a challenge, the farmer worked hard to identify where, along the chain of events from genetics to consumption, processes existed that could impact the eating quality of pork and/or lead to higher than necessary costs.

The farmer began by separating the potential causes of poor or inconsistent quality into internal issues (*such as hogs' natural psychology, stress, and feed*) and external issues (*such as housing, transportation, handling and slaughter*), and identifying where relationships existed between the two areas of focus. The farmer then worked with the processor and a chosen retailer to develop and implement processes that are at times radically different to those that occur in the commodity pork industry. The result is higher margins for everyone along the chain and the ability to produce high quality pork, sold at premiums that do not discourage a large proportion of discerning consumers from choosing this pork over cheaper alternatives.

Tender Fruit

It might be considered intuitive that locally grown fruit would be fresher and of more consistent higher quality than imported fruit. Research identified that this is not necessarily the case. The research showed in fact that the opposite could be the case, with imported fruit being of higher more consistent quality than local. This situation led to consumers often being prepared to pay premiums for imported fruit compared to local; and retailers often preferring to deal with international rather than local suppliers.

Through mapping a number of fruit chains, the researchers were able to construct a detailed picture of processes that were negatively impacting fruit quality and ultimately deterred many consumers and retailers from choosing locally grown fruit over imported. Those processes began in the orchard, with producers not choosing to prune and manage their trees in a manner which best suited the climate and the production of consistently high quality fruit. This behaviour was found to partly be due to the existence of a marketing board and a legislated pricing structure, which protected growers from being fully accountable for their actions. So the primary focus of many producers was on quantity, not quality.

An example of this is how many growers determined when to pick according to subjective rather than objective reasoning. They picked because they wanted to pick, not because the fruit was right to pick. Also, while some growers paid attention to extracting field heat as soon as possible after harvest and graded carefully, many made little effort to accomplish either process well.

That fruit from growers who had invested considerable effort in managing the quality of their fruit was mixed with lesser quality fruit during the process of aggregating then distributing meant that retailers and finally consumers were left to deal with fruit that was inconsistent in quality. At times this

amounted to severely high levels of wastage (50+% by volume) occurring between when fruit that was received by the retailer and that which was eaten by consumers. Furthermore, because picking decisions had been made for subjective reasons and cooling was essentially a secondary concern for many producers/packers, much of the fruit purchased by consumers was unripe and degraded from the inside before it was ready to eat.

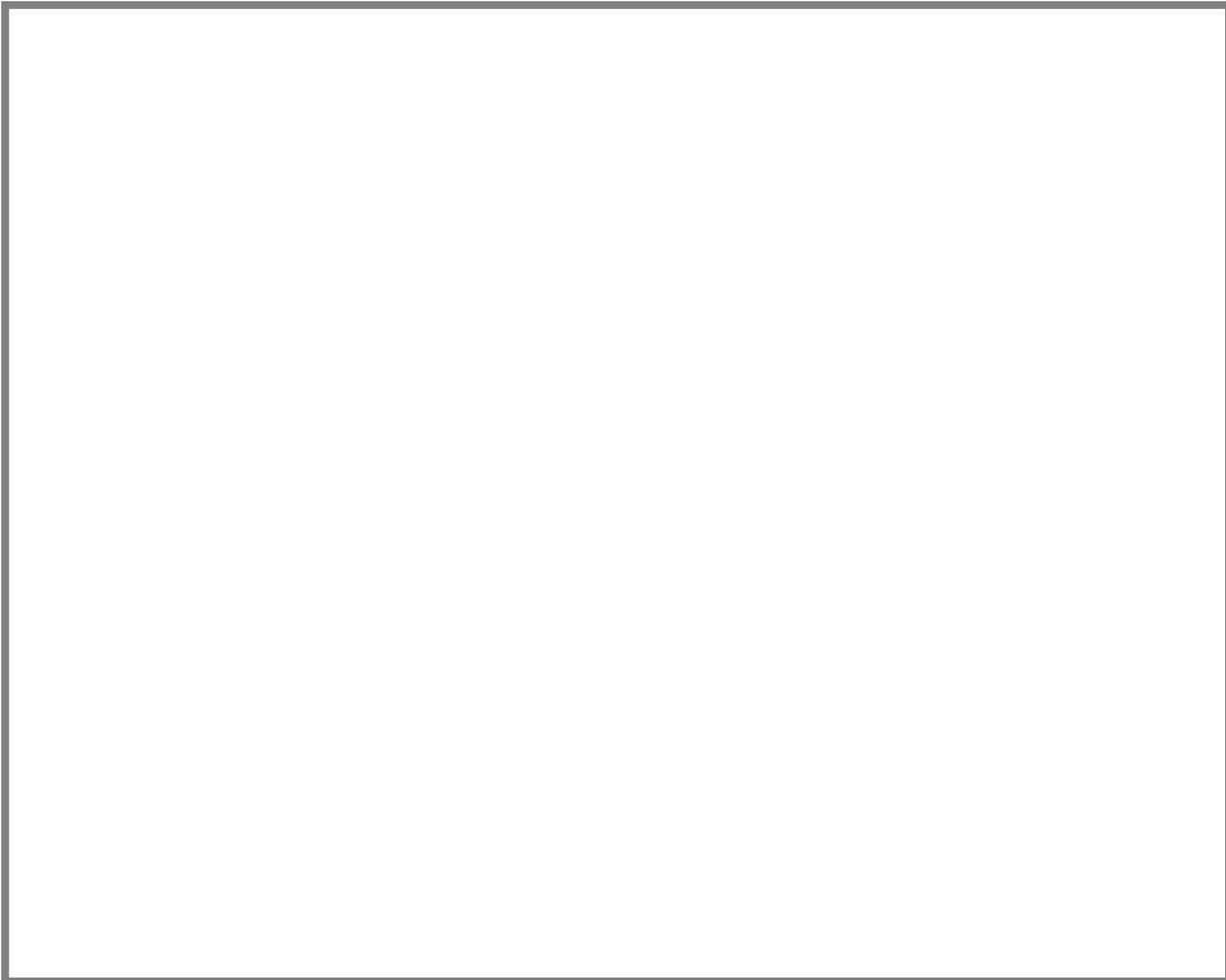
This scenario is very different to the approach taken by the leading international suppliers against which the local industry competes for market share. Facing high transportation and disposal / replacement costs if their fruit is substandard, they extensively invest in research and test objectively for quality along the entire value chain. They then use this objective information and data to proactively manage the value chain. The results speak for themselves.

Activity 15 Create a detailed value chain map

- This is a simple activity but may take time.
- You will require the project team.
- Tape a large sheet of brown paper to a wall.
- Use one Post It™ per value chain or process step. The Post Its™ are placed on the brown paper in an agreed sequence.
 - If there is disagreement of steps and sequence, “Congratulations!” you have just discovered there are at least 2 ways of doing the task.
- When a number of Post Its™ are in place, connect the steps with a marker, and then tape the Post Its™ to the paper. Remember they are designed not to stick permanently!

A more advanced option for this exercise is to use process mapping software (such as Microsoft Visio, iGraphics) to create the map. As only one person can have their hands on the keyboard, this is best done after the team has manually created the map.

Based on the SIPOC diagram, map out the detailed Value Chain or Process Map.



2.2.2 Introducing TIM WOOD

For an activity to be considered value added, it must meet the following criteria:

- It must physically transform the product or service;
- It must be done right first time;
- A customer must be willing to pay for it.

Activities that do not meet these requirements are non-value added or waste. There are seven types of waste that can be remembered with the acronym TIM WOOD:

T = Transporting material or product further than necessary

I = Carrying Inventory of finished goods, raw material or work in process

M = Unnecessary motion of people and machinery

W = Waiting for material, equipment, maintenance – not producing when you should

O = Over producing – making more than is required = inventory

O = Over processing – making it better than is required

D = Defects leading to scrap, rework, downgraded product and operating losses

Activity 16 Identify waste in your map

Once you have developed the SIPOC and detailed process map, you will be in a position to begin assessing the impact that factors such as cycle times, inventory levels, shrinkage, and organizational behaviour have on your chain's performance. This includes the ability to begin identify which factors are impacting the extent that the chain's activities are resulting in customer/consumer recognised value. For instance, are certain orchard management or cool chain practices resulting in significant levels of waste?

Looking at your SIPOC and process map, complete the table below.

- Write in your value chain activities. Categorize the function of each activity.
- To each activity that results in customer/consumer consumer recognised value, apply a check-mark.
- To each activity that does not add value, but facilitates the creation of value (such as unloading a truck), label them VE for value enabling.
- Any activity that is not yet marked is non-value added or waste. These are TIM WOOD activities.
- Add a TIM WOOD tick to any other activity that you have already identified as creating what you believe is an unnecessary level of waste.
- For each activity that is categorized as TIM WOOD, consider what actions you could take to eliminate or significantly reduce the waste.

Value Chain Activities	Value Adding? (✓)	Value Enabling (VE)	Waste (TIM WOOD) (✓)	How eliminate/reduce waste (TIM WOOD)?

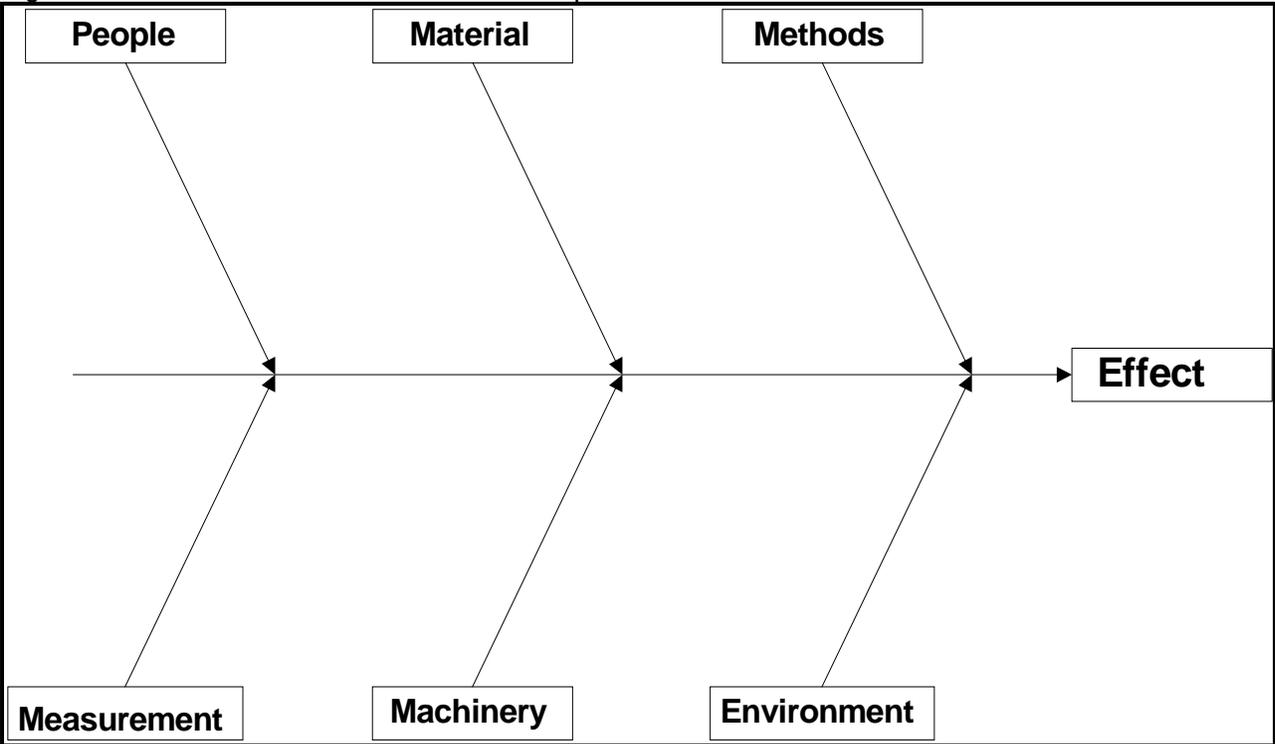
2.3 Finding Potential Causes of Waste

Why do it?

- In order to correct a UDE permanently, we need to take preventive action rather than corrective action. To do this, we need to determine the root cause of each issue.
- Simple and quick to implement solutions might be identified for some UDEs.
- Solutions for other UDEs may not be obvious or may require more information and take more people and time to accomplish. A value chain project may be launched to address these UDEs.

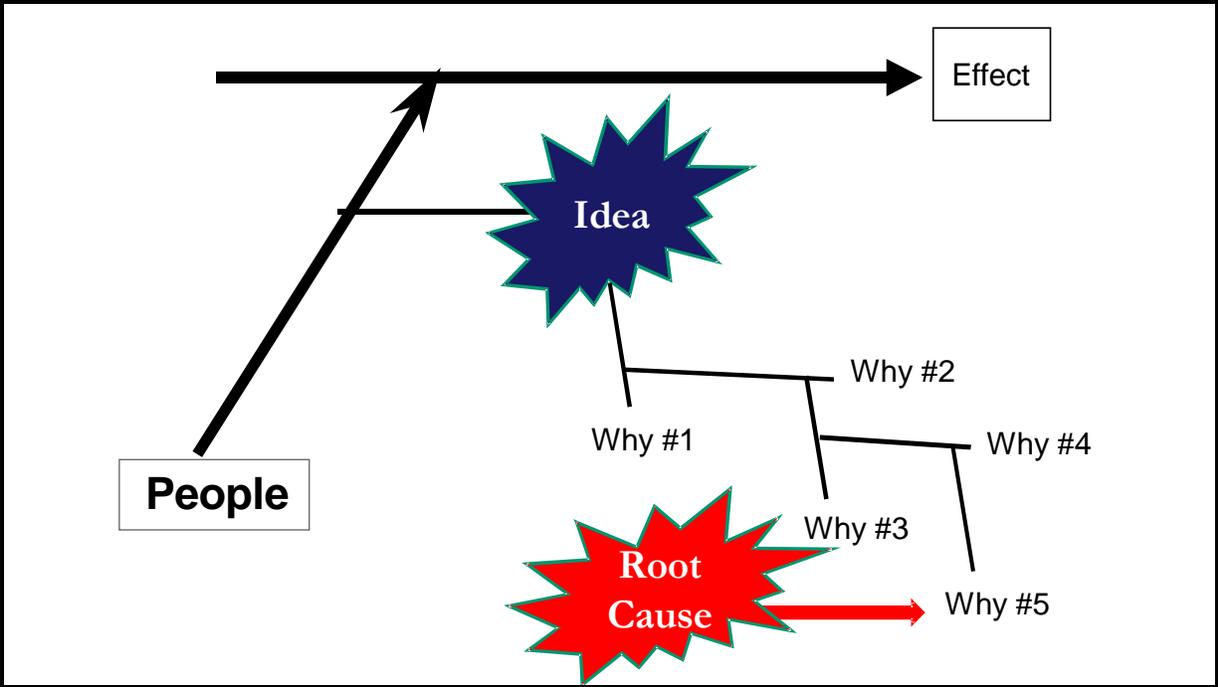
To take preventative action and permanently correct problems, it is necessary to identify the root cause of issues. A tool to tackle this is a 'fishbone' or cause and effect diagram. The UDE is listed in the head of the fish. Potential root causes are listed as the bones. This is illustrated below in Figure 11.

Figure 11: Fishbone Cause and Effect Example



For each cause that is identified, it is then necessary to ask “why” it exists five times. This will lead to the determination of potential root causes.

Figure 12: The 5 Why's of Each Cause



2.3.1 Example: Cause and Effect Fishbone

Red Meat

It has been estimated that addressing a quality issue at one level of the value chain commonly costs ten times the amount that it would have cost to address the same issue at the previous level. In a chain of four links (farmer, processor, distributor, retailer), addressing an issue at the retail store could cost one thousand times more than it would have at the farm.

When choosing meat, consumers have been found to value consistent tenderness, juiciness, and portion size, as well as limited excess fat. Therefore, it would be more resourceful to select animals that produce meat exhibiting those qualities at the farm level than to have the retail store segregate inconsistent products, and sell them differently.

Tracking the issue of inconsistent products back to the cause, a value chain found that beyond the farm, additional reasons existed explaining why retailers did not receive the correct product every time. These included incorrect performance of the processor's equipment. Tracking this back further, it was found that the most likely causes of faulty equipment were poor maintenance or inadequate staff training. Tracing the potential cause of quality issue further back along the chain, it was found that the most likely causes for the inconsistency of animals leaving the farm were mixed genetics, inappropriate feed, poor housing, and insufficiently trained staff.

As proven by multiple studies in the red meat sector, identifying then managing the factors that have most impact on determining quality is a far more powerful approach to improving profitability than grading what has already been produced.

Wheat

Delivery in full, on time, and to quality (DIFOTQ) is a common benchmark used to assess the performance of a business or value chain. In studying a value chain involving wheat producers, a miller, a biscuit manufacturer, a retailer, consumers, and the necessary logistic functions, researchers identified many significant opportunities to improve performance.

For instance, it was found that almost 50% of grain deliveries did not meet the customer's expectations for quality or on-time delivery. This situation created unnecessary costs and friction due to wasted effort and resources, which in turn negatively impacted chain relationships. Furthermore, a lack of communication led to often tenuous relationships existing along the chain, particularly between farmers and the miller. In turn, this negatively impacted farmers' and the miller's willingness to share anything other than transactional information. They were caught in a catch 22 situation.

It was not until an earnest effort was made to identify the root causes of poor performance that the entire chain purposely began working closer together. It was ultimately found that farmers' orientation to growing rather than marketing led to the production of wheat that was inconsistent in quality. It was also found that deliveries were arranged using many separate transport companies rather than aligning with a small number of companies. That none of the transport companies considered this source of work to be a priority compared to other customers negatively impacted delivery efficiencies. It was also found that if tests for quality occurred prior to the wheat being shipped, rather than at the point of delivery at the mill, the entire chain's operation could occur more seamlessly and therefore with less tension. Particularly as a key factor found to be impact performance was in how grain storage practices often reduced the quality of shipments delivered to the mill.

The study showed that, rather than being the cause of the chain's problems, the strained relationships that existed between chain participants were in fact symptoms of underlying issues that had never been addressed. In identifying the root cause of performance issues, the entire chain was able to establish more constructive relationships than existed previously. In doing so, the chain acquired the opportunity to benefit from focusing their combined resources on improving long-term performance, not fighting the seemingly daily scrums that had previously occurred.

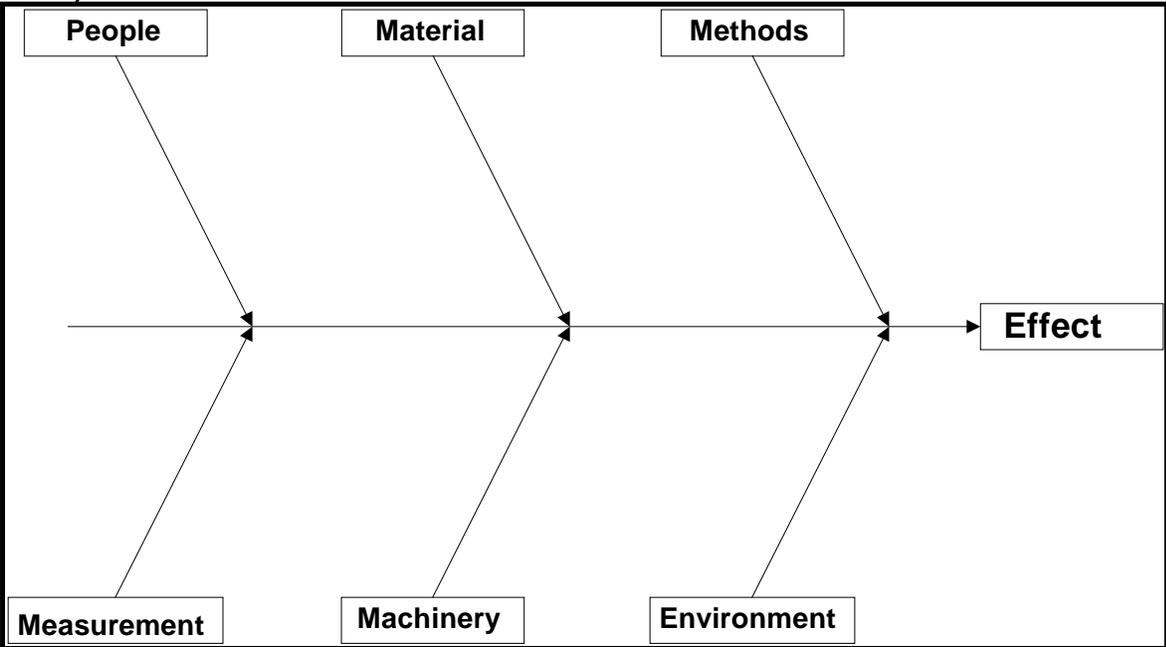
Activity 17 Develop a Cause and Effect Fishbone and Action Log

From Activity 16, pick one significant type of waste affecting the customer. Work on one issue at a time.

Ideally, it is best to work with a team of subject matter experts to brainstorm possible causes.

1. Construct a fishbone diagram like the one shown below, on a large sheet of paper.
2. List the waste in the head of the fish.
3. Have team members spend 30 to 40 minutes giving you their ideas on potential root causes.
4. Using the headers 'people', 'materials', 'methods' etc as subject groupings, fit each root cause against the most appropriate bone of the fish.
5. For each potential cause/idea, ask "why" five times. This will lead to the determination of potential root causes.
6. When the team has run out of ideas, decide which root causes need to be investigated or acted upon first.
7. For problems that are straightforward to resolve, assign an action log (as outlined in Activity 12), outlining what needs to be done, by whom and when. Use this tool to track the status of action points. For more complicated problems, you will need to develop a project charter.
8. Follow up with another team meeting in a reasonable amount of time (i.e. a week or two) to review progress.

Using the sample below, create a cause and effect/fishbone diagram (one chart per issue).



2.4 Controlling Processes to Better Manage Risk

Why do it?

- Many organizations document how processes operate, to manage and control risk.
- Invariably the way processes are set up, managed and controlled is often based on tribal knowledge rather than a well thought out control plan.
- A control plan uses data and detection to intervene before problems occur and encourages ongoing improvements to be made.
- The Process Failure Modes and Effects Analysis (FMEA) is a tool for determining the level of process control and thus the risk associated with low process controls.

The following questions address the degree of risk in the value chain or process.

- Do operating procedures and control plans exist? If yes, are they followed?
- Is there formal cross training of operators?
- What inspections and tests are performed? Are they meaningful?
- What information is provided or sent downstream?
- What information is received or sent upstream?
- How is information used?
- Do all members of the value chain receive the same information and at about the same time?
- How much of the information addresses the needs of the end customer/consumer?
- What decisions are made based on the information?
- What are the key performance indicators (KPIs) generated and tracked for each VC element and/or VC partner?

An effective tool for assessing risk is the potential Failure Modes and Effects Analysis (FMEA). This tool was developed by NASA to address the issue of food safety during space missions. It has since been widely adopted as an effective tool to identify, assess, and manage risk in commercial environments.

The first task is to consider and assess the risk of the current state process or situation. This is analyzed on the 'left side' of the FMEA form.

For each high level step in the process, consideration is given to what could potentially go wrong (failure) and what the effects of that failure might be. The severity of the failure is scored on a scale of one to ten. A score of one is inconsequential, while a ten is the most severe outcome.

A number of industries have developed their own standards for generating FMEAs; this includes scoring criteria specific to their industry. The scores below are intended as a guide to the tree fruit and table grape value chains.

