



# DISCOVER DEVELOP DELIVER

An investigation of innovation processes and systems  
within New Zealand's red meat industry

Todd Fortune

## **Abstract**

New Zealand's red meat industry faces challenges of the evolving alternative proteins sector, emerging consumer trends, and environmental concerns, all of which drive innovation. A hybridised lens of design thinking, systems thinking, and regenerative thinking was used to investigate the innovation processes and systems within New Zealand's red meat industry. The case studies selected centred on the emerging relationship between Silver Fern Farms (a meat processor) and the Food Design