Figure 13: Example of scoring criteria for Tree Fruit and Table Grape Value Chains

Severity	
9 to 10	Potential to cause a food safety issue, breach regulations
7 to 8	Potential to cause consumers/retailers to stop buying product
5 to 6	Potential to upset consumers/retailers and cause them to complain
3 to 4	Some degree of consumer/retailer dissatisfaction
1 to 2	Minimal inconvenience to consumer/retailer

Occurrence	
9 to 10	Issue occurs on a frequent basis - daily
7 to 8	Issue occurs often - weekly
5 to 6	Issue occurs sometimes - monthly
3 to 4	Issue occurs occasionally – one every 3 months
1 to 2	Issue may happen once a year

Detection	
9 to 10	Very low Potential to prevent or detect a problem
7 to 8	Low Potential to prevent or detect a problem
5 to 6	Some Potential to prevent or detect a problem
3 to 4	Reasonable Potential to prevent or detect a problem
1 to 2	Very robust prevention and detection measures in place

Next, potential causes are identified and scored based on potential or actual occurrence, again on a scale of one to ten. A score of one is an infrequent occurrence, while a ten is a very frequent occurrence.

Finally the degree of process control is assessed. This is addressed in terms of either preventive actions (that prevent causes of failure from occurring) or the potential to detect when a problem has occurred. Again the scoring is on a scale of one to ten. A score of one is excellent process control; there is little chance a problem could occur or go undetected. A ten indicates no process control; no prevention of a problem and every chance a problem could escape undetected.

The severity, occurrence and detection numbers are multiplied. The resulting product is called the risk prioritization number (RPN). For multiple step processes, the RPN indicates which have the highest risk and should be worked on as a matter of priority.

2.4.1 Example of Peach FMEA

Consider the process step of deciding when to pick peaches. Picking them too early would mean that the fruit either has a low shelf life or is too hard when it reaches the retailer / consumer. Since this outcome would cause retailer / consumer not to be able to eat the fruit when they wanted, we might score the severity in the area of a seven or eight. We will pick eight.

Next we consider some of the causes as to why fruit might be picked too early or too late. Causes might include a lack of quantitative testing by some growers. If we considered the number of growers who did not conduct any kind of structured test to make a decision to pick, and found it very high, we may choose a high occurrence score of say, seven.

In considering the current methods of deciding when to pick and found them to be subjective and based on experience, we might score detection at around a six or seven, we will choose seven. Thus the RPN for picking decision is $8 \times 7 \times 7 = 392$.

Let's compare this process to a differentiated peach grower in California who conducts ongoing testing as part of their picking process. The severity of picking fruit that is too hard or too ripe is still the same, eight.

However, by formalizing a pick decision testing process across several contract growers, the degree of process control has been increased. Thus we might score detection at a two.

As a result of using a formalized picking process, the occurrence of picking fruit too early or too late has decreased significantly, such that we might score Occurrence at three.

Thus the RPN for the Californian growing area is $8 \times 2 \times 3 = 48$, indicating a more robust process with less risk of causing dissatisfaction to retailers/consumers.

One can debate whether a score of seven should be a six or even an eight. In actuality, it doesn't really matter; the fact is there is a difference in the degree of risk to both growers and their customers. In the case of the California growers the risk is reduced because of better processes and controls.

2.4.2 The Future State FMEA

This is built and analyzed on the 'right side' of the FMEA form.

Those with process knowledge will decide what actions they might undertake to either increase prevention and/or implement by way of process controls and detection. Generally when process controls are improved, the level of occurrence is reduced. Severity of failure mode will generally remain the same. As ideas are generated and action plans developed, the future Occurrence and Detection scores are estimated. The proposed actions should be sufficient to make an order of magnitude to the RPN number. Once the ideas have been developed into actions and implemented, the (SOD & RPN) scores are reviewed again to determine if the actual met the estimate. As such the FMEA becomes a living document.

Peaches FMEA (1 of 2)

Peaches: Potential Failure Mode and Effects Analysis																	
Current state										Future state							
Item Function	Potential Failure Mode	Potential Effect(s) of Failure	S	Potential Cause(s)/ Mechanism(s) of Failure	O	Current Controls		D	R P N	Recommended Action(s)	Responsibility & Target Completion Date	Actions Results					
						Prevent.	Detect.					Actions Taken	S	O	D	RPN	
Orchard husbandry	Inappropriate or inadequate	Poor yield, poor quality, low margin, customer dissatisfaction	8	Lack of processes and shared data/information to make decisions. Each grower believes they know best	8	None	Poor quality is detected at the packer, distributor, retailer or consumer if pears are too green or too ripe	8	512								
				Older trees not replaced, yield and quality decline	4	Process peach replant program introducing new stack		3	96								
				Inadequate prune, thin or spray	4	grower knowledge and commitment		4	128								
Pre harvest testing	Pre harvest testing is not performed or results are incorrect	varieties are picked either too early or too late, leading to poor shelf life and low quality	8	lack of resources and/or lack of desire to invest in and/or share testing equipment	8		subjective decisions by grower based on experience, may be influenced by downstream demand	9	576								
				not interested grower knows best	8	education and standards		8	512								
Picking	Volume and quality of fruit picked are inappropriate to customer and consumer needs	Wasted packing costs, low quality, low margin	8	low quality fruit is produced	8		None until peaches arrive at packer or distributor, or retailer DC or consumer complaints	10	640								
				inadequate picker training	3	Some growers use casual labour hired for a few days		4	96								

Peaches FMEA (2 of 2)												
			inadequate grading reports and feedback to grower	8	most grading and packing is done on the farm. Very little data maintained. None		9	576				
Post harvest processing	Inadequate cold chain	Retailer shrink -3 x imported fruit. Variation in consumer experience	8	Significant variation in (and/or lack of) cold chain stresses fruit and reduces shelf life	9	None	10	720				
Grading and packing	variation in quality of peaches, equipment, training and standards	variation in quality of peaches packed, ripeness, shelf life, visual appeal and customer satisfaction	8	variation in orchard husbandry and picking decisions	8	No standard approach or required controls	9	576				
			Variation in investment and type of equipment	6	large packer operations. equipment is adequate for purpose		4	192				
			inadequate grader/packer training	2	Training is generally adequate		2	32				
			grader/packer fatigue	2	Process is largely automated - therefore likely not an issue		2	32				
Retailer distribution process	inappropriate receipt inspection criteria and/or inadequate product handling	good loads rejected/bad loads accepted. Good product is spoiled	6	Lack of inspection standards and training	4	Dedicated and experienced personnel	5	120				
			Poor internal handling processes	3	Retailers own product and are accountable for losses		2	36				
Retailer produce department	inadequate storage, handling and display maintenance	High rate of shrink, consumers walk on by, low margins	8	Lack of standards and inconsistent produce dept practices	8	lagging indicators, sales are down, displays look poor, shrinkage is high	9	576				

Activity 18 Create a 'nine box' Failure Modes and Effects Analysis (FMEA)

The FMEA is a tool for determining the level of process control that exists and the risk associated with low process control.

1. On a flip chart, set up a 'nine box' as shown below.
2. Work on one issue at a time. Identify something that does or could go wrong.
3. Assess the *impact* of the failure using the scale of 2, 6 or 9. The higher the number the more severe the consequence.
4. Assess the *probability* of failure using the scale of 2, 6 or 9. How frequently does the failure occur? The more likely it will or does occur, the higher the number.
5. Determine either the degree of prevention for that particular risk or the ability of the process to detect a problem in time to head it off. This is the level of process *control*. Assign a score as follows:
 - 2: Very Robust Process Controls – high degree of prevention or detection
 - 6: Reasonable Process Controls – some problems go undetected, room for improvement
 - 9: No Process Controls – little prevention of a problem and every chance an occurrence would go undetected.

Write this score on the bottom of the Post It™.
6. Multiply the *impact*, *probability*, and *control* scores. The resulting number becomes the Risk Prioritization Number (RPN). They will range from $2 \times 2 \times 2 = 8$ to $9 \times 9 \times 9 = 729$. The higher the RPN, the greater the risk and thus the priority to address the issue.
7. Repeat this activity for any significant problem that has been identified.

Impact of Failure	9			
	6			
	2			
		2	6	9
Probability of Failure				

Advanced Option:

To develop a full FMEA like the Peach example above is possible using Microsoft Excel. This is a more thorough process and will take longer to do. It will also likely require external coaching for a successful outcome.

2.5 Using performance measurement data to identify causes and eliminate waste

Why do it?

- Without accurate and timely data, you are making decisions based on assumptions and opinions.
- That which is measured gets done.
- If it is not measured – how can it be managed?
- If you are not keeping score, you are just practicing.

2.5.1 Examples: Performance Measurement

Red Meat

It has been said that, on average, a little over 50% of beef cattle and lamb produce meat that conforms to standard retail specifications. The primary reasons for this situation are that the measures used to manage the production, processing, and retailing of red meat are not uniform along the value chain or shared in a timely fashion. Other reasons include that the information shared between the different stakeholders is either outdated or fairly meaningless, and therefore cannot be used to make management decisions. As well, many producers simply choose not to access or use the information that they are provided.

To address all of these problems, a visionary producer who understood the retail environment established a group of like-minded progressive producers. The purpose of the initiative was to produce a superior quality of meat, and produce it more consistently from the same number of animals. The expected outcome, which has proven correct, is that by increasing the quality of meat produced as a percentage of overall production you naturally increase the value of the animals. Established in the early 1990's, the system has proved very successful. A number of similar initiatives have also found success with lamb, beef and pork.

The system's success has relied on identifying what to measure when, how to share the resulting information in a timely fashion, and which formats would allow the producers to act upon the information most effectively. In this particular case, the usual carcass traits such of loin size and fat cover are measured, though so too is information such as the health of the liver.

The information is shared through a secure internet site, often within an hour of the animals being slaughtered. This provides producers with immediate and objective information on which they can base management decisions. In addition to the performance data from their own animals, they can also compare their performance against other producers' animals delivered on the same day. They can also compare their performance across the week, across the month, across the season so far, and against previous seasons.

This type of information motivates producers to continually improve, and provides them with a method of doing so. As a result, producers have increased the value of their animals and, simultaneously, have reduced their costs of production by having access to a consistent supply of high quality animals and meat benefits processors, retailers, and foodservice operators. Everyone wins.

The performance of initiatives such as this is easy to see. One producer group regularly sees 88% of their animals meeting retail specifications; another group has seen 97% of their animals meet retailers' specifications, both for extended periods of time. When industry's overall performance is a little over 50%, the benefits of accurately measuring the factors that determine performance, then sharing the information with a closely knit group of likeminded producers in a timely and meaningful fashion, is undeniable.

Horticulture

The majority of farms and businesses measure the success of their business by its efficiency. For example, the volume produced by one person in a day. Or the overhead costs for each unit of production. While efficiencies are an important determinant of success, partly because they are relatively easy to track and account for, they are often allowed to drive the majority of business decisions. This was the case for a horticultural operator who focused primarily on

efficiency and throughput. They were not reaping the full rewards of their efforts, regardless of the prices they received for their products.

This study analyzed the impact that speed had on the harvesting and grading of vegetables. Researchers found that slowing the rate of harvest down by 30%, led to only 15% less vegetables reaching the packing shed. At the same time, the pack out rate increased from 70% to 85%. The pack out rate increased when the harvest time was reduced because infield workers had extra time to prepare the vegetables ready for packing. Slowing the harvest also reduced the volume of partially damaged production, which would have required re-working to meet customers' requirements.

Farmers that measure waste usually only measure the volume or percentage of products that have been completely wasted. They don't usually measure the impact that partly damaged products have on profitability. In this case, looking at their operations in a new light led to a 40% reduction in costs, 34% improvement in quality and 81% reduction in delivery lead time.

Beyond these internal benefits, the research also identified new measures for evaluating consumers' satisfaction. Previously the producer had monitored consumer satisfaction by the number of complaints they received. This is not an effective method for increasing consumer value or identifying new market opportunities. Research shows that only 5% of consumers complain before ceasing to purchase a product. This means that 95% of consumers will simply cease purchasing your products without complaining! The new approach to measure consumer satisfaction was to track product shelf life from the perspective of the retail store and consumers' kitchen as a method of measuring performance. The company also now conducts in-store sampling to evaluate consumer sentiments towards the products and its packaging/presentation in the retail environment.

2.5.2 Background Information

From the work you completed in the Define phase, you have a better understanding of how your process really functions and you may have obtained some high level historical data. Moving forward, you may also benefit from having more current performance data. To ensure that you are gathering the correct data effectively, you will likely require a Data Collection plan. Provided below is guidance on how to develop an effective Data Collection plan. Remember, while you may want to know everything about your business, to make informed decisions you just need to know the right information about the specific operation(s) that you are seeking to improve.

In order to obtain meaningful data you need to ensure that your Data Collection Plan addresses the following questions:

1. What do you need to know?
2. Where will you measure it?
3. What is the unit of measure?
4. How many do you need to measure?
5. How long do you need to measure for?
6. Who will collect the data?
7. How will they take the measurement?
8. Do they know how to take the measurement?
9. How will they record the measurements?

Additional points to consider in collecting accurate data are:

- Observe the measurement process. Do not rely on someone else's interpretation.
- Do you trust the integrity of the measurement system or equipment? For instance, is the measuring equipment calibrated on a regular basis? Is it stored and used properly?
- Ask the operator their opinion. Have they been properly trained?

Activity 20 Complete your own data collection plan

Question	Plan	Notes
What is it that we need to know?		
Who will collect the data?		
Where will we measure it?		
What is the unit of measure?		
How many do we need to measure?		
How long do we need to measure for?		
Who will collect the data?		
How will they take the measurement?		
Do they know how to take the measurement?		
How will they record the measurements?		

In collecting and recording data:

- Create a table for the person making the measurements to record the data on;
- Make sure they understand what is required and how to do the task;
- Observe them making the first few measurements;
- Collect and review the data daily;
- As this is likely an additional task for them, be sure to thank them for their help.

2.6 Summary

The objectives of this section were:

- Develop a more specific understanding of the Inputs and Outputs you need to control;
- Map and measure the details of your value chain performance;
- Understand, identify and plan to reduce waste;
- Assess the adequacy of process controls to reduce risk;
- Create a data collection plan and collect performance data.

Before you progress, ensure that you have completed the following activities:

- Created a SIPOC diagram for any project charters;
- Created a detailed Value Chain Map;
- Identified Value Added Activities vs. TIM WOOD activities;
- Established an action plan to reduce or eliminate TIM WOOD activities;
- Assessed Process Control using a 9 Box FMEA matrix;
- Designed improved process controls to reduce risk;
- Established a Data Collection Plan.

3. Analyze Phase

When we started the project, it was unlikely that very much current data was available or being used. Perhaps during the Define phase, some high level historical data was reviewed. As your work has progressed, a great deal of knowledge has been gained, particularly about your value chain. Having collected your current performance data (in the Measure Phase), you are now able to progress from “we don’t know what we don’t know”, to data based facts about the chain.

The objectives of the **Analyze phase** are as follows:

- 3.1 Determine what the data collected during the measure phase tells us about the performance of the chain
 - Where does the data lead us?
- 3.2 Identify if further analysis might be required
 - Can we benchmark or learn from another chain?
 - Is there an opportunity or need for experimentation?
- 3.3 Complete the final analysis on the ‘current state’ value chain
 - What is the extent of improvement that might be gained?
 - Identify causal relationships between variables.
- 3.4 Establish a vision of the ‘future state’ value chain
- 3.5 Based on the data analysis, consider the future performance of the value chain
- 3.6 Update your chain map, FMEA, KPIs and roles and responsibilities for your future value chain
- 3.7 Identify possible resistance to the planned changes
 - How will you manage it?
 - How will change be managed and measured within the value chain?

How you proceed through the Analyze phase is very much dependant on what data was collected during the Measure phase.

3.1 What does the data tell us about the Chain's Performance?

Why do it?

- All too often people who have worked in a particular business or function have strongly held opinions as to what works and what does not. The analysis of data provides information that may support, though often refutes those opinions.
- Collecting data helps with the operational management of the chain.
- Data analysis allows us to see what might be done and develop a vision for the improved state value chain. It provides the case for change.

The purpose of operational management is to try to ensure that what you are producing always has a higher value than the costs it took to produce. Whatever you are producing, whether it is a beef animal, a loaf of bread, a bushel of grain, a frozen entrée, a bag of carrots, or anything else, exactly the same principles apply to your business.

The vast majority of farms and agri-food businesses do not monitor their operations well. They do not work to respond to customer needs, nor do they focus on maximizing the quality of the product that they produce. Instead, they focus on quantity rather than quality. The ironic thing is that this approach often exacerbates the inefficiencies that exist within their operations, which makes them even less competitive!

A term commonly used to describe the purpose of operations management is to make your business 'Lean'. The strategy followed by a lean business is to strip out as much waste as much is humanly possible, and only doing things that create value for their customer/consumer. In earlier sections we approached the subject of reducing waste from the relatively high level perspective of assessing the purpose of individual processes. You did this through asking whether the entire process is necessary at all or, if it is important to creating customer/consumer recognised value, how urgent does the process need to be improved.

From here on in we dive down into a greater level of analysis. You will use information gathered during the Define and Measure phases to assess the performance of individual processes and your operations as a whole. Then identify how you can improve performance, and make those improvements permanent.

In the Measure phase, you planned and executed the collection of data. We will now guide you through conducting some simple analysis of this data. The results will provide you with vital information on how your chain operates. The tools you will use in this section are:

- a) Pareto Diagram
- b) Basic statistics
- c) Histogram
- d) Capability analysis
- e) Run Chart
- f) Scatter diagram

3.1.1 Example of Analysis using Charts

The following table contains two datasets. Based on a real situation, we will use them to illustrate how to analyze data to the greatest effect. The following charts and/or graphs use this

data from their source. By entering in your own data you will be able to analyze the performance of your own business or value chain in precisely the same way.

Dataset #1 pertains to packaged food where the target weight is 454 grams, and the allowable margin of error is +/- 2 grams. At periods during production we asked operators to record the package weight in grams (PW/G). We also asked them to record fill speed in units per minute (FS/M). This will enable us to establish if a relationship exists between consistency and weight (effectiveness) and speed (efficiency). Any units weighing less than 452 grams is shorting the customer and may lead to regulatory issues. Any units weighing over 456 grams is giving product away unnecessarily and waste.

Dataset #2 is a table of tons of grain that were sourced by the food manufacturer though rejected for reasons related to quality. The dataset lists the specific reasons for why the shipments were rejected and the total tonnage of rejections incurred because of each issue.

A method of analysing dataset #2 to identify the quality issues that will have the greatest benefit on the business operations if resolved is featured in example 'a'. Methods for analysing dataset #1 are featured in examples 'b' through to 'f'.

As a rule of thumb, a sample of 30 data points is usually sufficient to be considered representative of the overall process average.

Figure 14: Example Dataset 1 and 2

Unit #	Data set 1					Data set 2	
	Weight gms	Units per minute	Unit #	Weight gms	Units per minute	Problem	Tons held
1	458	72	16	454	75	Moisture	64
2	452	79	17	454	75	Colour	17
3	454	75	18	459	73	Mildew	35
4	454	75	19	454	74	Insects	4
5	453	77	20	453	76	Weed seeds	15
6	455	74	21	452	77	Protein	37
7	454	75	22	454	76	Purity	11
8	452	76	23	453	77	Bushel weight	18
9	458	74	24	451	79	Insects	12
10	453	79	25	456	75	Mildew	13
11	456	74	26	454	75	Weed seeds	23
12	453	78	27	458	73		
13	455	75	28	453	77		
14	455	75	29	456	73		
15	455	74	30	454	75		

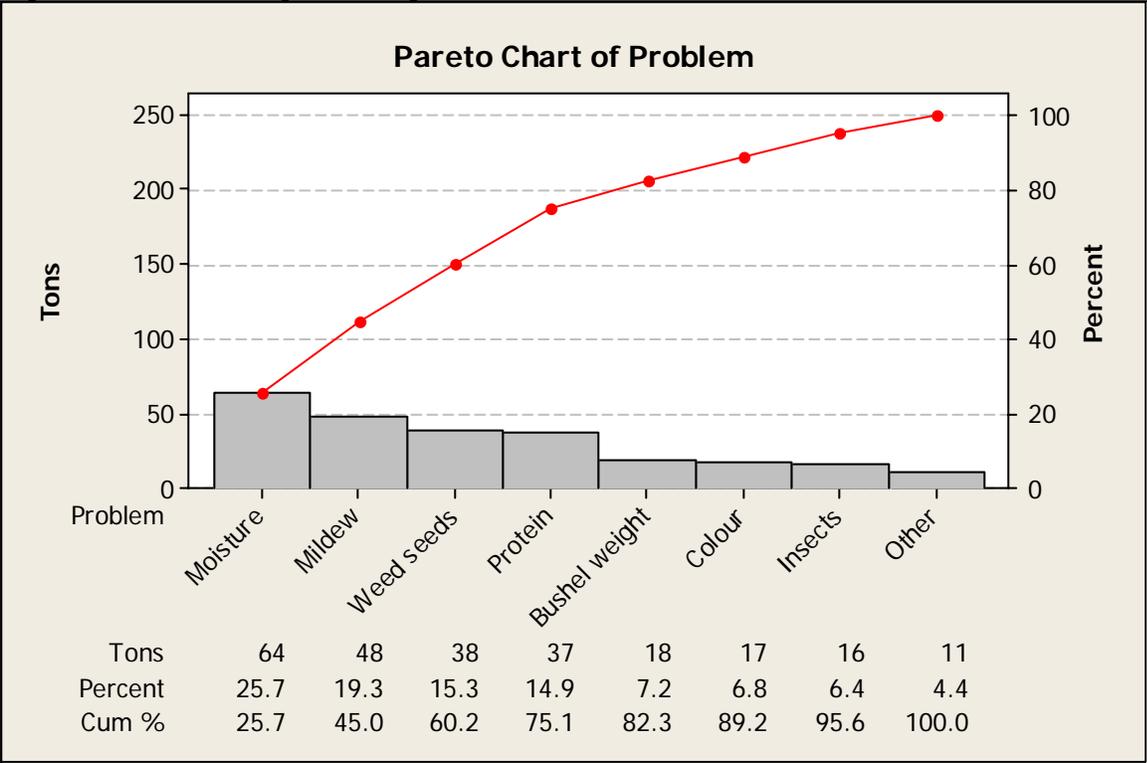
a) Pareto Diagram

- A Pareto diagram is useful to rank gaps, problems or opportunities. It also shows us which issue(s) we need to address first.
- Pareto was an Italian economist who determined that 20% of the population accounted for 80% of the wealth. In doing so he established the 80/20 rule, which has proven an occurrence in many other situations – most notably operations.
- In an operational setting it is highly likely that a small number of issues (the vital few) account for the biggest cause of your problems. You should determine what these are. This saves you from spending valuable resources attempting to fix the many trivial things.
 - Do you remember the 232 improvement opportunities mentioned in Section 2.1.1? Many of those were trivial. Therefore they needed to identify the opportunities which would bring the greatest rewards for their efforts – such as were identified in the examples that we presented in Section 2.3.1 and Section 2.5.1.

Dataset 2 is a table of tons of grain rejected by reason. It allows us to create a Pareto Chart of issues that need to be addressed. To create a Pareto diagram:

1. Count the number of times each problem occurs
2. Total all the problems
3. Calculate each problem as a percentage of the total
4. Draw a bar chart of each problem in descending order
5. Show the count and percentage
6. Draw in the cumulative percentage

Figure 15: Pareto Diagram using Dataset 2



The bars in the chart above show us the tonnage rejected by each reason. The red line illustrates the cumulative percentage of the overall benefits that combating the issues is expected to bring the business or chain. The steeper the line the lies above each issue, the more benefit could expect to result from it being addressed. This diagram allows us to observe

that moisture and mildew (possibly related) account for 45% of tons rejected. Therefore, these issues should be resolved as a priority above the others. To accomplish this, we might map out the process to understand how the grain gets to this point and/or create a fishbone diagram to determine potential root causes for moisture/mildew.

b) Basic statistics

Remembering that inconsistency is the number one cause of waste, a valuable exercise is using basic statistical analysis to identify the variability in a production system.

- To calculate the mean or **average**, add the value of each line item together (in this case that it 30 values), then divide the total by the same number of items (in this case that is of course 30). The **range of values** is found by circling the highest and lowest values. Then subtract the lowest from the highest.
- The results will tell you that the:
 - Average packed weight is 454.4gms. Thus, it might appear that the production system is operating close to the target weight.
 - Range of values is from 451 to 459 (a difference of 8gms).
- While the lowest weight is only 1gm below the allowable weight (which is of course a regulatory issue), the highest weight is 5gms above the target weight. This suggests that the operations could be incurring a significant level of waste through over production versus value created.
- The findings suggest therefore that further analysis is warrant. With the purpose of identifying the cause of over production, we will now use slightly more sophisticated statistical tools to identify the causes of waste in more detail.

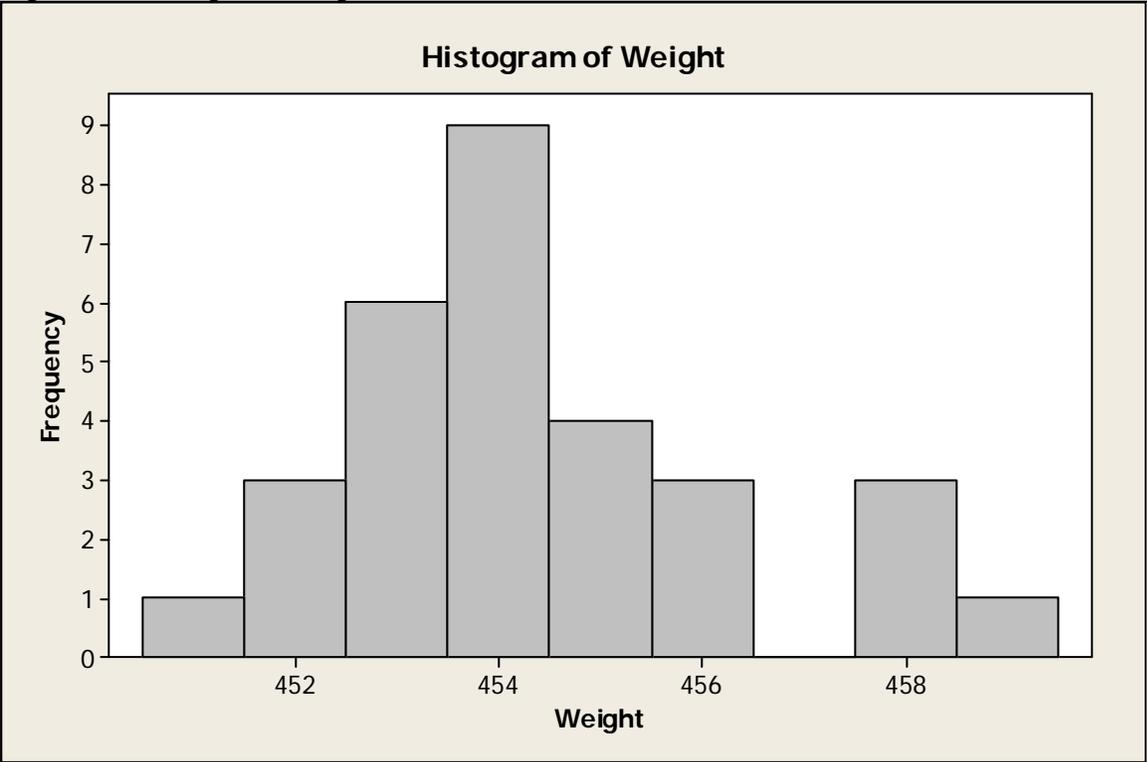
c) Histogram

- A histogram shows the distribution of data and where it is centered.
- When compared to specifications, a histogram shows how capable the process is at meeting customer requirements, as well as the extent of losses or rework/downgraded product.

To construct a histogram from Dataset 1:

1. Calculate the approximate square root of the sample size (30). As the exact square root of 30 (5.477) is not a practical basis of analysis, we will use the closest rounded number. In this case it would be 5 or 6. We have chosen to use 6.
2. Divide the range in value by 6. This produces the cell width, the extent over which you need to analyze your findings.
3. Scale off the lower 'X' axis (horizontal) scale by the cell width. Start at 450.
4. On the left 'Y' axis (vertical) scale, mark of one square each time a value occurs.
5. Each time a value occurs, go to that cell and count off one frequency.

Figure 16: Histogram using Dataset 1



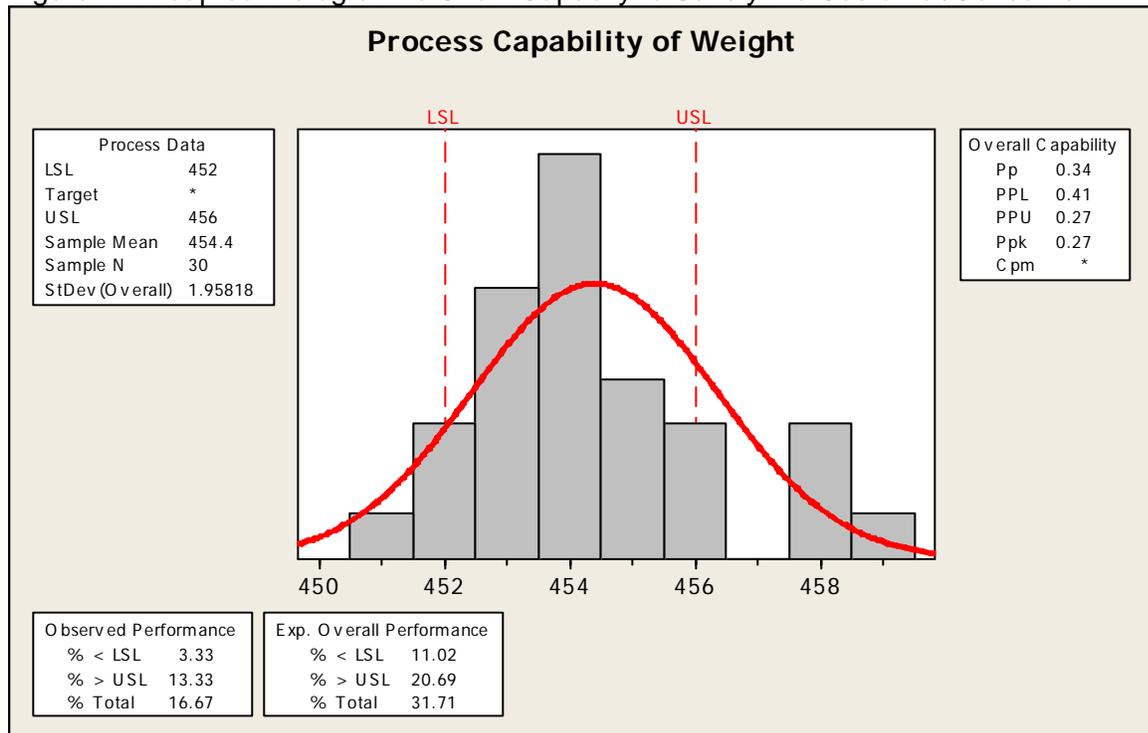
We observe that the highest incident (mode) is our target weight of 454 grams. However, while (as we showed in Example A) the spread of weights range vary from 451 to 459 grams, you will notice that the Histogram shows concentrations of specific package weights. For instance, there is a cluster of values around 458 and 459 grams. This is well outside of the intended performance.

d) Capability Analysis

The histogram can now be adapted to show how well the business is satisfying the customer/consumer. The chart below shows the capability of the operation for meeting customer/consumer specifications. To develop a Capability Analysis chart:

1. Draw in vertical lines at the margins of error that are acceptable. In this case, they are the package weights of 452 and 456 grams.
2. The results allow you to calculate the percentage of customers/consumers will be dissatisfied due to underweight packs.
3. They also allow you to calculate the percentage of packs that are being sold overweight, and the cost incurred.
4. How do we reconcile this with the average?

Figure 17: Adapted Histogram to Show Capacity to Satisfy the Customer/Consumer



LSL = Lower Specification Limit and USL = Upper Specification Limit

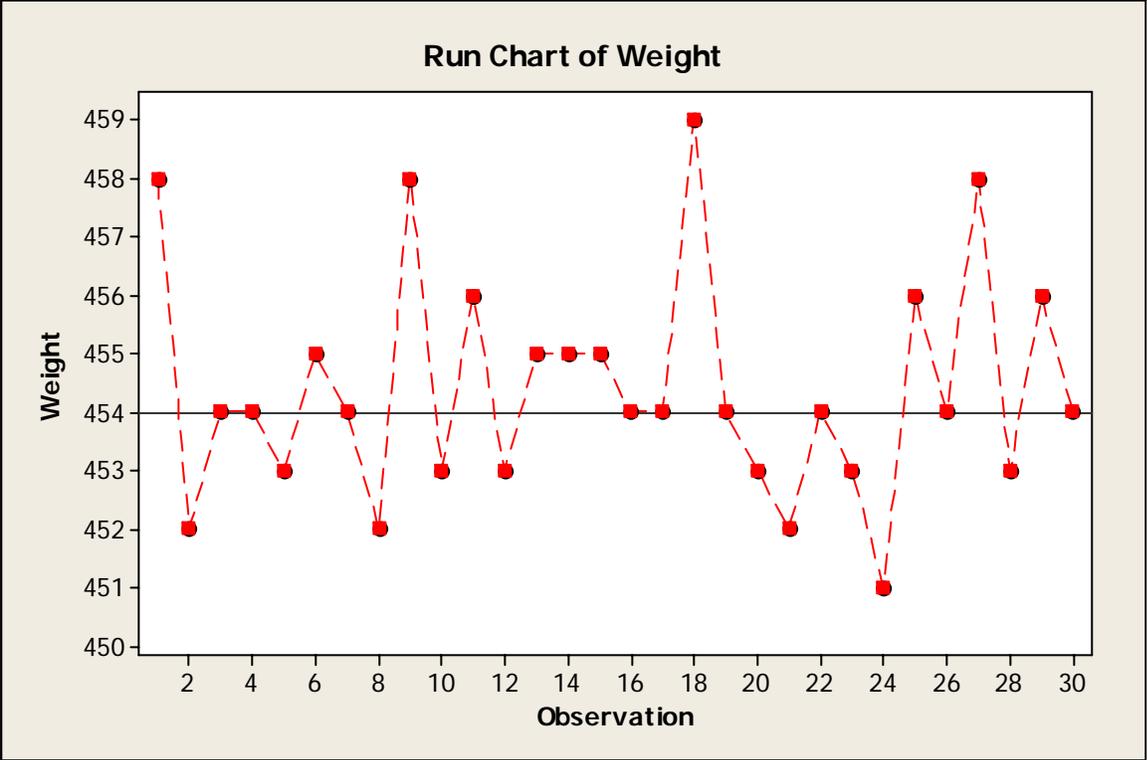
Using a combination of the histogram and capability analysis, we notice from our sample of 30, we have one unit (3%) below customer/regulatory requirements and 4 units (13%) that exceed our internal 'giveaway' specifications. If we pack 75 packets per hour, on a double shift we will produce 72,000 packages per day. If 13% of those packages (9360) have 2 grams of extra product in them, at the end of the day we will have given away the equivalent of 41 packages of food. This does not amount to a huge quantity per day. However it adds up to nearly 11,000 units a year!

e) Run Chart

We will now look to identify if a relationship exists between effectiveness (quality of production) and speed (efficiency). Do you recall the vegetable example in Section 2.5.1, where reducing speed of harvest by 30% led to a 40% improvement in operating costs and an increase in revenue? These same tools were used in achieving those improvements in performance.

- A run chart shows the sequence in which the data occurred and any patterns or trends in performance.
- A control chart (a run chart with control limits) will show if the process is stable and predictable. A control chart is produced by layering horizontal lines at the limits of acceptable margins of error. In this case, that is 452gms and 456gms.

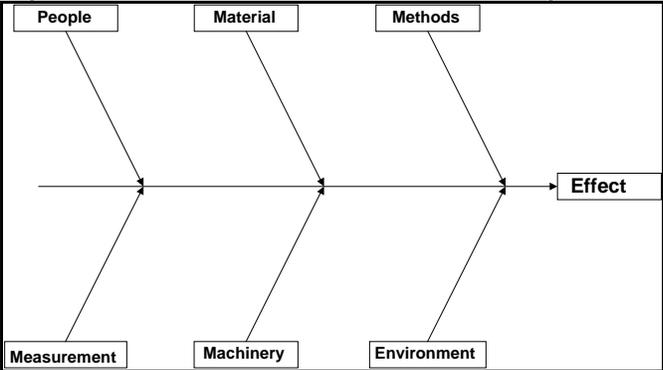
Figure 18: Run Chart using Dataset 1



The chart above shows that approximately every nine to ten hours a spike occurs in the weight of packages produced. This is known as a pattern. That spikes are observed to be occurring at such regular intervals implies that there may be specific reasons that are causing the jump in weight, which means that the company is less profitable than it otherwise could.

Revisiting the Cause and Effect or fishbone diagram that was introduced in Section 2.3 and is shown again below could help you identify why this variation occurs in such a repetitive pattern.

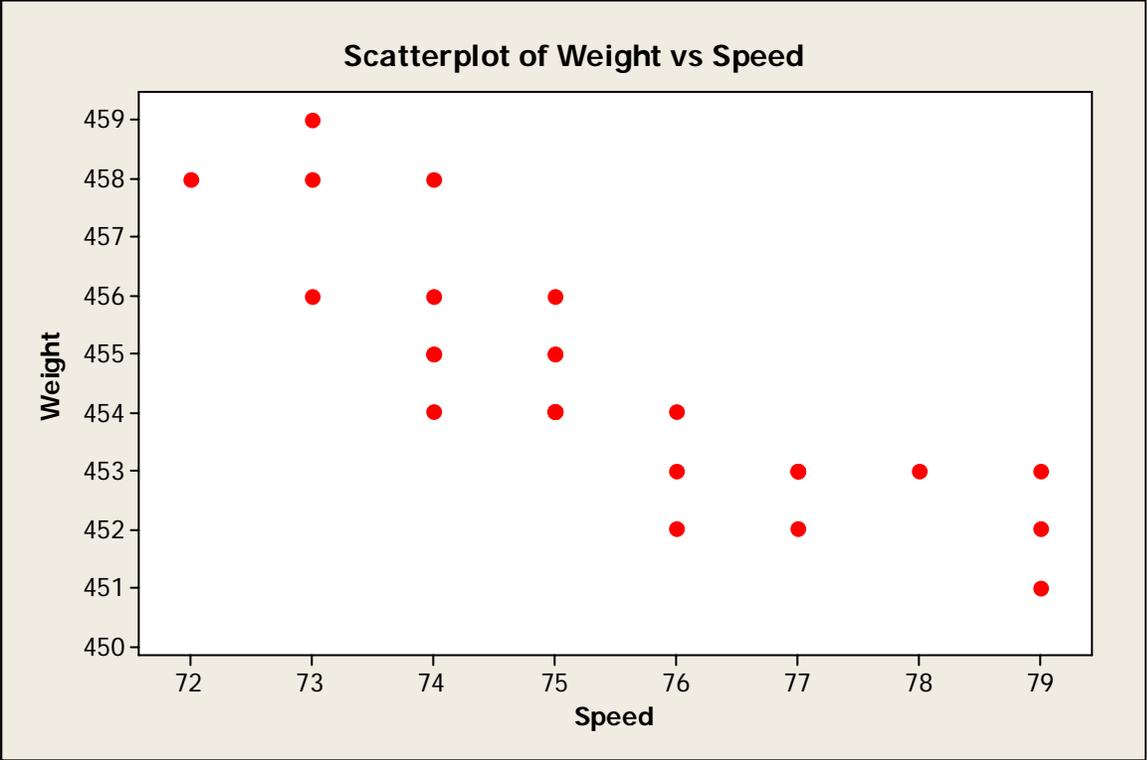
Figure 19: Fishbone Cause and Effect Diagram



f) Scatter Diagram

- A scatter plot shows us if there is any relationship between two independent variables. In the example the variables are weight and speed.

Figure 20: Scatter Diagram using Dataset 1



From this scatter plot we have learned that weight decreases as speed increases. We go below customer minimum expectations if we run over 76 units per minute. We give product away as soon as we run less than 74 to 75 units per minute.

We have found a relationship between effectiveness and efficiency. In some operators trying to do things right (reducing overhead cost through maximizing capacity) something is clearly going amiss and they are not doing the right things. Remember this is just one packing line in what might be a large business. You could well find similar occurrences if measuring one harvest line on a large farm.

We now move to the next stage of identifying causes behind the differences in pack weights. The first step is engaging the operators to understand why they need to vary the pack speed. If we decide to control the speed to between 74 and 76 units per minute, we should collect another 30 samples and repeat the histogram and capability analysis. If we do this we have just conducted a small experiment (refer to Activity 23). If it works, we can now document the pack settings, train the operators and take samples on a regular basis. If it doesn't work, we likely need to go back to the operators and explore what other factors maybe effecting the packing operations. For instance, are there inconsistencies in how materials are flowing prior to the packing line, and is this effecting the packing operations?

If our efforts were successful, we have just made small improvements that have increased customer satisfaction, saved us money and made our production output more predictable. Further experimentation may allow us to reduce the weight variation even more, such that we are perhaps a gram either side of the target weight. However, we would only do this if the cost of getting there makes business sense. To make best use of our resources we would have to consider whether, having fixed the underweight and giveaway, is there a more pressing issue than seeking a further reduction in weight variation?

Activity 21 Basic Data Analysis

Analyze the data that you have collected about your business.

For best results we suggest that you use tools in the following order:

- Establish priorities first using a Pareto Diagram.

Working on priorities first, complete:

- Basic statistics
- Histogram
- Capability analysis
- Run Chart
- Scatter diagram

These charts can be easily created using graph paper, a pencil, ruler and an eraser (just in case). Those more proficient with Excel may wish to create computer generated graphs, the results of which might be used for further analysis.

3.2 Does the data indicate that further analysis might be required?

Once you have completed your first round of analysis, conducted an initial experiment with only limited success, or solved all the problems that you consider to be the easily fixed 'low-hanging opportunities, you may well decide that you need to undertake further analysis before investing further effort into improving performance.

Guiding you through the process of analyzing your operations in more detail is the purpose of the next section. The same process can be used to ensure that you are analysing the correct data, or are missing information that may prove critical to improving your operations or planning how we to test a solution through experimenting.

Activity 22 Summarize the information we have gathered from the data

Using the data you have collected and analyzed, ask yourself the following questions to review the current state of your value chain.

Are we working on the right issues?

What is the gap between current performance and customer/consumer expectations?

Are process outputs on target?

Do process outputs have a variation issue?

Have we observed any patterns or trends? If yes, what are they?

Does the data indicate there are consistent processes?

Is there a need to conduct any further (fishbone) root cause analysis? If yes, what are the findings?

Is there opportunity for small experimentation?

Is there an opportunity to benchmark another chain to find out how they do it?

Activity 23 Experimentation

In situations that are complex or involve numerous stakeholders or variables, planning and experimentation is critical to success and the wise use of resources. Successfully planning, then implementing and managing an experiment, comes from asking the, “what if” questions that commonly arise from newly acquired information.

The purpose of this activity is to guide you through the process of asking and answering those “what if” questions.

Start by making a list of all the factors that could potentially affect the area of interest (the subject of your experiment).

Now decide:

Which factors (such as feed, irrigation, genetics, pruning, slaughtering, cooling, processing, etc.) should be controlled during the experiment?

Identify how each of the identified factors will be controlled?

Identify the factors are not controllable, such as rainfall or other weather conditions? These should be regarded as noise. Knowing the factors that are noise can be critical for ensuring that the results of your experiment are interpreted correctly.

What are the factors that we wish to experiment around? (e.g. What outcomes are you looking to achieve in relation to specific operations or performance measures?)

Have you selected safe and sensible settings?

What are the costs associated with running the experiment?

Who is on the support team? This should include who has ultimate responsibility for overseeing the experiment through to a successful conclusion?

How will the outcome of the experiment be recorded and analyzed?

What have similar industries in other areas or countries done in this situation?

Should we look at how different industries approach the situation? If yes, list them and make people responsible for presenting ideas, information and suggestions to the group.

Are there any case studies we should review before undertaking the experiment? If yes, what are they?

3.3 What is our final analysis of the current state value chain?

Before we focus your entire efforts on improving your business and/or the value chain, you should establish a benchmark that describes where you are at now and why. This process provides four important references. They are:

1. A concise description of where your business or value chain is performing well and therefore the strengths that you can build upon going forward. For example, what can you develop into core competencies that will be difficult for others to compete against?
2. A concise description of the issues that you are limiting your performance.
3. A rallying point for what needs to be achieved, why it needs to be achieved (the urgency perhaps), and in what order.
4. A reference point to refer back to when, a few years from now, people have forgotten why the chain was established and what it has enabled them achieve.

3.4 What is our vision for the value chain in the future?

Why do it?

- Without a vision that is shared by all value chain participants, there will be confusion. No one will understand where they are going, what they need to do to get there or will know when they are done.
- Management often states what the vision is. However, without the input of all stakeholders, the vision may not be achievable, it may not be bold enough, or for a number of reasons it may not be widely supported. If any of these are the case, support may be lukewarm at best, and failure inevitable.

A vision is what the value chain could or should look like in its future state. The vision needs to be realistic, achievable and make business sense. Above all, it should result in a value chain that better meets the needs of customers/consumers than the current state.

All stakeholders need to be heard and feel they have contributed to the future state vision. This shaping of the vision may start with a top down approach, and then be followed by a bottom up review. It is highly likely that it will take a number of iterations before agreement is reached on the vision that everyone has for your business(es) and the overall value chain. This process should not be rushed, nor should you cut corners.

Once agreed, the vision needs to be turned into a series of formal targets and a statement(s) about how the value chain will achieve those targets.

A useful tool for transforming the creative ideas of a number of people in a structured manner is the affinity diagram. Created in the 1960s by Japanese anthropologist Jiro Kawakita, the affinity diagram takes large amounts of disorganized data and information and enables a team to organize it into groupings based on natural relationships, or an affinity of ideas.

The objective of the affinity diagram is to gather and translate creative ideas (gathered in a group setting) into a structured and coherent vision of the future. This includes how that vision will be achieved. The team does this through quickly creating a number of ideas around a central theme. Ideas are then sorted into logical groupings of ideas that appear to have an affinity with each other. These groupings can then be used for analysis and/or planning purposes.

Activity 24 Create an Affinity Diagram to shape your future value chain

Following the steps set out below will result in an affinity diagram for your situation. Do this exercise outside of the workbook. The space below is to record your final idea groupings and show how they connect to each other.

Step 1:

- Set up a large sheet of brown paper on a wall
- Provide each member of the group with 1/3 of a pad of Post Its™
- Have them write in bold, one idea per Post It™. Keep the idea to 4 to 6 words.
- Ideas are created simultaneously.
- Record each idea as the Post It™ is placed on the paper. You need not look to do this in a particular order.
- It is common to gather 40 to 60 ideas. Even over 100 ideas are acceptable.

Step 2:

- In silence, members sort ideas into 5 to 10 related groupings.
- Next, in silence, move Post Its™ to where they best fit for you.
- Sorting will slow down or stop when the group is reasonably comfortable with the groupings.

Step 3:

- Using consensus, create a label or header Post It™ for each grouping.

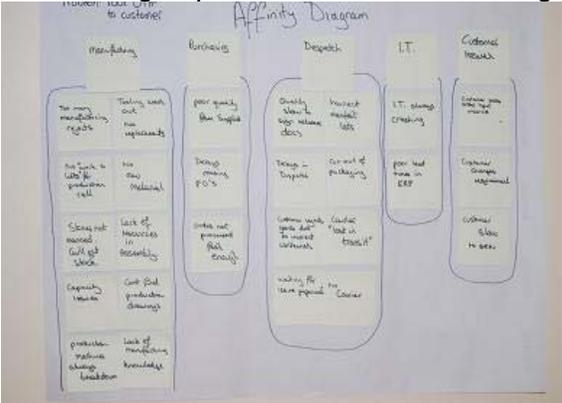
Step 4:

- Create a short sentence that combines each group's central idea and what the individual ideas add to that idea.

Step 5:

- Connect related headings and ideas.

An example of an affinity diagram is displayed below. It is included to show how Post-it™ notes have been grouped under different headings.



Record your final idea groupings and show how they connect to each other in the space below.

3.5 Future state performance

Why do it?

- We know how the value chain currently performs and have developed a vision of the future state of our value chain.
- We now have to set performance standards for the performance of the chain and check that the desired level of performance meets consumer needs.
- Performance standards should include who is responsible for doing what and when. Essentially roles and responsibilities need to be agreed upon.

Like any plan, it is worthless until it has been implemented correctly and is successful. The purpose of the next section of the workbook is to help you ensure that the stakeholders are committed to undertaking and successfully completing their role in achieving the future state that you have agreed upon for your business and/or your chain.

For a process to be changed successfully, it is vital that stakeholders define and sign up to the roles and responsibilities required in order to make the change(s) happen. To establish accountability amongst the stakeholders, it is also vital that the stakeholders know that failure to fulfill their assigned roles and responsibilities will result in consequences. Depending on whether they are targeted at an individual or an organization, those consequences could include expulsion from the chain, loss of preferred supplier (or customer) status, loss of earnings, or demotion.

On the flipside, the best incentives have a carrot that is executed if and when the future state vision is achieved. Again depending on whether the incentive is targeted at an individual or an organization, they could include appointment as preferred (perhaps sole) supplier, the awarding of premiums or a bonus, recognition as being a committed employee, or a promotion.

While without this level of formality, resistance to change will not be uncovered and there is no incentive for stakeholders to make the required changes. Therefore, it is vital that change be applied in a manner that encourages a team effort. Failure to encourage employees to work in teams or with colleagues from complementary functions or levels of the chain is the most common reason for why change efforts fail or prove to be an expensive sinkhole.

Incentives or penalties need to be based on performance measures that can be tracked. Some considerations might include:

- Customer satisfaction;
- Order to in store time (cycle time);
- Value added versus costs;
- Performance according to quality expectations;
- Cost reduction (*linked to quality and operations, not short term budgetary constraints*).

The outcome of the future state performance might be a summary of important or Key Performance Measures (KPIs) along with instructions as to who will do what if a KPI is off target or outside specification.

The following activities will guide you through the process of establishing assigning performance measures, along with roles and responsibilities, then translating these into a successful chain program.

3.6 Map the Future State Value Chain (and update FMEA)

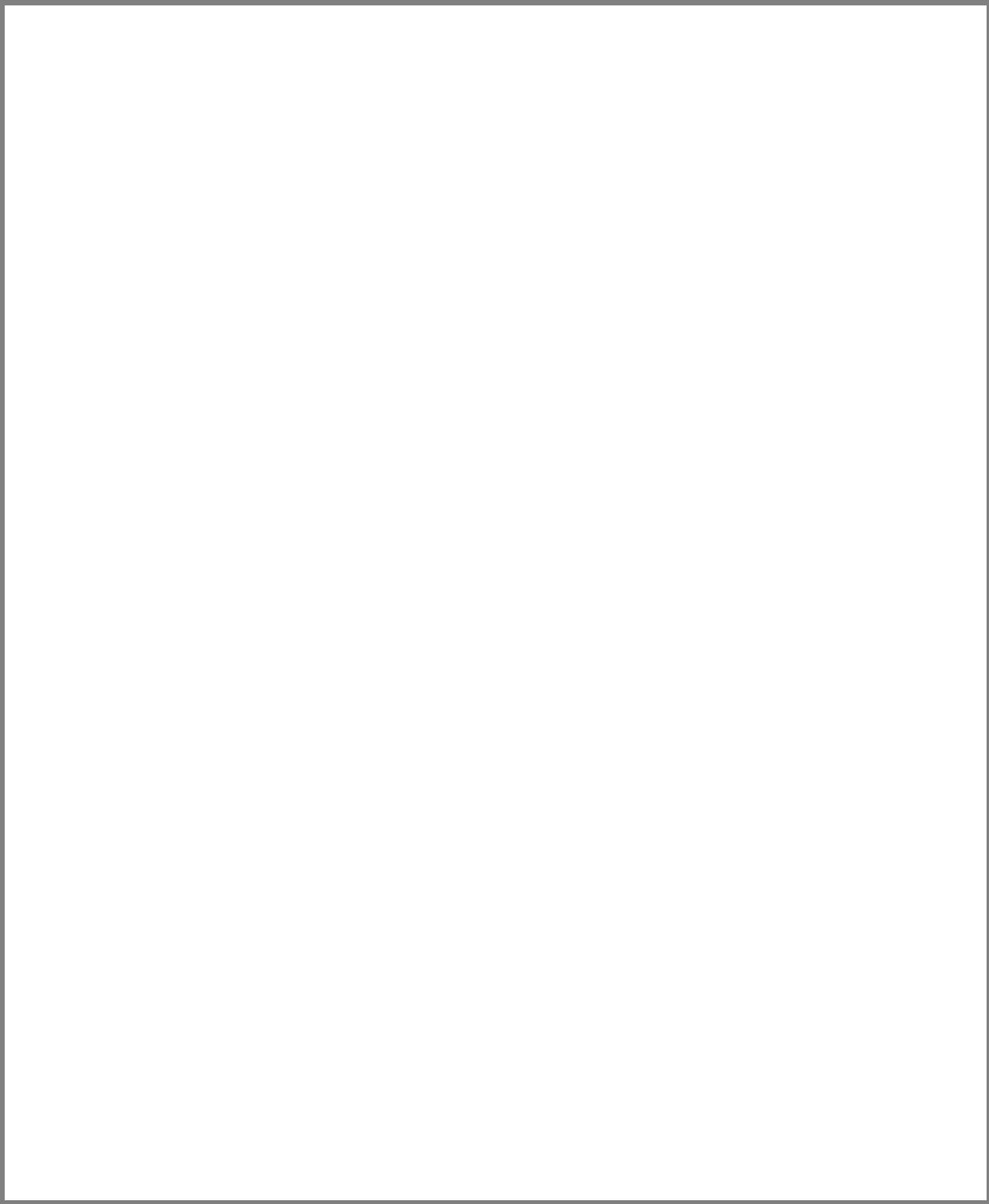
Using the process map and FMEA that you developed earlier as the basis, draw a map showing the future state that you envision for your value chain.

- Refer to Activity 5 when mapping your future state chain.
- Refer to Activity 18 when updating the value chain's FMEA.

On your new revised map, pay special attention to identifying improves that you have made and where improves in performance will be monitored. Similarly, when updating your FMEA, map where your revisions will see a significant reduction in risks.

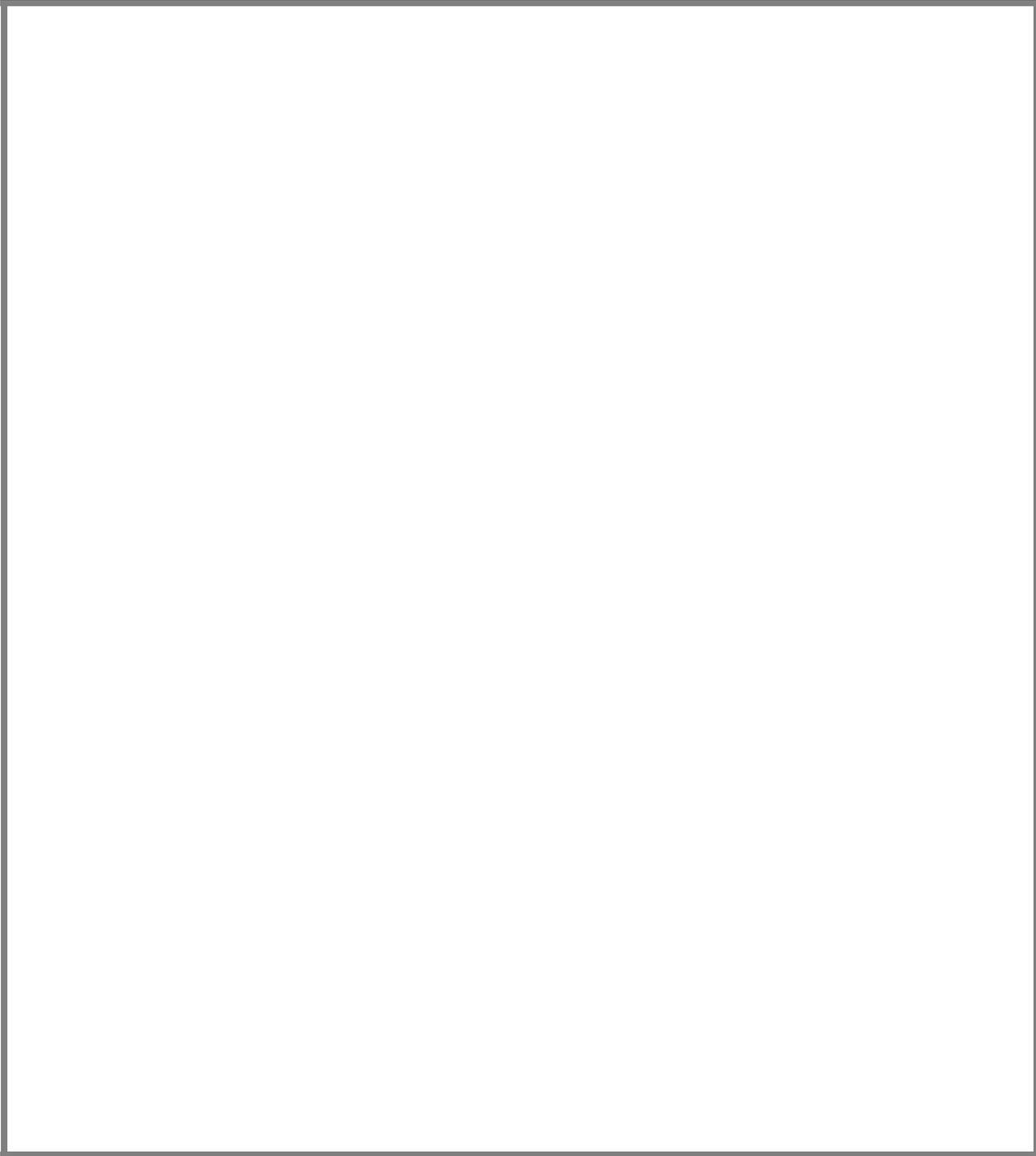
Activity 25 Draw a revised map to reflect your future value chain

Use separate paper if you require more space.



Activity 26 Update your FMEA to reflect your future state value chain

Use the space below or separate paper to draw the revised FMEA.
Then list the specific areas that you are looking to improve through redesigning your chain.



Activity 27 Measure the future performance of your value chain

Some of the questions to ask when deciding what key performance indicators (KPIs) are relevant to your situation include the following:

- What are the KPIs of the new improved VC?
- Are they relevant to customers/consumers?
- How will they be measured, recorded or reputed?
- Who is responsible for recording and reputeding the results?
- What are the targets and limits for each KPI?
- What is the reaction plan if limits are exceeded?
- Have we regularly communicated to each other and every member the consequences of not meeting the KPIs for which they are responsible?

List the KPIs for your future state chain.

3.7 Resistance to Change

Resistance to change is the primary reason that change efforts fail. For many, particularly those that have performed their roles for many years with little outside influence or with little change, change brings feelings of uncertainty and fear. Therefore you need to be aware the types of resistance to change that will arise, so you can combat it effectively.

Note: do not skip this exercise or underestimate the challenge that can be posed by those who resist change. Resistance to change has brought businesses, large and small, to their knees. If you don't believe us, we suggest you read Kotter's 'Leading Change' and/or Hamel's 'Leading the Revolution'.

3.7.1 Background Information

Change

"It should be borne in mind that there is nothing more difficult to handle, more doubtful of success, and more dangerous to carry through than initiating changes..."

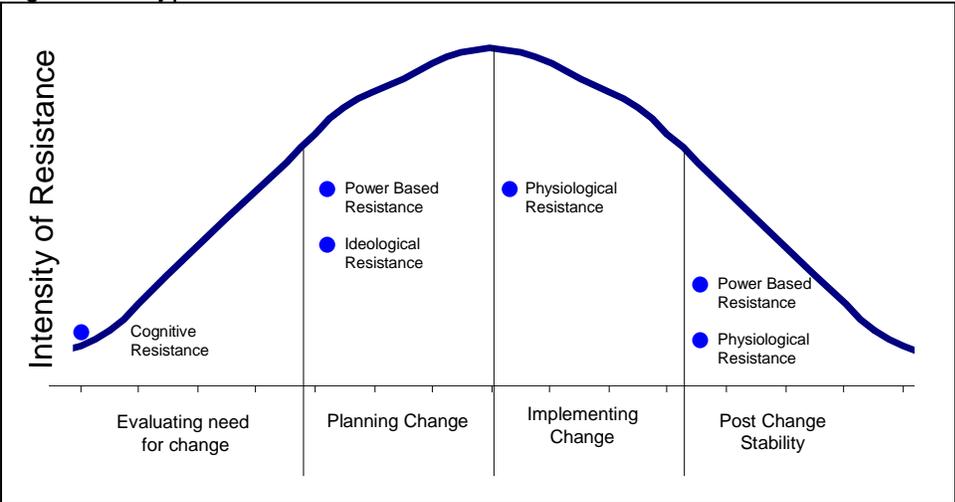
The innovator makes enemies of all those who prospered under the old order, and only lukewarm support is forthcoming from those who would prosper under the new.

Their support is lukewarm partly from fear of their adversaries, who have the existing laws on their side, and partly because men are generally incredulous, never really trusting new things unless they have tested them by experience."

Niccolò Machiavelli (circa 1527)

You will certainly be faced with resistance to change during this process. To help you manage this better, we have identified the types of resistance to change below in Figure 21.

Figure 21: Types of Resistance



Cognitive

"Never mind the facts. I have made up my mind. I don't go along with this."

Power Based

“If we make this change, my job will be reduced/disappear and/or I will no longer be visible.”

Physiological

“What is wrong with the way we have always done it?”

Ideological

“I too have data, and my data shows we do not need to do this.”

In addition to these types of resistance, it should be noted that not all resistance to change is purposeful or explicit. People can resist change through subconsciously continuing to perform tasks in the same manner as before. Therefore, explicitly stating the case for change, what change will mean for both individual employees and the overall organization, along with why change needs to occur, is a critically important aspect of the change process.

As communicating the case for change takes charisma, integrity and energy, the leadership characteristics necessary for motivating change include:

- Enthusiasm;
- Engagement and Involvement;
- Awareness;
- Provide Resources;
- Remove Obstacles;
- Celebrate Successes;
- Maintain the Momentum.

3.7.2 Sustaining the Gains

Sustaining change is not easy. Not least because people are often tempted to revert to old habits long after the change program might be thought to have achieved its purposes. Therefore, even while the initial change program is being implemented, the basis of a successful operation will be achieved through conducting itself in a controlled, measured and documented manner. This ensures that all employees are on the same page and that they have no doubts about knowing what to do and how to do it. This ensures that problems are detected and corrected in their early stages.

The best way to encourage changes to be sustained and eventually ingrained in an organization's psyche is to identify the hidden leaders. These are people who recognize the need for change and possess the capabilities required to encourage less progressive individuals to accept that the changes that are occurring are important to their future prosperity. Depending on the extent of change that you are proposing and the size and structure of your organization, you may need few if any hidden leaders. On the other hand, you may need to identify a hidden leader in every function and every level of the business.

Use the results of Activity 29 (below) to identify likely sources of resistance to change and why people may resist change. Do not forget that involving those who are most resistant to change during improvement efforts and any subsequent analysis of improved performance can be an effective method in transforming a source of resistance into a champion for change.

Activity 29 Consider the stakeholders and potential resistance to change

Areas to consider include:

- Where in your organization and/or the chain, will hidden leaders most likely be required?
- Who is/are the hidden leader(s)?
- Who will embrace change?
- Who will resist change?
 - Why will they resist?
 - What kind of resistance will they offer?
 - Will resistance be overt or covert?
 - What contingency plans can you prepare to address resistance to change, if it occurs?

3.8 Summary

The objectives of the **Analyze phase** were:

- Determine what the data collected during the measure phase tells us about the performance of the chain;
- Identify if further analysis is required;
- Complete the final analysis on the 'current state' value chain;
- Establish a vision of the 'future state' value chain;
- Based on the data analysis, consider the future performance of the value chain;
- Update your chain map, FMEA, KPIs and roles and responsibilities for your future value chain;
- Identify possible resistance and manage the planned changes.

Before you progress, check that you have completed the following:

- Analyzed your data, using the appropriate charts.
- If you identified a need further analysis, you have you done it?
- Identified and at least begun to correct current performance gaps.
- Establish a vision for the future state of the value chain.
- Re-assessed the level of risk and updated the FMEA.
- Worked with others in the value chain to develop performance measures for the future.
- Established future performance measures for the value chain.
- Identified potential sources of resistance to change, and established method to address such if it arises.

4. Improve Phase

The purpose of this phase is to detail, test and implement the vision that you have established for an improved future state value chain. As this section builds on earlier sections and asks you to revisit some of your previous findings and models to ensure they reflect your latest data and analysis, we have purposely kept this section concise.

Objectives for the **Improve phase** are:

- 4.1 Create a change plan
- 4.2 Pilot and test the 'future' value chain
- 4.3 Validate the improvements
- 4.4 Roll out the improved state value chain

4.1 Set out the case for change

Why do it?

- The time taken to achieve an improved future state value chain will depend on the complexity of the changes required, the cost of implementation and validation that they work at a pilot level.
- To make improvements sustainable you need to ensure that the controls are in place.

As we stated in earlier sections of the workbook, successful change requires:

1. A vision - to prevent confusion;
2. Participants that possess the necessary skills;
3. Sufficient resources: people, time and money;
4. The correct incentives: non monetary and financial benefits;
5. A coordinated plan of action.

Lack of the above attributes will respectively result in:

1. Confusion;
2. Fear / Anxiety;
3. Frustration;
4. Incremental change;
5. False starts.

As also described in earlier sections, the importance of leadership and accountability to driving change cannot be underestimated. For the reasons stated above, we have set out below an easy way of establishing and communicating a change plan. While the size and complexity of your change initiative will determine how often and with whom you will need to review project developments versus the change plan, we suggest that review your plans no less than once a month.

Activity 30 Create a Change Plan

	Who is responsible?	What is the plan, and where is it?	What are the actions?	What are the checks and balances?	What is the remedial action if 'off track'?
Vision					
Skills					
Resources					
Incentives					
Action plans					

4.2 Pilot and test the future state value chain

We strongly suggest that you do not roll your redesigned processes out across your business or value chain without first piloting them. Like any experiment, you never know exactly what will happen until you put it in the field. Therefore, taking baby steps and learning as you go is a far wiser option than making sweeping changes than having to live with a host of unexpected and potentially wide ranging consequences.

The purpose of a pilot run is to test the implementation of a new idea or process on a small scale and with an appropriate amount of support from those responsible for the changes. During a pilot run, all elements, functions and support processes are tested with the full support from those who are responsible for them. Participants are trained in what to do and how to do it. Any issues or problems that arise are addressed, which in turn increases the capabilities of the involved participants to take on larger more complex projects. The pilot run should not be considered complete until all deficiencies have been corrected to the satisfaction of those that initially noted them.

Throughout the pilot, ensure that you have an action log that is regularly updated and reviewed by all those involved; particularly those who are accountable for seeing the pilot through to a successful conclusion.

Activity 31 Create an Improvement Action Log

VC Element	Improvement Action	Who	When	Check & Balance	Status

4.3 Validate the improvements

During the pilot run, observe the new level of performance – does it meet the desired expectations or are further improvements still required? What is the level of improvement achieved – does it meet consumer expectations?

To test the extent to which your revised processes have resulted in the desired improvements, you may wish to use the same data analysis tools that were used in the Analyze phase.

At the end of the pilot, gather all the stakeholders together to review the outcomes. This is often called a tollgate review.

- The purpose of the tollgate review is to decide if it is prudent to proceed with a chain wide roll out or if further work is required.
- If further work is required, this should again be undertaken as a pilot.
- If successful, the results of the pilot should be conveyed to the wider stakeholders (particularly potential challengers of change) ahead of a full roll out occurring.

Activity 32 Review the Roll Out

The questions that should be asked during the tollgate review include:

- Did the pilot meet the required expectations?
- What went well?
- What did not go well?
- Who has checked customer/consumer satisfaction?
- Should the chain wide roll out proceed?
 - If yes, you should use results of the pilot to determine how the roll out should proceed and who will be responsible for its successful introduction? This topic is addressed in the next chapter.
 - If not, what needs to be corrected in order to achieve the roll out?

Item to Review	Decision	Action	Who/when	Status

4.4 Roll out the new value chain

If the pilot run was satisfactory and data will show there was a measured improvement, the tollgate review should have provided insights in to how best to proceed with the chain wide roll out. When you are comfortable that you can answer each of the questions posed below, you will be ready to roll out the improvement across the entire value chain.

Questions to guide your roll out decisions and planning:

- How will the roll out occur?
- Who will be responsible for leading and managing the roll out?
- Who will monitor the roll out, and submit regular updates to key stakeholders?
- Who will document the operation of the new chain and its supporting processes?
- How will the new chain/processes be communicated?
- If a training plan is required, who will lead it?
- What support is required during the rollout?
- What are the potential risks and workarounds?

The next section of the workbook will guide you through the process of controlling the processes that you begun implementing across your organization and/or the value chain.

4.5 Summary

Objectives for the **Improve phase** were:

- Create the change plan;
- Design an improvement plan for the value chain in the future;
- Pilot and test the future state value chain;
- Validate the improved performance;
- Roll out the new Value Chain.

Before you continue, check that you have completed the following:

- Ensured participants are adhering to their identified roles and responsibilities;
- Piloted improvements in a chosen section of business / value chain;
- Validated that the required level of improvement has been met;
- Checked back that customers/consumers are satisfied;
- Conducted a tollgate review of the pilot;
- Used results of the tollgate review to plan a business / chain wide roll out and proceed as planned.

5. Control Phase

The purpose of the Control phase is to ensure that the improvements that you implemented can be sustained in a controlled and documented manner and without frequent management intervention. The last thing that you want is to spend precious resources fighting fires.

Therefore, in the **Control phase**, you will:

- 5.1 Develop and implement a Standard Operating Procedure (SOP);
 - Develop an information sharing log
- 5.2 Develop a communication plan;
- 5.3 Develop a training plan;
- 5.4 Establish key performance indicators and reporting processes;
 - Establish information and communication flows
- 5.5 Conduct post implementation follow up audits;
- 5.6 Establish a monthly management review process.

5.1 Documenting the Process, Standard Operating Procedures (SOPs)

Why do it?

- Documenting the improved state value chain and supporting processes will help ensure that all those working in the chain are performing their assigned roles and responsibilities in a consistent manner.
- The processes that you have documented need to be easy to access and understand.
- The same processes also need to be easy to communicate, train and follow up on.
- Without this important step, those working within the chain may revert back to basing their decisions on 'tribal knowledge' rather than following the approaches that you devised when establishing your future vision of the value chain.

To be effective, documents that set out Standard Operating Procedures (SOP) should contain information that is grouped under the following headings:

- Purpose
- Scope
- Roles and Responsibilities
- Process Flow / Map
 - To help make a point or establish relationships between process steps, as most people think 'visually', it is often a good idea to include drawings or photographs in SOP documents
- Key rules / instructions by process step
 - The criteria for adding a rule is where the absence of a rule or additional information would have an adverse effect
- Key Performance Indicators (KPIs)

Note: The likelihood that any process will require a SOP and the importance of creating a SOP for any process increases exponentially according to:

- The number of people that are involved in performing that process.
- The importance of that process to improving or maintaining the performance of your business or value chain.

5.2 Sharing Information

Why do it?

- One of the principles of delivering a quality product or service to the customer/consumer is Plan-Do-Check-Act.
- Frequently checking up and down the chain that expectations are being met is a vital component in evaluating performance and knowing whether you need to adjust a process and, if so, by how much.
- Establishing the rules of engagement about who is going to receive what information and how, is an important part of facilitating the development of close, respectful, and trusting relationships within and between organizations.

Integrity is the cornerstone of successfully sustaining value chain relationships. While the sharing of information is an important aspect of overcoming barriers that may previously have prevented collaboration from occurring, so too is ensuring that everyone knows what information is being shared with whom, when, in what format, and why. In doing so, you directly address the fear that someone (or organization) has a hidden agenda. It also establishes accountability for how the chain as a whole, and individuals, will operating within the chain, and will handle sensitive information.

A number of highly successful value chains started out saying that they weren't comfortable sharing certain information with certain participants. By providing a reason for their position and a timeline when they would reconsider that position, meant that it was not a barrier to the chain's formation.

Establishing an information sharing log is therefore a valuable tool in establishing and sustaining a value chain.

Activity 34 Develop an information sharing log

Develop an information log for your business/value chain using the table below.

Info Type	Will it be shared? Y/N	Purpose/ Objective if sharing	Precisely what will be shared?	With who - Organization & Person(s)	Level of confidentiality	Is there a requirement prior to sharing?	Format in which shared	How shared	Regularity of sharing / period	Performance : how are benefits measured?	When/if revisit arrangements ?	Notes

5.3 Communication Plan

Why do it?

- All value chain stakeholders need to know what is changing, when, why, how it affects them, and how to provide timely feedback.
- Failure to communicate fosters resistance to change.

As we mentioned in the Improve section of the workbook, the six factors which will ultimately determine if your intentions and strategy are implemented successfully are:

1. Leadership;
2. Roles;
3. Responsibility;
4. Accountability;
5. Motivation;
6. Teamwork.

These factors will only be achieved through proactively communicating with every element of your business and value chain. Without effective communication at the start of a project, how will individuals know why change is occurring and what is expected of them? Then, as the project progresses, how will the individuals that ultimately determine success know whether they are meeting your expectations and, if not, why not?

Set out below are the elements of a communication plan. In planning your communication activities, identify what needs to be communicated when and why. You will also need to have an expectation of the likely reaction and questions you will receive as feedback from your staff and stakeholders.

Not planning ahead for questions and feedback will lead to you responding on the fly, which could undermine your authority. It is also wise to think through your responses to questions that may come up in situations charged with emotions. If you are unprepared, people could question whether they are putting their neck in a noose by supporting change.

The elements of an effective communications plan include the following:

- What is it that we need to communicate?
- Who needs to know?
- When do they need to know?
- How will we communicate?
- Where will we communicate?
- What questions (responses/reactions) can we expect?
- What are the “no go” areas?
- How will we test the effectiveness of the communication? How long shall we wait (i.e. x days or weeks) after it has been delivered?

Activity 35 Create a communications plan

What to Communicate	To Who	By When	How & Where Communicate	Anticipated Questions & Reactions	Any “No-Go” areas	Measures & Timelines to test Effectiveness	Status

5.4 Training / Teaching Plan

Why do it?

- New SOPs have been created, stakeholders are aware of the changes.
- Individuals need to be trained in how the chain/processes now operates; how it affects them, what the expectations are, as well as providing the opportunity for them to give their feedback.
- Failure to give adequate training and feedback opportunities will lessen stakeholders' buy-in.

Training is a vital element in successfully facilitating and sustaining change. Yet it is often overlooked. It is a good idea to begin training programs in a group, then transition to one-on-one (hands-on) training. Periodically you should follow up formal training programs with refresher groups, which serve a double purpose of allowing people to share their experiences (challenges and successes) in a controlled environment.

A good training plan will address the following:

- Who is the audience?
- What is the lesson plan?
- What learning styles are we addressing?
- Are there exercises, examples or hands on?
- How long is the training?
- Where and when will it be held?
- How do we test the effectiveness of the training? How long shall we wait (i.e. x days or weeks) after it has been delivered?

Use the tool set out below to identify the characteristics of your training plan. You will likely have a training program for each family of processes, which is then tailored to each specific process during the hands-on stage of training.

Activity 36 Create a training plan

Audience	Lesson Plan	Learning Styles?	Exercises	Training Length	When & When	Measures & Timelines to test Effectiveness	Status

5.5 Key Performance Indicators (KPIs) and Reporting

Why do it?

- Measuring KPIs provides the chain with the ability to continue improve and, thereby ensure that it is meeting customer/consumer expectations.
- You must ensure that the KPIs that are being measured are relevant to stakeholder needs.
- There needs to be criteria as to when, where and how measurements are taken.
- You must implement remedial actions if KPIs do not meet specified criteria.

Continual improvement is the lifeblood of successfully managing businesses and value chains. Unless you are continually improving your operations in relation to customer/consumer demands and expectations, at some point in the future someone else will be eating your lunch. In fact, you may be their lunch!

It is a common occurrence for value chain initiatives to survive 2-3 years, then falter as the competitors that followed their example catch up. The most common reason for these situations arising is that, perhaps held back by less progressive elements, the chain has not continued to improve since its inception.

Therefore, an important stage in continually improving operations is to identify whether any operational issues that arise are being caused by factors that are internal and or external to the chain. If the issues that affect performance are found to be internal to chain, remedial action could ultimately include expelling an organization or an individual member from participating in the chain.

Examples provided earlier (include red meat and wheat in Section 2.3.1), illustrate the importance of continually improving processes by ensuring that you are monitoring operations correctly and working with the right partners.

Some of the questions to ask when deciding on which KPIs are relevant to your situation include:

- What are the KPIs of the new improved VC?
- Are they relevant to customer/consumers?
- How will they be measured, recorded and reputed?
- Who is responsible for recording and reputed the results?
- What are the targets and limits for each KPI?
- What is the reaction plan if limits are exceeded?
- Have we regularly communicated to each and every member the consequences of not meeting the KPIs for which they are responsible?

5.5.1 Example of KPI Control Plan

An example of a simple KPI and control plan is shown below. It relates to the impact that the temperature of tender fruit received at the packer has on consumer satisfaction and competitiveness. Further information about the study on which this KPI/Control plan is based was described in the example given in section 2.2.1. The peach value chain map that was developed from this same study is featured in Appendix 3.

- The ideal core temperature is five degrees Celsius.

- The ‘wiggle room’ of ideal temperature is between four to six degrees.
- If seven to eight degrees, it should be put into cold store for *n* hours and rechecked.
- If between two and three degrees more samples should be taken and perhaps additional tests conducted.
- If less than two degrees or above nine degrees, the fruit is to be rejected.

A “traffic light chart” below illustrates the required actions, by fruit temperature.

Figure 22: Traffic Light Chart

Fruit Temperature in Degrees C	10	Red						
	9	Red						
	8	Yellow						
	7	Yellow						
	6	Green						
	5	Green						
	4	Green						
	3	Yellow						
	2	Yellow						
	1	Red						
	0	Red						
		Batch 1	Batch 2	Batch 3	Batch 4	Batch 5	Batch 6	Batch 7

A traffic light chart is easy to use, requires neither complex calculations of control limits nor precision in marking the charts. Each zone will have criteria as to what actions are to be taken.

Green	Accept Delivery
Yellow	Re-check or management disposition
Red	Do not accept delivery

Activity 37 Create a KPI Control Plan

Measuring KPIs provides the chain with the ability to continually improve, and ensure that it is meeting customer/consumer expectations. To measure KPIs, you must establish criteria as to when, where and how measurements are taken. Remedial actions must be implemented if KPIs do not meet specified criteria.

A traffic light chart is often used to measure and control KPIs. These are easy to use, with different colour zones having criteria as to what actions should be taken. You will have to decide who will chart them, how measurements are to be taken, and what the red/yellow/green criteria are.

Refer to Activity 27 and decide which KPIs to chart. Each KPI will require its own chart.

Example Traffic Light Chart

KPI	Measure 10							
	Measure 9							
	Measure 8							
	Measure 7							
	Measure 6							
	Measure 5							
	Measure 4							
	Measure 3							
	Measure 2							
	Measure 1							
	Measure 0							
		Batch 1	Batch 2	Batch 3	Batch 4	Batch 5	Batch 6	Batch 7

	Green	Accept Delivery
	Amber	Re-check or management disposition
	Red	Do not accept delivery

5.6 Post Implementation Audit

Why do it?

- To ensure that all stakeholders have implemented the improved processes as planned, that improvements and processes have been documented, that staff have been trained as required, and that the businesses/chain has achieved the desired results.
- To identify if any additional improvements and/or changes are required.

At times you will need a reference that helps you keep track of where you are, in exploring what you have unearthed and whether the results of your experiments prove that your assumptions are correct and match your expectations.

An audit is a paper trail that allows you to identify ongoing relationships between Inputs, Outcomes and Processes; which is where you started working through the process of improving your activities. Without this trail of evidence you may have to sift through reams of data to find the gold nugget that you knew was somewhere though couldn't prove. Moreover, you won't be able convince others about the relationships that you have proven to exist between the Inputs, Outcomes and Processes which will ultimately determine the success of your business..

Like any other practice, 'failing is plan' is the equivalent of 'planning to fail'. Therefore you need to plan how you will undertake and use your audit for the expressed purpose of improving the performance of your business and/or value chain.

5.6.1 How to plan and conduct an audit

Based on the process documentation (e.g. SOPs, training plans and KPIs):

- Create a checklist;
- Schedule and conduct a kick-off meeting;
- Walk the value chain;
- Interview stakeholders;
- Observe work being done;
- Examine the KPIs;
- Examine if your chain is performing at least as well as expected;
- Ensure any deficiencies are understood and accepted;
- Get agreement as to how and when any deficiencies will be corrected;
- Hold a wrap up meeting.

5.7 **Establish a monthly management review process**

Why do it?

- As part of the check/act discipline, a monthly review is a timely method for providing the stakeholders' management teams(s) with the opportunity to share outcomes, decide on further improvements, and/or plan, implement and evaluate remedial actions.
- Above all, regular reviews ensure that customers/consumers are getting the increased value and the chain is receiving increased rewards.

The agenda for an effective monthly management review should include:

- Customer/consumer feedback;
 - Satisfaction measures, complaints, other communications
 - As mentioned in example 2.5.1, do not base this assessment on written complaints!
- Stakeholder feedback;
- Status of information sharing;
- Operational (process) performance;
- Opportunities for further improvement;
- Actions arising from previous reviews;
- KPIs and remedial actions.

5.8 Summary

The objectives of the **Control phase** were:

- Develop and implement a Standard Operating Procedure (SOP);
- Develop a communication plan;
- Develop a training plan;
- Establish key performance indicators and reporting processes;
- Conduct post implementation follow up audits;
- Establish a monthly management review process.

Before you continue, make sure that you have completed the following:

- Documented your processes and standard operating procedures;
- Developed an information sharing log;
- Developed your communication plan;
- Developed your training plan;
- Established your KPI Control Plan;
- Conducted a Post Implementation Audit;
- Established a regular management review process.

6. Further Information

For further details on the tools described in this workbook and their application, the extended workbook, or additional learning opportunities please contact:

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The same sources can be contacted to access further information and advice on the following topics:

- Value chain analysis
- Statistical process control
- Change management
- Lean thinking

Appendix 1: What is Value Chain Management? An Overview

“Value chains are not a panacea. However, if your firm is not involved in a value chain, it is essential that you develop a strategy that will allow you to compete successfully against those of your competitors who are.”

Dunne, 2008

Value chains are formed in response to consumer demand to meet a specific market opportunity and benefit all parties. They are a mechanism that allows companies to more effectively respond to market drivers by aligning their operations to maximize efficiency and effectiveness in relation to an identified market opportunity, and drive out unnecessary costs.

The aim is to increase the value that consumers perceive a product to offer, hence the name ‘value’ chain.

A value chain is a system comprised of a series of subsystems:

- Finance;
- Governance;
- Human Resources;
- Information;
- Operations & Quality;
- Marketing.

As illustrated in Figure 1.1, traditionally, business measures and management information tends to be vertically focused. Staff is rewarded for their performance on these measures. No one is usually responsible for horizontal processes, which impacts relationships between organizations, information sharing, innovation and its execution. This significantly impacts the competitiveness of the chain.

Figure 1.1: Strength of Value Chain Management

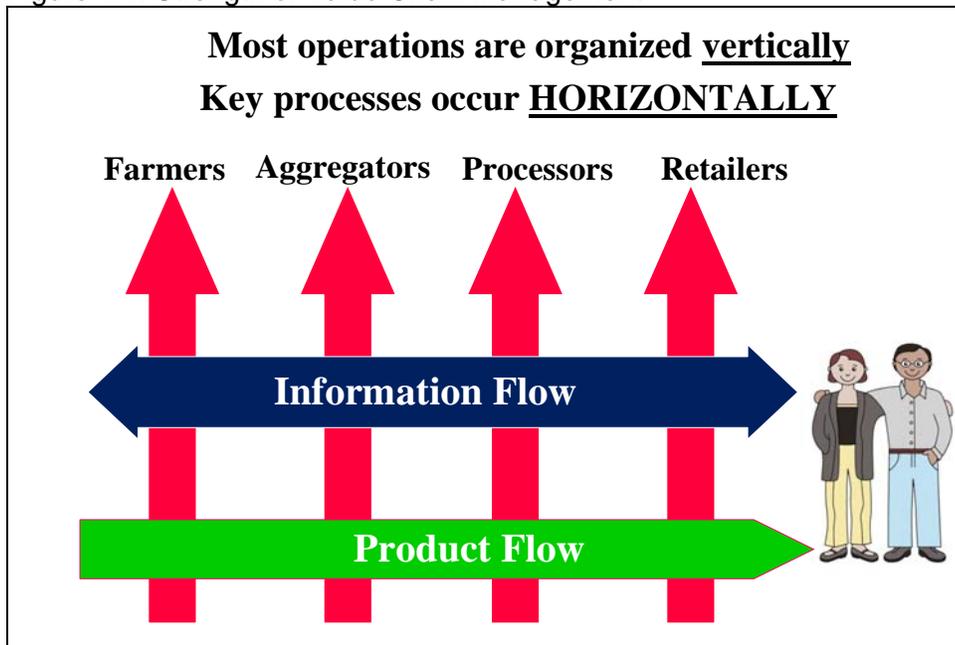
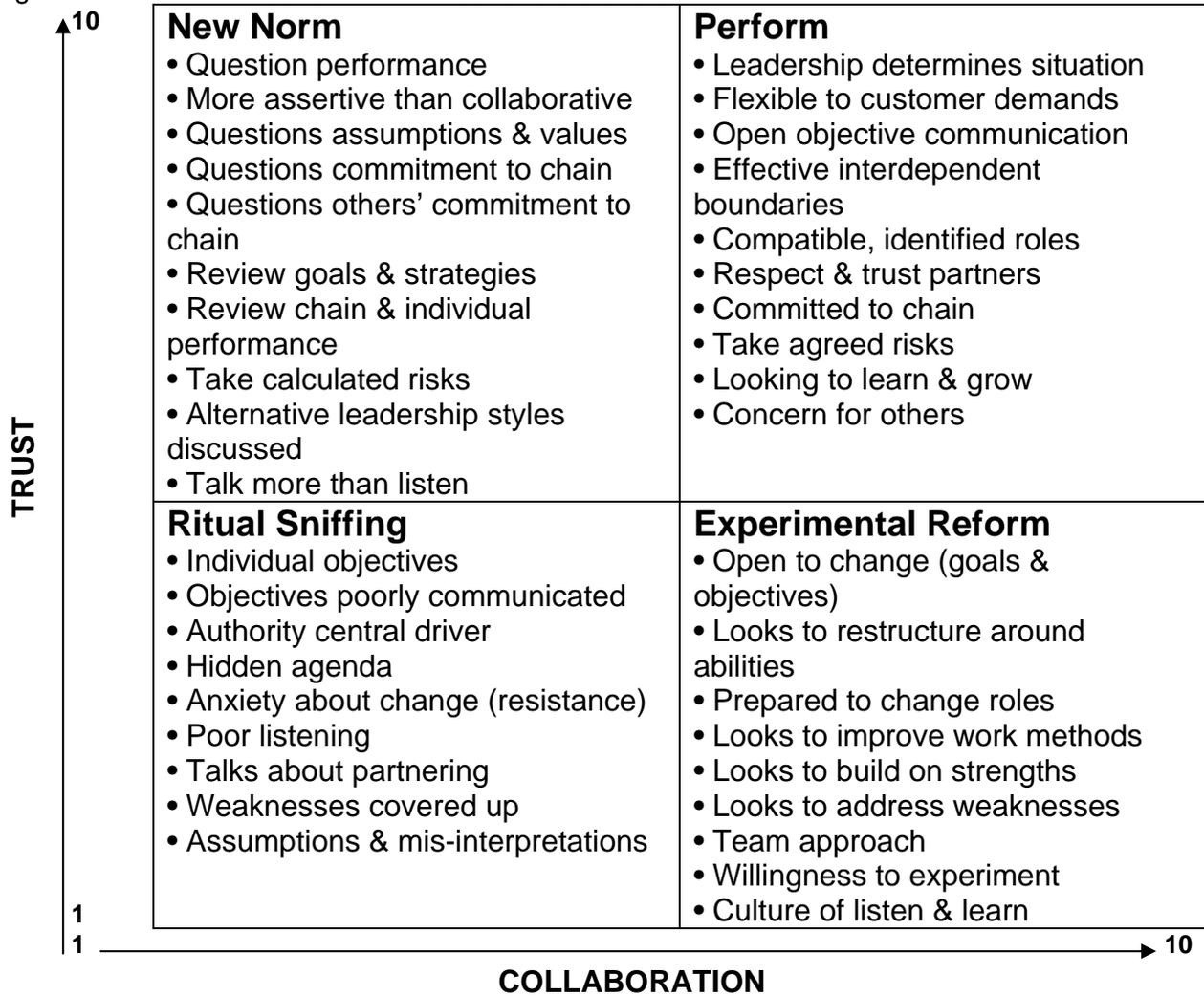


Figure 1.2: Performance relative to Trust and Collaboration



Gooch, 2005: Adapted from Hind, 2005

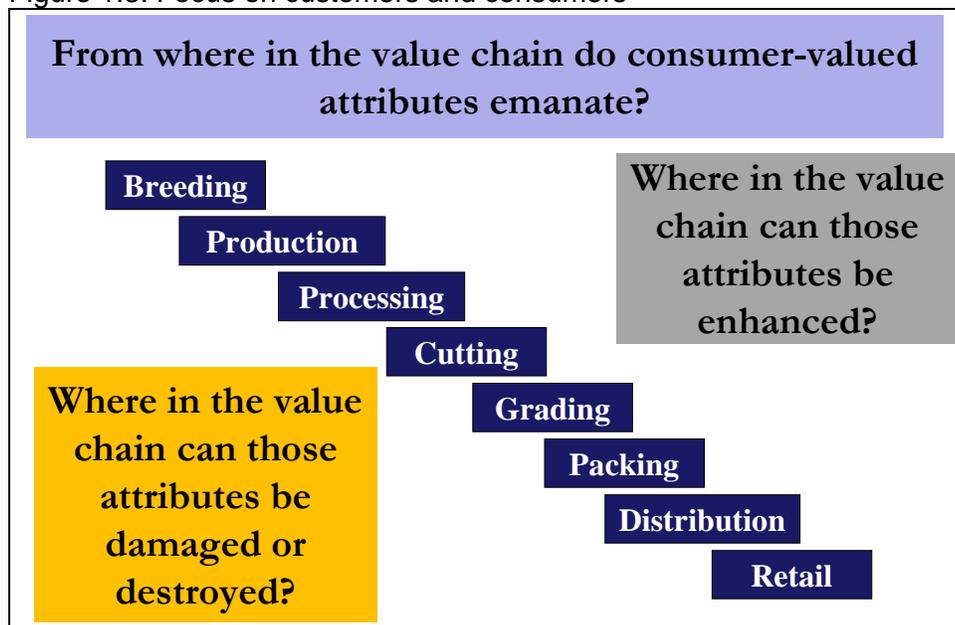
Value Chain Management does not discriminate about whether the resources and infrastructure used to perform any operation or procedure are owned by one or many companies. The same principles apply to vertically integrated corporations that involve part, or all of the chain, as they do to a chain solely comprised of independent businesses working together to enhance their overall competitive advantage.

Principles of Value Chain Management

1. Focus on customers and consumers
2. Choose the correct partners
3. Identify and share strategically important information
4. Have excellent leadership
5. Develop and execute an effective marketing strategy
6. Produce and position the product correctly in the market
7. Ensure effective logistics and distribution
8. Implement and maintain a suitable governance system
9. Build effective relationships
10. Ensure operations reflect strategy

Adapted from Collins & Dunne, 2002

Figure 1.3: Focus on customers and consumers



Three Factors Are Crucial To The Successful Management of Value Chains

Factor#1: Relationships

- Realistic strategy (*provides a common focus*)
- Compatible culture, beliefs, behaviour (*the will*)

Unless the involved businesses share the same values and objectives, and possess the capabilities required to achieve the voiced strategies, the tension that will build up between the businesses will inevitably get to the point that it tears the chain apart.

Factor #2: Information

- Market (*customers, consumers, competitors*)
- Performance (*operational, strategic, cooperation*)

Timely, accurate and relevant information on the chain's performance and the target market, along with the ability to draw relationships between the two areas of information are vital to a chain possessing the ability to successfully adapt to an ever changing commercial environment.

Factor # 3: Governance

- Roles, responsibilities, accountabilities (*the enabler*)
- Compatible processes that allow partners to fully use their core competencies (*the capability*)

Effective governance plays a critical role in maintaining a successful chain. A lack of governance will guarantee that the chain fails. The basis upon which your initiative should be governed is established through the series of protocols surrounding performance expectations and limitations.

Of the three factors, Governance is the most important to a chain's long term success. Governance is as much about ensuring the economic viability of a value chain as it is about gaining and maintaining the commitment of suitable partners, while purging unsuitable participants from the chain to maintain long-term effectiveness.

The most important factor in governance is that one person needs to take the overall lead and ultimately be accountable for ensuring the chain adheres to pre-agreed performance criteria. That leader will need to be completely impartial and NEVER allow decisions to be based on who is concerned, particularly in terms of quality.

All successful chains have strong leaders who hold everyone (including themselves) accountable. The same systems and protocols need to be adhered to, regardless of whose products or performance is in question. Only by following this approach will an embryonic initiative develop into a successful chain that survives the rigour of the commercial environment.

Governance includes the types of contracts that each partner in the chain has with others. The exact type of contract used by differentiated marketing initiatives varies greatly, but many will include similar stipulations to the list provided below relating to hogs.

- a. Period of time over which the contract extends;
- b. The type of genetics to be used;
- c. Production practices to be adhered to;
- d. Quality requirements;
- e. Pricing determinants;
- f. If appropriate, the relationship between the contracted agent and the conditions under which they can use the brand or trademark associated with the initiative;
- g. Where the agent can market their hogs;
- h. Terms under which the contract may be annulled.

Contracts may incorporate a conflict resolution clause stating on what premise a third party arbitrator might be called to resolve a conflict that the group is unable to settle by itself.

Contracts may also outline a process for dissolving the initiative should the parties decide that they cannot continue working together. Given that many chains pass through a pretty tumultuous period during the early stages of their development, having disengagement criteria in place can actually encourage the participants to work all that much harder and be committed to the initiative, simply because they know that no nasty surprises await them should they be forced to concede defeat.

Factors of Successful Governance

Including the basis upon which they must be formed for greatest success

- Identify an economically viable proposition
 - Based on a proven market opportunity
- Effective leadership
 - Guides and motivates personnel, and enforces governance
 - Commitment
 - Senior management
 - Middle management
 - Shop floor
- Written goals
 - Specific, informed, time orientated
- Objectives
 - Market driven
- Procedures
 - Designed to foster continual improvement
- Performance measures
 - Monitoring process
 - Feedback process
 - Incentives
- Trust
 - Crucial to address opportunistic tendencies
- Respect
 - Gained through actions taken and knowledge shared
- Transparency
 - Developed through information exchanged
- Motivation
 - Enabled through appreciation, accountability and responsibility at a team level

Critical Success Factors of Value Chain Management

1. Vision
2. Leadership and Creating the Correct Culture
3. Roles, Responsibility, Accountability
4. Motivate To Continually Improve
5. Building and Maintaining Effective Relationships
6. Implement Effective Communication Strategies
7. Create, Share, and Protect Value
8. Start Off Small
9. Restrained Ambition: Step by Step
10. Get the Product Right Every Time
11. Acknowledging Differences: Forming vs. Managing
12. Experience Things Together

Appendix 2: Financial Management

This appendix describes the financial management that must underlie a value chain network. Value Chain Management requires a process of self-examination within the firm, followed by a process of information sharing and collaboration with like-minded suppliers, processors, marketers and distributors. This quest for operational effectiveness is essentially a quest to identify, expand and exploit any competitive advantages that might exist and to identify, minimize or eliminate any competitive disadvantage that might exist.

The process starts with the examination of the “value chain” of the individual firm, and then expands to other firms in the “value network”.

Planning for the value chain and planning for financial management are similar. Set strategic goals, gather the right information then set your financial goals or targets. Develop financial planning habits much like you would set operational plans or best management practices.

The reality check is to undertake on a regular basis is to compare actual expense/revenue with your budget projections. That’s right – set a budget that should be a basic business planning objective.

A simplistic method to determine financial health of your operation is to look at the key indicators that are: monthly profit and loss statements, monthly aged payable and receivables and inventory volume.

Self-Assessment

A first step in setting financial goals is to undertake a self-assessment and to confirm the following observations:

- In assessing the value chain, one of the critical success factors is identifying a link between managing your position in the value chain and being a sound financial manager.

What are the principles of sound financial management that you feel are critical to success?

- Understanding financial performance measures includes identifying performance benchmarks. Use financial information to understand cost of production, margin, price indicators and value.

Can you create a short list of direct and indirect cost of production items for your contribution to the chain?

Identifying good financial stewardship practices for measuring and monitoring the economic viability of operations from a cost and value creation standpoint.

What price indicators and value measurement criteria would you use as a reference?

Financial management is the process of identifying the critical success factors to comprehend the finances of an individual business that operates as part of a value chain alliance.

List the critical success factors that translate to added value or differentiation?

- Value chain participants should identify information and monitor each member of the chain in order to understand who creates and shares financial value

Measuring performance allows comparison to 'better practices' (benchmarking), as well as the rate of improvement toward the better practice. Why is sharing financial information important in a value chain relationship?

Value Chain participants must be prepared when meeting with their potential lender(s). As a starting point, below is a list of questions that a customer and lender must be ready to answer.

Lender Questions:

1. What is your background in this sector?
2. How will the loan be repaid?
3. What security is available for the request?
4. What is the fallback in case of product failure or loss?
5. Who are your suppliers that impact production?

Customer Questions to the Lender:

1. Why do you need all this information?
2. How quick can we have the funds?
3. Why do you need security?
4. Why do we need a due date for the loan?
5. How is the interest calculated? If I am late is there a penalty?

Developing and analyzing financial statements

Financial statements are the output of financial accounting and for most businesses involve three components:

- A balance sheet which focuses on assets and liabilities and equity (or net worth);
- A cash flow budget which focuses on the income and expenses of a business and their timing, and;
- A summary of the income and expenses is called an Income Statement.

As a member of the value chain, the financial stability of suppliers is critical to your success. As a supplier within the chain, your buyer will be interested in how long you have been in business, who are your customers, what volumes can be supplied, and what percentage will this be of the capacity.

Buyers are concerned that suppliers be financially viable, that there is no interruption of supply since your product could create brand loyalty with the buyer's customers – interruption of supply means a financial loss for supplier and buyer plus additional cost for product replacement.

How can the supply chain members benefit from the use of accurate financial assessment tools and financial business management?

Allocating fixed costs as part of the process of determining the cost of production for each product

The first step that has to be taken to establish the price of a product or service is to determine the cost of production. It should be relatively easy to establish the variable costs – that is the cost of the inputs that go into the production of each product. In farming operation the variable costs of growing a particular crop would include the cost of seed, fertilizer, chemicals, fuel, repairs and custom work.

Allocating fixed costs requires good record keeping but to some extent it requires some educated guessing on the part of the manager.

Analyze and determine credit needs

Determining future credit needs requires an excellent understanding of the operational requirements of a business as well as the cash flow. It is also a healthy practice to communicate the firm's future financing needs to their lenders so that there are no surprises and so that the lender retains its faith in management. An analysis of cash flow will determine the operating credit needs of the firm over the period that is being budgeted for.

Knowledge of credit history and ratings

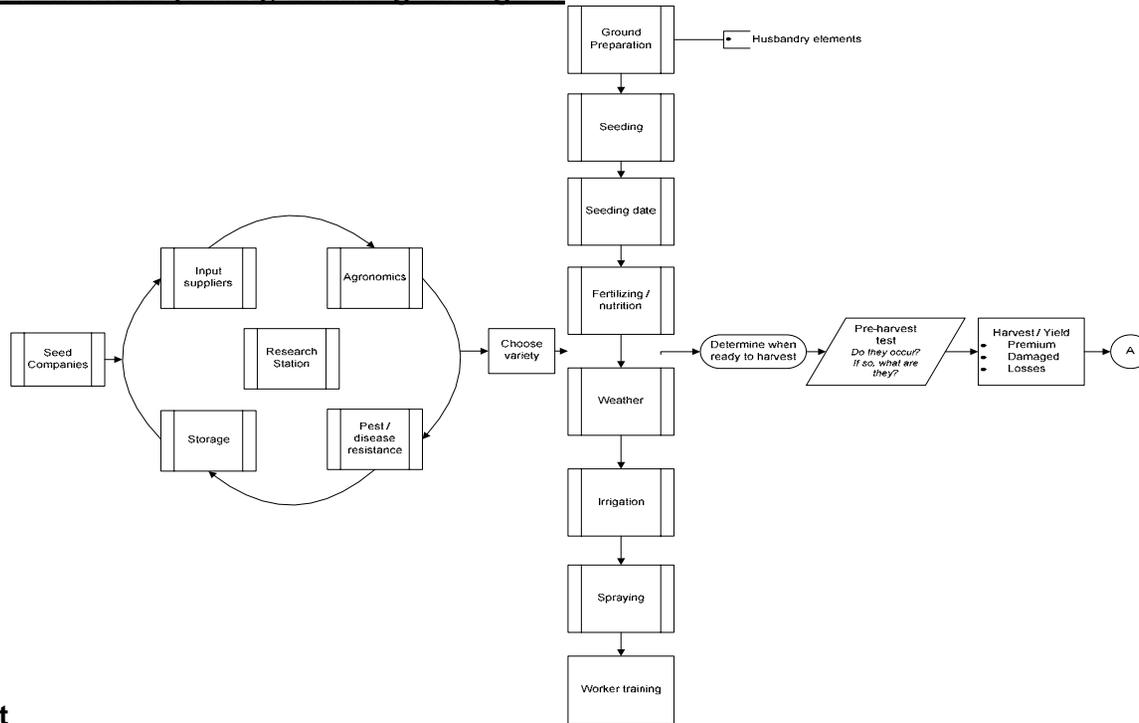
Managers should have a very clear understanding of the basis under which lending and credit decisions are made. Today, many institutions use credit scoring to make decisions. Initially this was used in consumer lending but it is now a part of commercial and agricultural credit decision making in most large financial institutions.

Choosing a lending institution

Firms should try to find lenders who understand their business and industry and who are committed to its success. For example, a lender who understands a particular industry will be able to design loan products that work well for this particular business. As well, should a business experience a setback that is beyond their control, lenders who understand that certain events do not necessarily increase the lenders risk are preferable to those who rigidly stand by the original intent of the financing even though the situation might be dynamic.

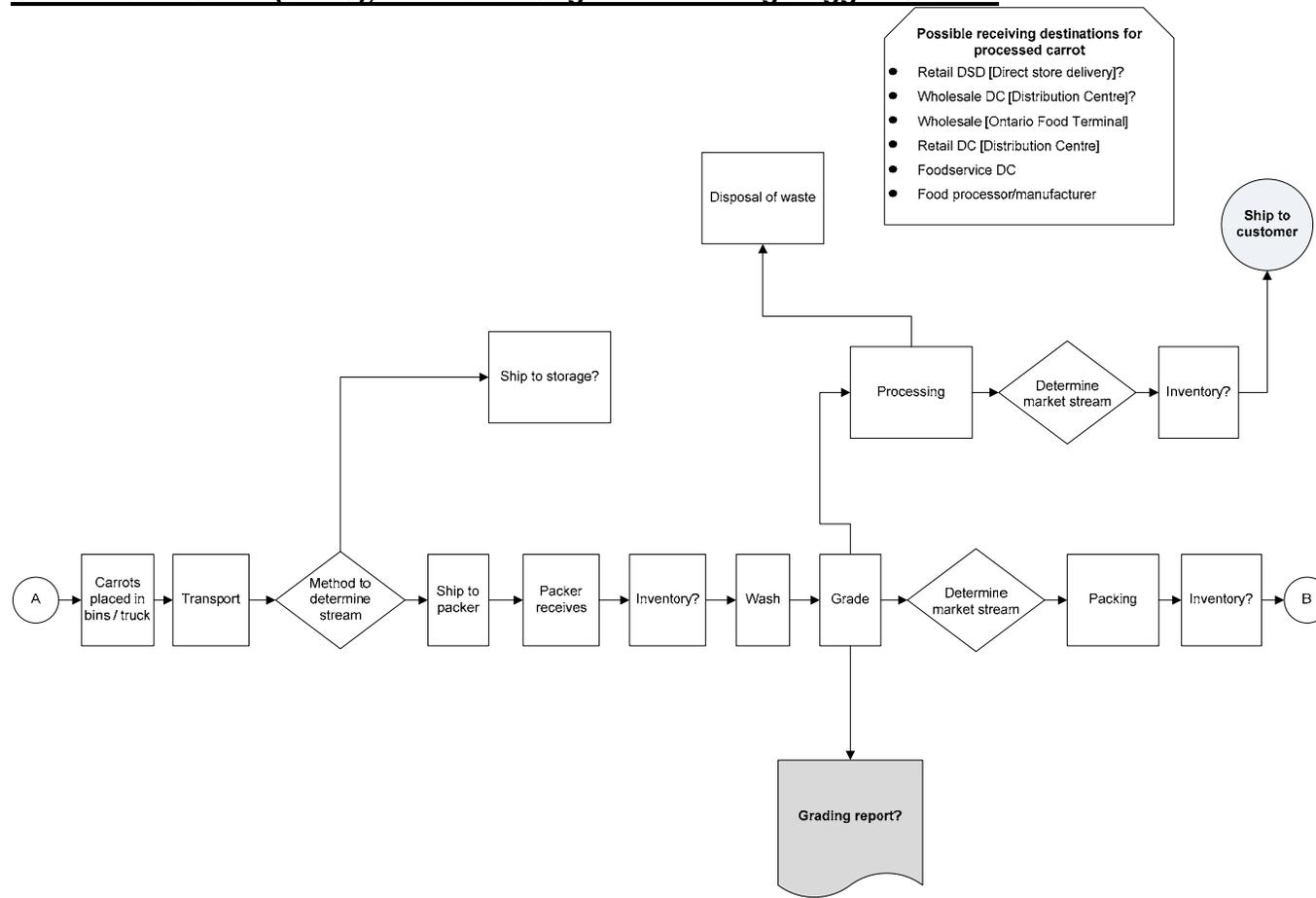
Appendix 3: Detailed Value Chain Diagrams

Carrot Value Chain (1 of 3), Breeding through to

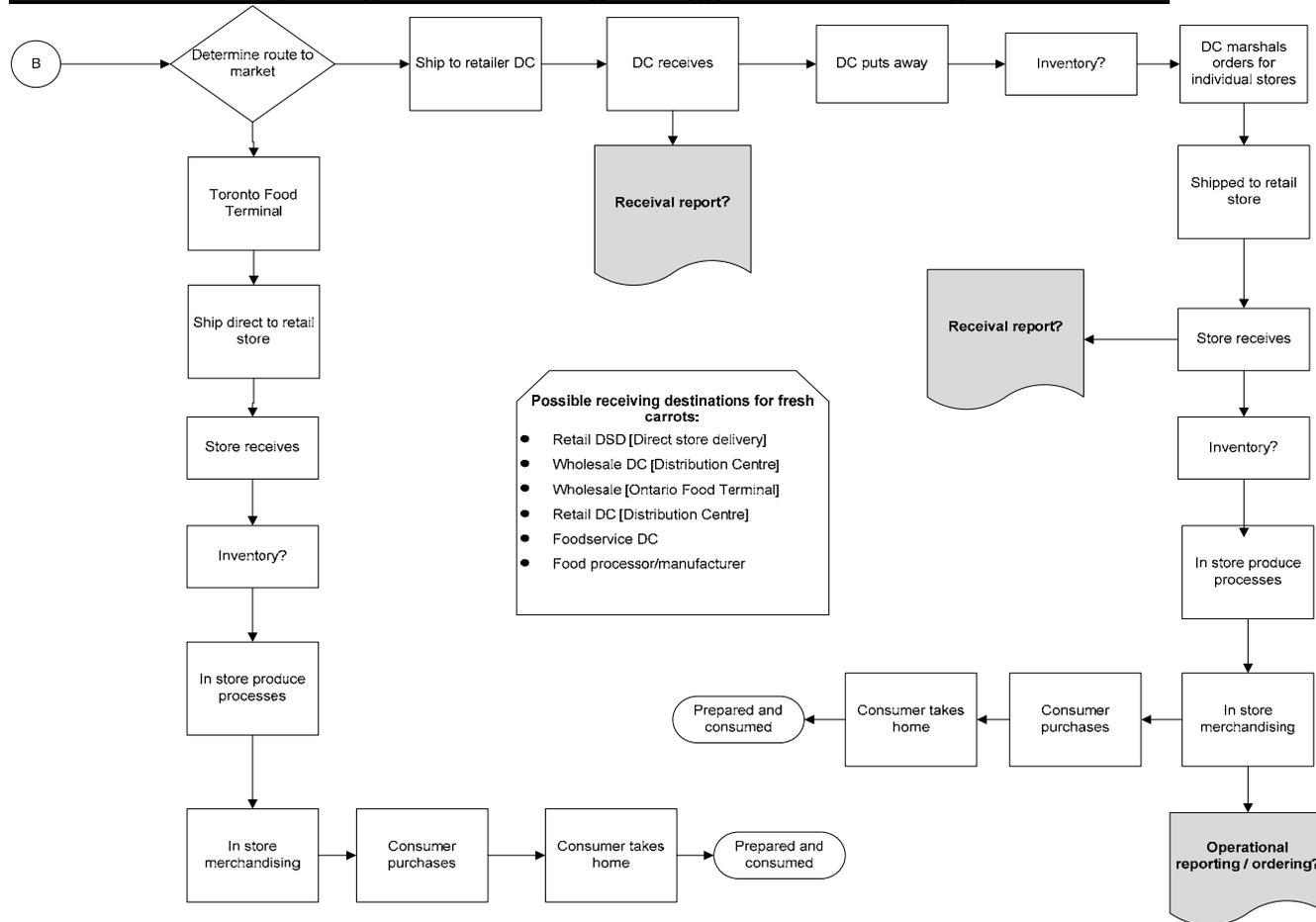


Harvest

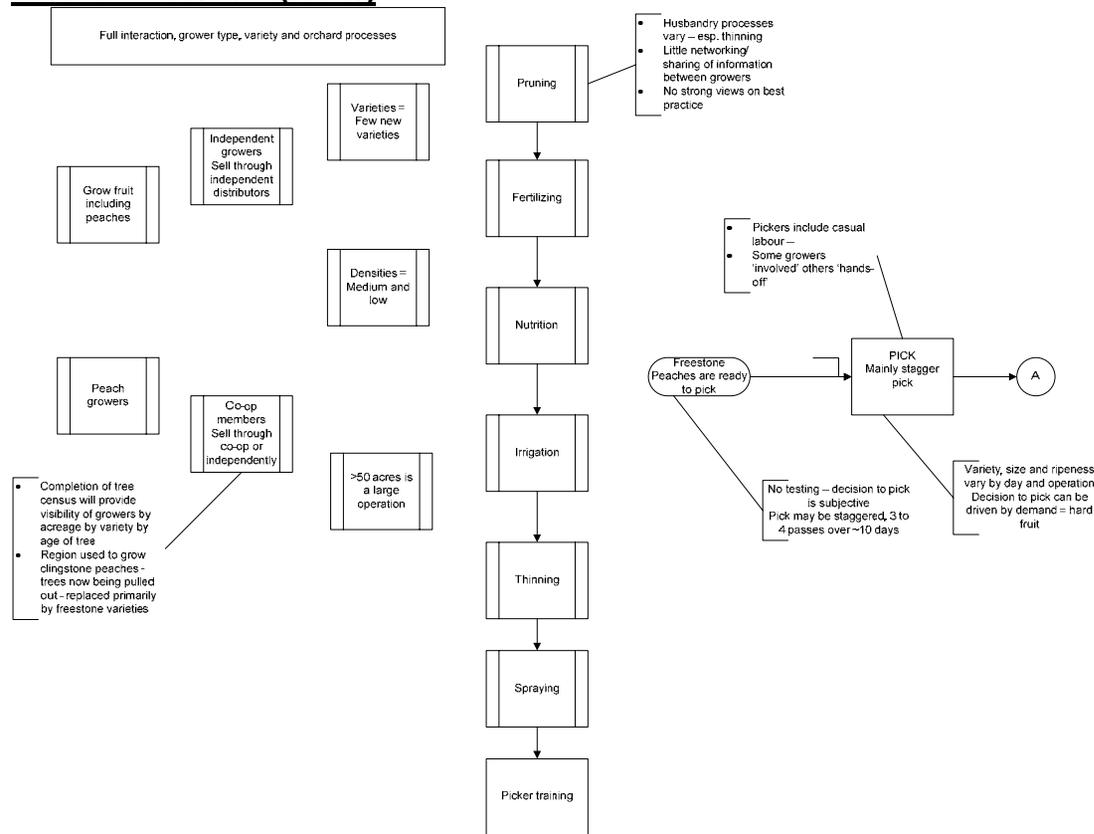
Carrot Value Chain (2 of 3), Harvest through to Marketing Bagged Carrots



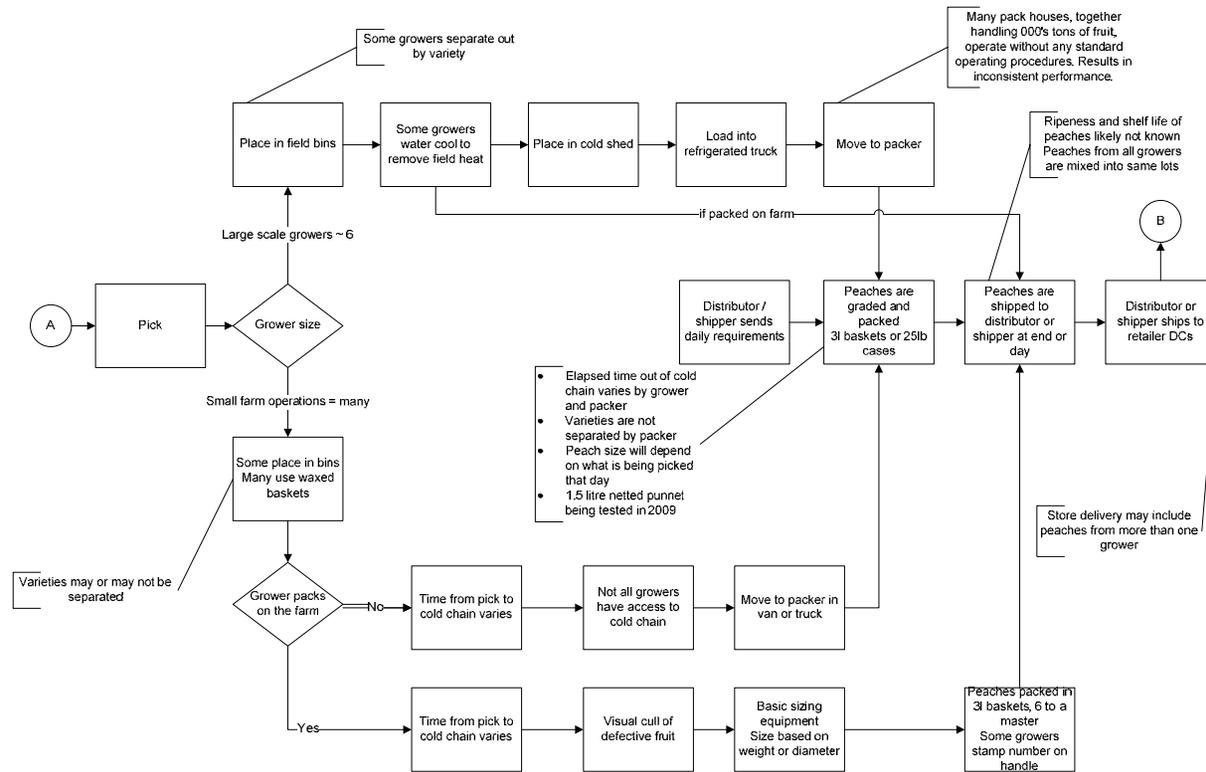
Carrot Value Chain (3 of 3), Initial Marketing of Bagged Carrots through to Consumer



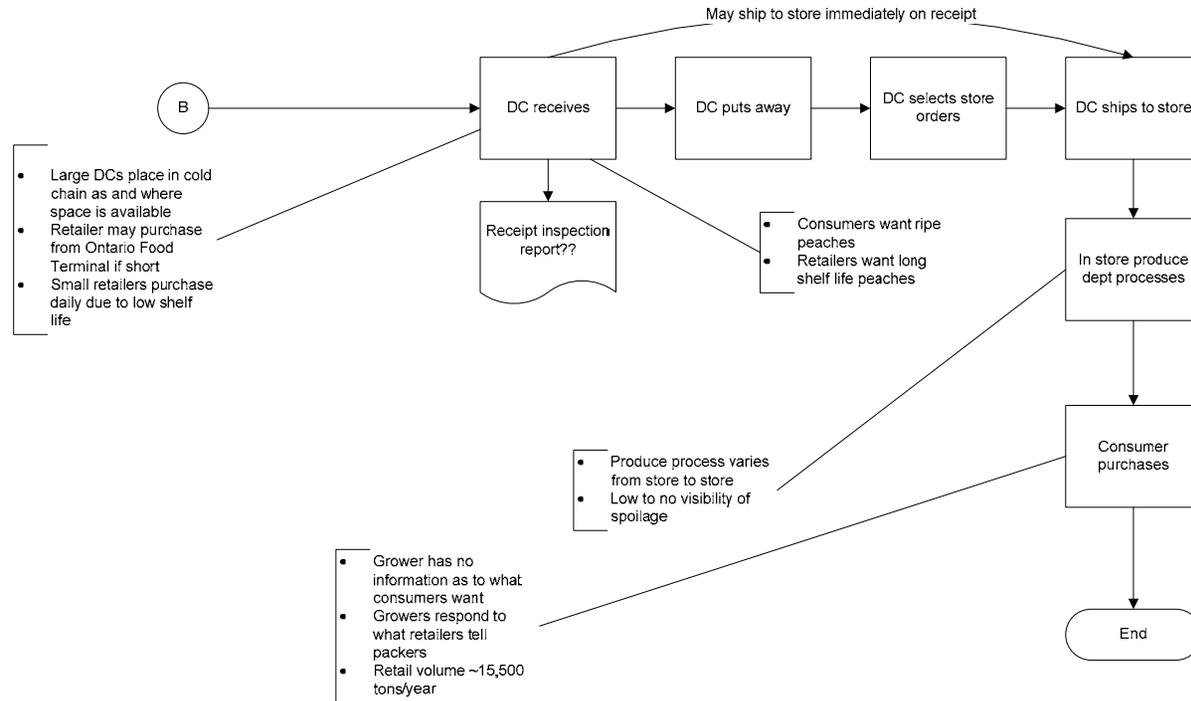
Peach Value Chain (1 of 3)



Peach Value Chain (2 of 3)



Peach Value Chain (3 of 3)

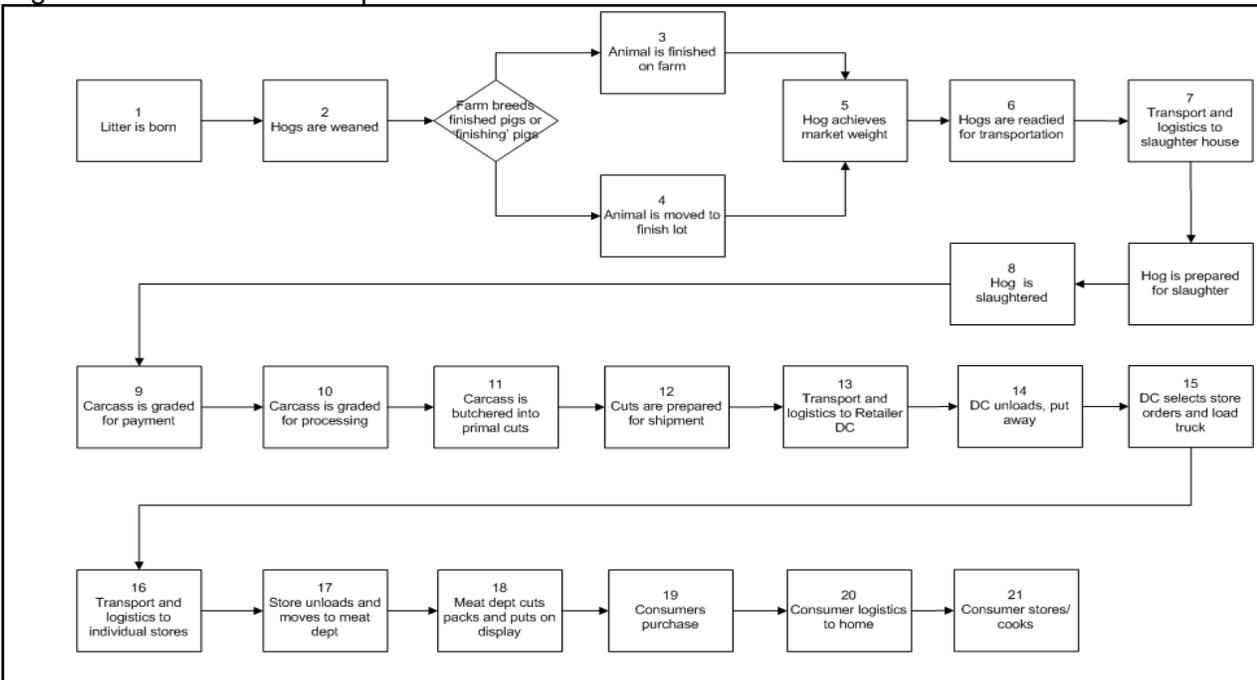


Appendix 4: Pork Case Study

Value Chain Map

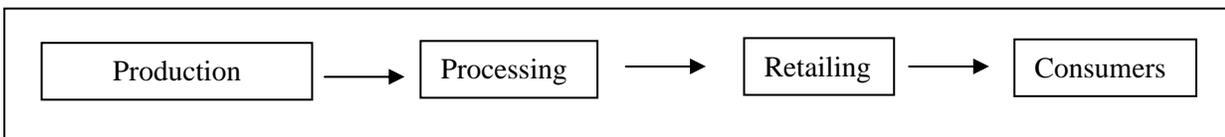
Figure 4.1 presents the schematic of the fresh pork value chain used as the basis of this example. It involves farrow to finish and finishing hog operations, a processor that slaughters 80,000 hogs annually, and a retailer.

Figure 4.1: Value Chain Map



While this map has 21 major steps, each a summation of many interrelated activities, Figure 4.2 shows that the chain essentially operates as four distinctly separate units. While overlaps occur between each of the four units, our observations suggest that many of the management processes at each unit along the chain operate in relative isolation to the others.

Figure 4.2: Operational Units



Interviews with members of this and other pork value chains suggested that the present situation culminates from a number of factors:

- Primary producers, processors, and retailers each expect the other to exhibit predatory business approaches should they share all but immediate transactional information;
- Each member follows a tendency to sell, rather than market, products;
- Each member possesses an ardent belief that focusing on productivity (maximum volume at minimum cost) is the most effective method to address business risks;

- Governance practices limit each player's desire to work closer with other members of the value chain to increase the overall value of the pork category through market-focused innovation;
- Performance is reported in terms of operational units rather than chain length activities.

An example of how these factors translate into limited ability to capture value by improving consumers' satisfaction was relayed to us by a senior retail representative. He stated that, "supplier performance is largely measured by consistency of delivery and price, and incentives are provided according to how much money the retailer can save, rather than the quality of the meat being supplied." It was also noted that this situation is exacerbated by retailers often taking a short-term predatory approach to growing meat sales by attempting to jump ahead of their competitors, and regularly discounting the cuts that consumers value the most. Little effort is placed on growing the overall value of the fresh pork category by using consumer insights to develop innovative products, processes and marketing strategies.

Upstream opportunities to create value are also being missed. A processor representative stated that, "producers are rewarded for the absence of fat, not the occurrence of high quality muscle." As well, many primary producers do not seek to identify processes to reduce their production costs or increase their margins. "We have suppliers following at least 20 types of production systems and no one really knows the system that produces the best (fresh) pork."

Beyond transactional metrics such as price and weight, little currently connects the entire chain in capturing value from supplying fresh pork to increasingly discerning consumers. Yet the attributes that influence consumers' purchase decisions extend beyond factors such as the size of cut and price per kilo. The remainder of this commentary explores opportunities for the value chain to benefit from introducing new processes that could lead to an increase in consumers' perceptions that pork offers a high value proposition.

Consumers' Definition of Value

Identifying opportunities to improve the performance of a fresh pork value chain began by evaluating results from the 'Consumer Data for Farmers' project, which tracked consumer perceptions of 16 attributes relating to purchase, preparation and consumption of fresh pork.

Distinct differences were found in the extent to which each of the 16 attributes influence consumers' perceptions toward fresh pork. These findings enabled researchers to identify how Critical to Satisfaction (CTS) each of the attributes was in defining the value of fresh pork from consumers' perspectives. Relative importance of each of the 16 factors and consumers' satisfaction that their expectations are being met are summarized below.

The CTS criteria were designed by Ipsos Forward in conjunction with the Value Chain Management Centre and the Canadian Pork Council. The 16 attributes are as follows:

- Taste
- Tenderness
- Freshness
- Consistency in quality
- Overall healthiness
- The whole family will eat it
- Affordable price

- Value for money
- Quick to prepare
- Versatile
- Appropriate sizes of the cuts
- Availability of recipes
- Availability of desired cuts
- Available in a variety of quick to prepare products
- Easy to locate in the store
- Easy to prepare from scratch

The relative importance of each attribute in shaping consumers' overall perception of the value of fresh pork came from the results of ranking each attribute on a scale of 1 to 10.

- A score of 8, 9 or 10 would be a potential deal breaker. If a particular requirement cannot be satisfied, consumers will not buy the product.
- 5, 6 and 7 are important. Consumers may buy the product now, but will likely look for alternatives if dissatisfied with the product's performance when preparing and/or consuming it.
- 2, 3 and 4 are of low importance, and may not influence consumers' purchase decisions but could create opportunities to 'delight' consumers, making the product and/or the retailer the one of choice.

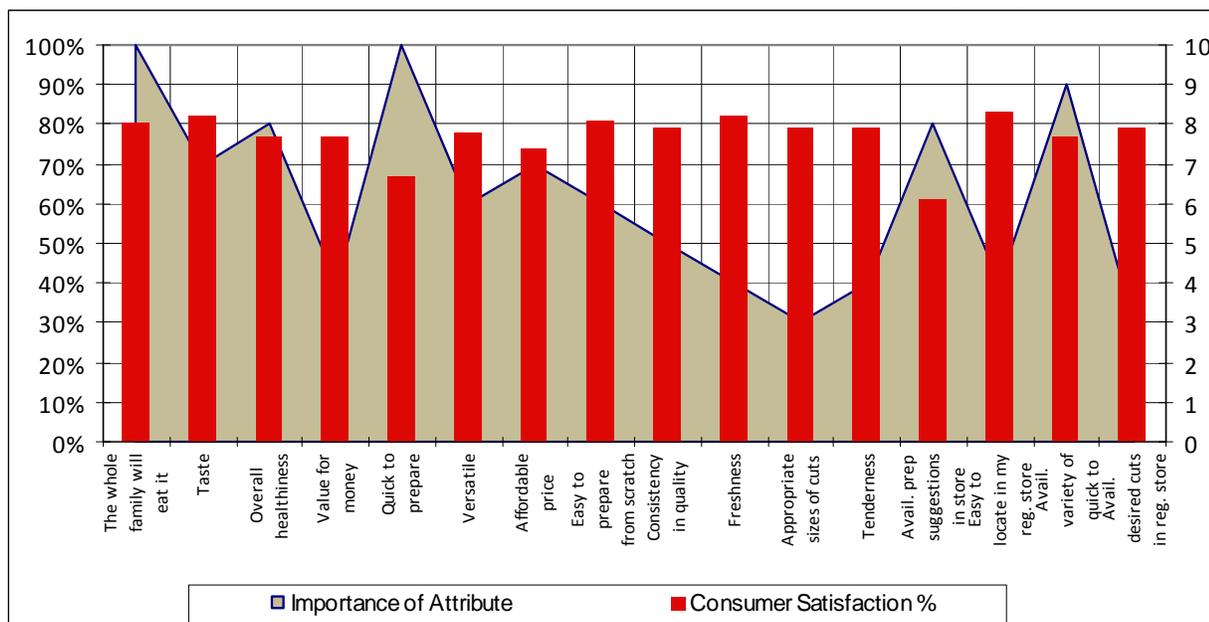
Figure 4.3 shows the relative importance of each of the 16 attributes tracked. It also shows how well consumers feel fresh pork currently performs across each of those attributes, compared to their expectations.

Figure 4.3: Consumers' *Critical to Satisfaction* and *Satisfaction* scores for pork

	The whole family will eat it	Taste	Overall healthiness	Value for money	Quick to prepare	Versatile - can be prepared in a wide variety of ways	Affordable price	Easy to prepare from scratch	Consistency in quality	Freshness	Appropriate sizes of the cuts	Tenderness	Availability of recipes, preparation and serving suggestions in the store	Easy to locate in my regular store	Available in a variety of quick to prepare products	Availability of the desired cuts in my regular store
Critical To Satisfaction	10	7	8	4	10	6	7	6	5	4	3	4	8	4	9	3
Satisfaction	80%	82%	77%	77%	67%	78%	74%	81%	79%	82%	79%	79%	61%	83%	77%	79%

Figure 4.4 illustrates the same information as above, though schematically. 100% means that pork consumers are highly satisfied that the attribute is meeting their expectations.

Figure 4.4: Consumers' *Critical to Satisfaction* and *Satisfaction* scores for pork (shown schematically)



As illustrated, the importance of different attributes surrounding the purchase, preparation and consumption of fresh pork and the relative satisfaction consumers feel toward their expectations being met, vary considerably across the 16 attributes. Results show that fresh pork performs least favourably on attributes with the greatest influence on consumers' perceptions toward the value proposition offered by fresh pork. They also show that price is only the sixth most important factor influencing consumers' satisfaction with fresh pork.

Furthermore, consumers who distinctly rated pork as performing below their expectations said that fresh pork performed worst on tenderness, followed by texture and taste. Simultaneously, core pork consumers are less likely to rate pork as overly fatty or unhealthy.

For simplicity we have separated specific attributes into 'Must have' (a deal breaker if not provided as an attribute of the product), 'Should have' (a commonly expected attribute that suppliers 'play ball') and 'Would be nice to have' (a delighter that sets it apart from competing products).

'Must have' attributes:

- The whole family will eat it
- Healthy choice
- Easy to prepare
- Availability of recipes, preparation and serving instructions in my store
- Availability of quick to prepare products

'Should have' attributes:

- Affordable price
- Taste
- Versatile – can prepare in a number of different ways
- Easy to prepare from scratch

- Consistency in quality

'Nice to have/delighter' attributes:

- Meat attributes
 - Freshness
 - Tenderness
- Retailer/pork category marketing attributes
 - Value for money
 - Appropriate sizes of cuts
 - Availability of the desired cuts in the store
 - Easy to locate in the store

Summary of CTS results

In summary, the CTS results suggest that opportunities to add value to fresh pork are currently being missed as the chain focuses mostly on price and volume, ahead of determining how it could deliver superior value to fresh pork consumers.

The five drivers of purchase that rated higher in importance than price include the "Whole family will eat it" (importance of 10, satisfaction 80%), and "Availability of recipes, preparation and serving instructions in my store" (importance of 8, satisfaction 60%). The following are also worth noting:

1. This information comes from regular consumers of pork. Therefore, the current gap between the relative importance of "*the whole family will eat it*" and other attributes would likely be greater amongst those who consume fresh pork less frequently.
2. Core pork consumers exhibit higher than average levels of dissatisfaction toward the availability of pork recipes and information on preparation methods at the point of sale.

The first point shows that the chain is missing an opportunity to encourage non-core consumers to consume fresh pork more frequently. The second point shows that suppliers are not meeting the expectations of core pork consumers, their most important target market.

Addressing opportunities

While the analysis has identified opportunities to improve the performance of fresh pork, sustaining any improvements will rely on the creation of a more meaningful performance reporting system. It will also require discipline by the chain to reward those who are performing beyond minimal requirements, while penalizing those who are not.

The matrix in Figure 5 uses the principles of Total Quality Management to illustrate how a value chain might use the information presented to increase sales and capture added value from producing, processing and merchandizing fresh pork. It illustrates where the research suggests a relationship exists between the tracked CTS attributes and processes performed along the value chain, as well as the potential strength of each association. Changing how processes are managed, particularly where a strong relationship exists between the process and the CTS attribute, could increase the value proposition that consumers perceive fresh pork to offer.

Keys to understanding Figure 5:

- Where a consumer attribute is affected by a step in the value chain, there is an association.
 - No score means no defined association exists between a process and a CTS attribute.
 - The strength of any association between a process and a CTS attribute is scored on a scale of 1 to 10.
 - A score of 1 signifies a very weak association

- A score of 10 signifies a very strong association
- Association scores for each cell are multiplied by the consumer CTS score. Row and column scores are totalled.
- Columns with low scores or few association points likely indicate a consumer CTS that is either not addressed, or is addressed at only one or two points along the value chain.
- Rows with low scores or few association points likely indicate a value stream element that is non value added or waste because it does not create much value from the perspective of consumers. In either case, the row represents elements of the value chain that offer an opportunity to reduce cost or increase value for consumers.
- Rows with high scores represent elements of the value chain that have significant impact on consumer CTS. These elements should be controlled and managed carefully.

Figure 4.5: Association Matrix, Relationships Between Value Chain Elements and CTS Attributes

	The whole family will eat it	Taste	Overall healthiness	Value for money	Quick to prepare	Versatile - can be prepared in a wide variety of ways	Affordable price	Easy to prepare from scratch	Consistency in quality	Freshness	Appropriate sizes of the cuts	Tenderness	Availability of recipes, preparation and serving suggestions in the store	Easy to locate in my regular store	Available in a variety of quick to prepare products	Availability of the desired cuts in my regular store	VC element association score	% contribution to consumer CTS
Consumer criticality score	10	7	8	4	10	6	7	6	5	4	3	4	8	4	9	3		
Consumer satisfaction	80%	82%	77%	77%	67%	78%	74%	81%	79%	82%	79%	79%	61%	83%	77%	79%		
Store display/meat counter	8	7	7	8	9	9	9	7	9	9	6	3	9	9		9	712	17%
Retailer operations	6			7			7		9	9		6		9	9	9	386	9%
Retailer procurement	6	9	8	9	6	3	9	4	9	9	8	7			9	9	629	15%
Distribution and logistics	5	4	3	6			6		6	9		3					246	6%
Cool chain and transportation	4	4					4		7	9		3					179	4%
cut pack and label	7	7	9	9	9	9	8	9	9	9	9	7	9		9	9	797	19%
Post kill cooling and logistics	6	7		6			4		8	9		6					261	6%
Slaughter		4		5		2			8	3		9					148	4%
Animal Sale/Purchase	2						6		6		6	3					122	3%
Housing and handling	3		8	3			6		5		3	6					206	5%
Animal genetics	3	6	5	6			3		5		6	6					224	5%
Production system and feed	4	6	9	5		3	6		5		6	9					313	7%
4223	540	378	392	256	240	156	476	120	430	264	132	272	144	72	243	108	4223	100%

Figure 4.6 schematically illustrates the potential impact that each element of the value chain has on enabling the chain to capture added value from producing, processing and marketing fresh pork.

Figure 4.6: Importance of Each Value Chain Element to Creating Value

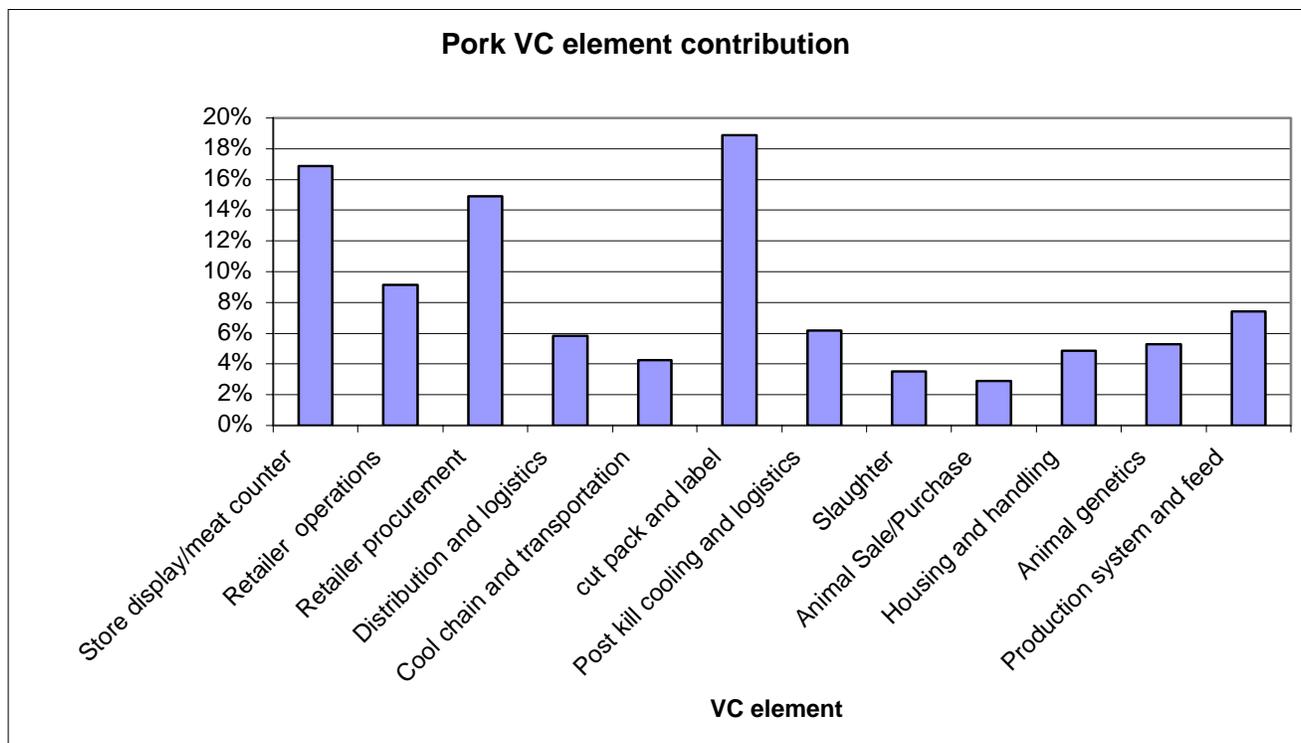


Figure 4.6 identifies the most important value chain elements:

1. Cut pack and label
2. Store display/meat counter
3. Retailer procurement
4. Retailer operations
5. Grouped factors relating to hog production

The first four value chain elements affect approximately 60% of consumer satisfaction. The fifth value chain element, “Grouped factors relating to hog production”, affects 22% of consumer satisfaction. Managing and controlling these value chain elements and their supporting processes are critical to success.

Appendix 5: Example of a Project Charter and Plan (from Hines, 2006)

To get things done, you must identify who needs to undertake what tasks, along with when the tasks must be undertaken, in which order, why, and what will be the estimated benefits. The chart below is taken from the Perfect Pineapple project, a successful value chain initiative that saw an overall reduction in value chain costs, improvement in quality, and increase in producer returns. All of which was enabled by identifying problems that had inherently occurred in the chain; then addressing those problems through a well-planned series of tasks.

The Charter for the Perfect Pineapple project was, compared to prior the project occurring:

- Have the chain agree on a supply chain strategy
- Achieve a Delivery In Fill On Time to Quality of 50% closer to perfection
- Achieve inventory levels that are 30% closer to perfection
- Annually reduce costs by a minimum of 3%
- Improve stakeholder relationships (measured through an annual survey)
- Achieve profitable growth
- Achieve consistent on-shelf availability of over 96%

The plan that enabled the chain to exceed the objectives set out in the Charter is shown below.

Figure 5.1: A supply chain project plan

The Perfect Pineapple Supply Chain Project Plan

	Ease	Timing	Team							
			Retailer	Transp Out	Canner	Transp In	Growers	Pallet Supply	Carton Supply	Can Supply
Customer Integration		ST/LT	✓	✓	✓			✓		
Align consumer demand project 10 to 8 days SOH @ Retailers DCs	2	ST	✓	✓	✓					
Smoothing material flow (all product) transport / primary freight / packaging	5	LT	✓		✓			✓		
Consumer trends (alignment Canner/retailer)	2	ST	✓		✓			✓		
Internal Integration		JDI/LT	✓		✓		✓			
Avoid shift work with supply modification / analysis	3	JDI			✓					
Cost benefit of unsweetened from concentrate	2	JDI			✓					
Nitrate management	2	JDI			✓					
SKU rationalisation	4	JDI/ST	✓		✓		✓			
Align fruit intake to sales demand	4	LT			✓		✓			
Remove nightshift requirement / asset utilisation	3	LT			✓					
Rationalise of process lines	5	LT			✓					
Reduction of on-the-job training of seasonal staff	3	LT			✓					
Reducing premium paid for casual labour	3	LT			✓					
Remove inefficiency in low volume period	3	MT			✓					
Grower Integration		JDI/LT			✓	✓	✓			
Increase sugar levels through quality based payment system (QBPS)	4	JDI/LT			✓		✓			
Review grower rationalisation	5	LT			✓	✓	✓			
Feasibility study of sourcing supply options aligned to customer requirements	4	LT			✓	✓	✓			
Packaging Integration		JDI/LT			✓			✓	✓	✓
Five day carton inventory project	2	JDI/ST			✓				✓	
Electronic Receipting	3	JDI/ST			✓				✓	
PLI (Product, leadership & Innovation) Generic carton cost feasibility project: reduce SKUs	3	MT/LT			✓			✓	✓	
Can gauge project (all products)	2	ST			✓					✓
Tin Coating	2	MT			✓					✓
PLI - Product, Leadership & Innovation	3	MT/LT			✓			✓		✓
EDI - Receipting	3	JDI/ST			✓					✓
Forecast Accuracy	4	LT			✓					✓
Enablers		JDI/ST			✓					
Develop & Communicate Short - Long Term Strategy for Pineapples	3	JDI/ST			✓					
Continued costing and profit potential	3	ST			✓					
Confirm targets & current state	2	JDI/ST			✓					
Develop & Communicate Short - Long Term Strategy for Pineapples	3	JDI/ST			✓					

JDI = Up to 3 months
 ST = Up to 6 months
 MT = Up to 18 months
 LT = Up to 5 years

*Note: JDI = Just do it, ST = Short term, MT = Medium term, LT = Long term

Appendix 6: Example Standard Operating Procedures (SOP)

1. Purpose

- To define the process for progressing project applications through to presentation to the board

2. Scope

- Applies to all projects regardless of program.

3. Critical to satisfaction

- Thoroughness of review of application content and project eligibility
- Thoroughness of due diligence process
- Application recommendation
- Completeness of board package

4. Roles and Responsibilities

4.1 Client

- Submits complete and accurate application package
- Provides additional information as required

4.2 Front Office

- Receive and forwards (to PA) all project application packages
- Receives and forwards to PC additional documentation as received
- Review project budgets as required by PM
- Photocopies and mails out on agenda board packages

4.3 Program Assistant

- Assign project number and enters tombstone information as required
- Reviews application enclosures for completeness and updates database
- Creates application file
- Checks for pre proposal and adds to application file
- Conducts 'standard' due diligence, follow up and forward to PM and PCs
- Conducts peer review as required by PC
- Participates in 'pro/con review'

4.4 Program Manager (PM)

- Establishes application deadlines and internal milestone schedule
- Assigns applications to PCs
- Reviews and approves case summary
- Generates board package
- Provides feedback on, receives recommendations
- Reviews and signs off on internal checklist
- Participates in pro/con review
- Records minutes of non board meetings

4.5 Program Coordinator (PC)

- Reviews project application for alignment with program requirements
- Ensure project checklist is complete

- Meets/discusses project details with applicant
- Conducts project specific due diligence
- Generates case summary
- Conducts peer review of case summary and recommendations
- Makes application recommendation to PM
- Complete internal checklist

4.6 Director

- Reviews board packages
- Participates in pro/con review
- Receives recommendations from PM

4.7 Finance

- Reviews project financials for alignment with program budget
- Receives recommendations from PM
- Participates in pro/con review
- Records minutes of board meetings

4.8 Board/Committee/Panels

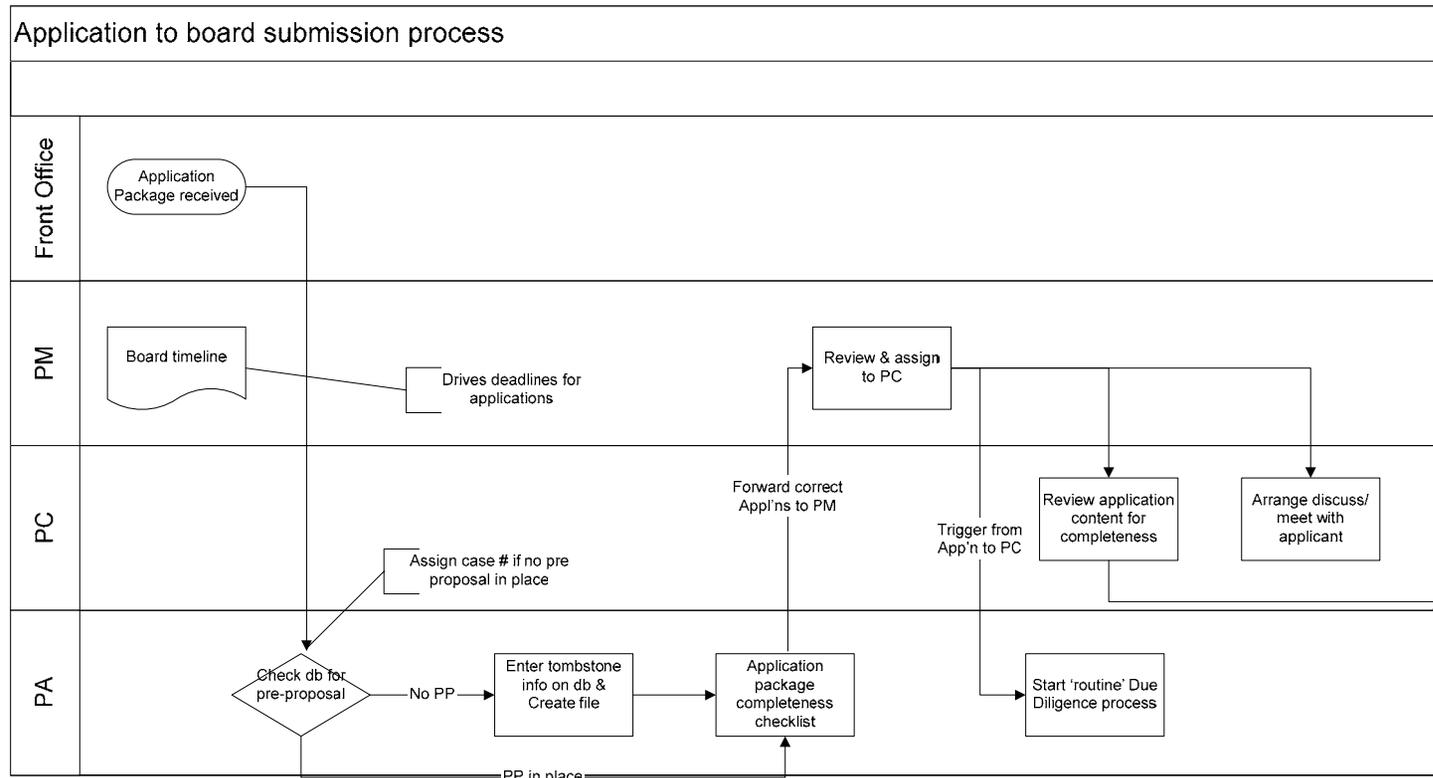
- Review board package
- Evaluate project and recommendations
- Make final decision on projects

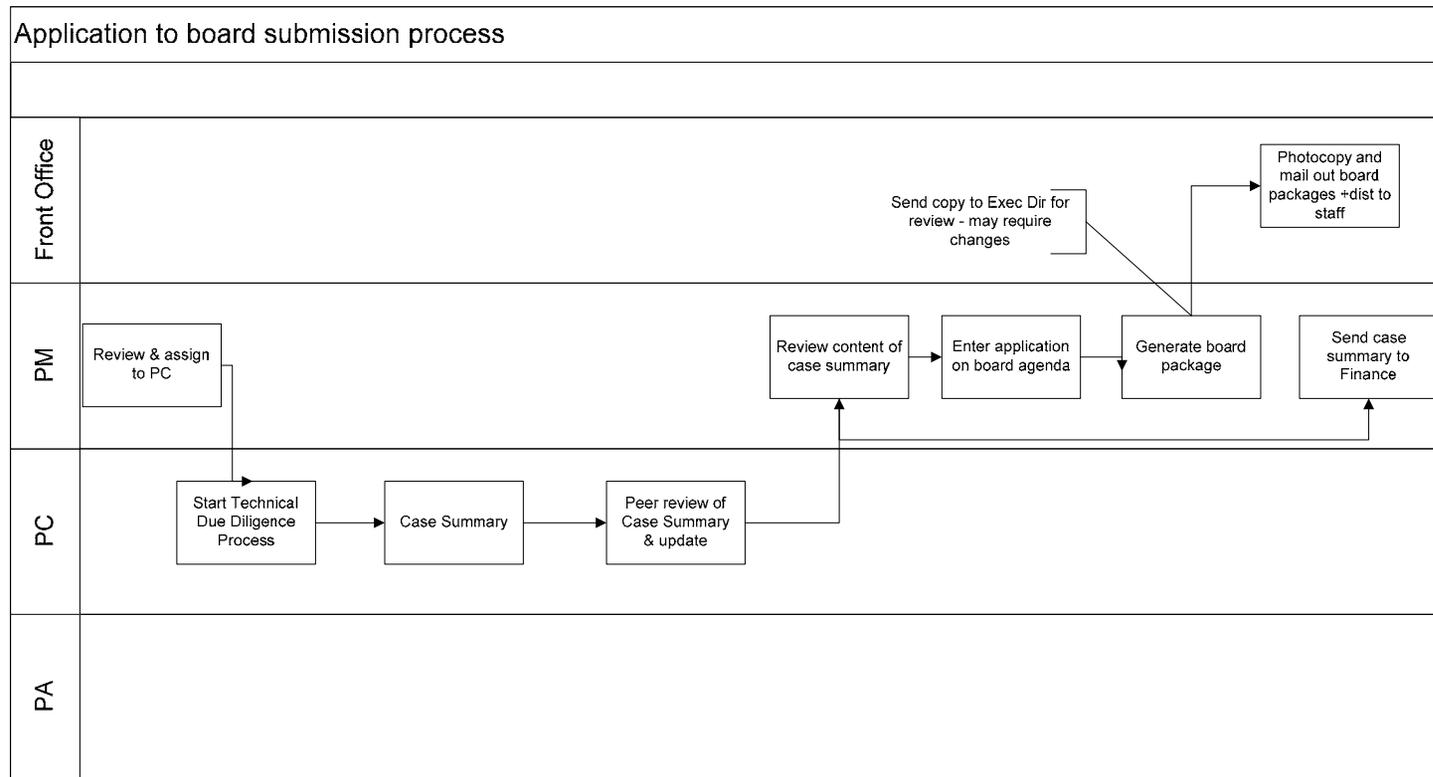
5. Reference Documents

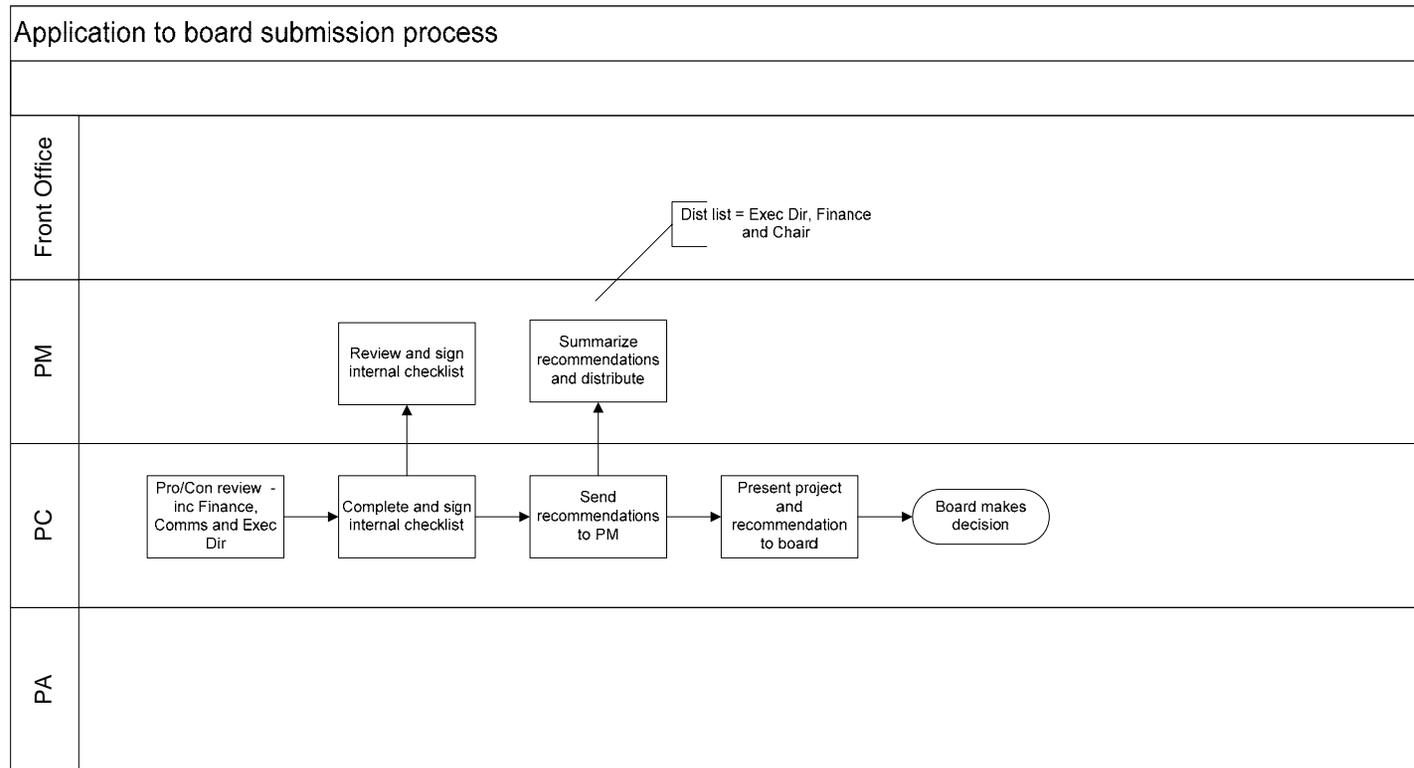
- Case summary template.
- Board package
- Technical review
- Internal checklist

6. Process

See the following process flow charts.







7. Deliverables

To ABC Dept:

- Database update
- Application checklist
- Completed due diligence and summary
- Updated client files
- Case summary
- Board agenda
- Board package

8. KPIs

Completion of process steps to milestones plan.

Appendix 7: List of Required Workshop Materials

Materials for a workshop with 15-25 participants

Quantity	Item
1	Digital Camera
10	Rolls of brown paper (size of wrapping paper) - Can often be purchased at a dollar store
5	Flip charts
5	Sets of markers (Each set includes 4 colours: red, blue, black, green) - to be used with flip charts
10	Sets of Post Its™ (Each set includes 4 colours: yellow, pink, blue, green) - size 3" square
5	Rolls of clear scotch tape
5	Rolls of masking tape
5	Pads of Graph paper (with small blue squares)
5	12" Rulers
10	Sharpened Pencils
5	Scissors

Additional Resource Book:

- GOAL/QPC – The Memory Jogger. There are 2 sizes. The larger version is suggested.
- Cost ~\$24 each
- ISBN 1-879364-44-1
- Order from: <http://www.goalqpc.com> or telephone 1-800-643-4316

Appendix 8: Activities Overview

Activity #	Phase	Activity title	What you will need to complete the activity	Desired outcome of the activity	This feeds into activity #
Intro	Intro	Business Objectives	Identify goals you would like to achieve using value chain management methodology	Define the purpose and objectives of completing the following activities	All
1	Define	Identify your customers and who they serve	Comprehensive knowledge of your customers and in turn, their customers/consumers all along the chain	Comprehensive listing of all customer and consumers served by the chain	2
2	Define	Customer CTS list	What is critical to the satisfaction of each customer/consumer? How important is each attribute? Note: You may go straight to activity 3 if you wish	Critical to satisfaction attributes identified and scored for each customer link in the chain	3
3	Define	Map out the CTS tree for your product or service	Input from activity 2 Organize (map) the attributes and ranking identified in activity 2.	A hierarchical (tree) of critical to satisfaction attributes identified and scored for each customer link in the chain	6
4	Define	Draw your current chain	Comprehensive knowledge of the workings of the value chain	A detailed map (Post It™s on brown paper) of the all the components of the value chain	6
5	Define	Measuring Quality and Value	Comprehensive knowledge of the value chain and or processes in terms of what is important along the chain	Identify how you and those in your chain define and measure quality and value	
6	Define	Create an association matrix for your chain	The inputs from activities 3 and 5 as well as good knowledge as to how the elements of the chain impact customer/consumer CTS	Analysis of the relationships between value chain elements and CTS attributes. Understanding of potential missed opportunities and waste as well as critical elements of the value chain	10
7	Define	Define the (external and internal) factors that impact the value you create	Comprehensive knowledge of the value chain and or processes in terms of inputs along the chain	A listing and understanding of inputs that affect the performance and well being of the chain	8, 9 and 10
8	Define	Defining the determinants of quality that you can control	The output of activity 7	Identify input factors that you can control as opposed to those you cannot control. Later, you are asked to consider how well they are controlled	9 and 10
9	Define	List undesirable effects (UDEs)	The outputs of activities 8 and 9	A listing of inputs and outputs of the chain which are problematic or otherwise undesirable	11 and 17
10	Define	Define your current process	The outputs of activities 3,5,6,8	A diagram of the relationship of important inputs, outputs to the value chain – that the chain transforms into value for the customer/consumer	14
11	Define	Prioritizing alternatives	Outputs from activities 6, 7 and 8	A list of all issues and UDEs identified thus far.	12

Activity #	Phase	Activity title	What you will need to complete the activity	Desired outcome of the activity	This feeds into activity #
		Identify 'do it now' priorities		A short list of all quick win, do it now opportunities that will correct UDEs other issues identified within the chain	
12	Define	Create an action log for 'do it now' priorities	Output of activity 11	A plan as to what will be done, when and by whom, as well as the provision to regularly review and record progress	
13	Define	Establish your project charter	Output of activity 11. Items that will require more time and people resources to bring about change/improvement	A formal document outlining the opportunity or problem statement, objectives, business case, roles and responsibilities and major milestones of the project	The Measure phase
14	Measure	Create a SIPOC diagram for your value chain project	The output of activities 4 and 10	A more detailed diagram of the value chain or process related to the project along with inputs, outputs, suppliers and customers - in other words all stakeholders	15
15	Measure	Create a detailed value chain map	The output of activity 14 and thorough knowledge as to how the chain/process operates at a very detailed level	A more detailed map that shows all value chain/process steps and how the inputs and outputs are managed	18 and 20
16	Measure	Identify waste in your chain	The output of activity 15, a good understanding of 'TIM WOOD' waste, and a thorough knowledge how the chain/process operates at a very detailed level	A list that shows specific types of waste, where they occur and ideas/plans to eliminate or significantly reduce the waste	11 and 17
17	Measure	Develop a cause and effect diagram and action log	The outputs of activities 9 (UDEs) and 16 (waste) as well as thorough knowledge as to how the chain/process operates at a very detailed level	A prioritized listing of potential of potential causes of UDEs/waste to be immediately actioned and/or investigated	
18	Measure	Create a nine box FMEA	The process map along with thorough knowledge as to how the chain/process operates at a very detailed level	The assessment of current controls within the value chain/process and the identification and prioritization of risk	17 and 19
19	Measure	Improve Process Controls	The high priority risk areas from activity 19	A detailed plan of improvements to process controls to either prevent risk or to detect a problem is about to occur, thereby mitigating overall risk	
20	Measure	Complete your own data collection plan	The detailed process map along with a need to know how the value chain/process performs	A detailed plan for the collection of data. Data will be collected.	21
21	Analyze	Basic data analysis	The data collected as defined in the data collection plan (activity 20)	Basic data analysis using tools like a Pareto chart basic statistics, histogram, capability analysis, run chart, scatter diagram	22

Activity #	Phase	Activity title	What you will need to complete the activity	Desired outcome of the activity	This feeds into activity #
22	Analyze	Summarize the information we have gathered from the data	The output of activity 21	Information as to how the chain performs relative to requirements/specifications. A decision as to what to do next	23
23	Analyze	Experimentation	If activity 22 determines some experimentation is required	A plan for conducting a basic experiment designed to bring about improvement in a key performance area	25 and 26
24	Analyze	Create an affinity diagram	A thorough understanding as to how the chain functions relative to customer/consumer requirements and perhaps how other chains function	An affinity diagram of the groups vision and functionality of the future state value chain	25 and 26
25	Analyze	Draw a revised map	A shared vision of the future state value chain, just do it improvements and future state chain stakeholders	The future/improved state value chain map	27, 33 and 34
26	Analyze	Update your FMEA	A shared vision of the future state value chain, just do it improvements and future state chain stakeholders	9 box FMEA to identify and mitigate risk by improved process controls	27, 33 and 34
27	Analyze	Measuring the future performance of your value chain	The future/improved state value chain map with 9 box FMEA (from activity 26)	A list of KPIs for the future state chain, along with ideas as to how measurements will be taken	28
28	Analyze	Define stakeholder roles and responsibilities	The outputs of activities 24, 25, 26 and 27 along with all future state chain decision makers	An agreed to list of roles and responsibilities = accountability for bringing about change	29
29	Analyze	Consider the stakeholders and potential resistance to change	Knowledge of all value chain stakeholders and their potential position on the improved state	Identification/detection of potential resistance to change – with plans to address resistance	30
30	Improve	Create a change plan	The outputs of activities 24, 28 and 29 and future state chain stakeholder involvement	Create a plan of action for bringing about the change necessary to achieve the future state value chain – including checks and balances and remedial actions	32
31	Improve	Create an improvement action log	The outputs of all Analyze phase activities as well as any pilot runs of improvements – plus future state chain stakeholders	Create a plan of action as to what is required to bring about the future state value chain	32
32	Improve	Review the roll out	Completion of any pilots and validation of improvements along with updated action logs	A tollgate review of the readiness for planned improvements to be rolled out and implemented chain wide	
33	Control	List processes that require a SOP	The future state chain process map and FMEA	A list of SOPs to be created – where the absence of a SOP would have an adverse effect on customer/consumer satisfaction as well as cause risk to the chain	34 and 36
34	Control	Develop an	The future/improved state value	Decide what information will	34

Activity #	Phase	Activity title	What you will need to complete the activity	Desired outcome of the activity	This feeds into activity #
		information sharing log	chain map with 9 box FMEA and SOPs	be shared back and forth along the chain and a plan to make it happen – with actions	
35	Control	Create a communication plan	The future/improved state value chain map with 9 box FMEA and SOPs and info sharing log	A clear plan as to how the new and improved value chain – along with the process documentation and controls will be communicated to all value chain stakeholders	36
36	Control	Create a training plan	The future/improved state value chain map with 9 box FMEA and SOPs and info sharing log	A plan for the delivery of training in the new process documentation and controls used to manage the value chain	37
37	Control	Create a KPI control plan	The future/improved state value chain map with 9 box FMEA and SOPs and info sharing log. Refer to KPIs from activity 27.	A plan to measure, control and report on the ongoing health of the value chain	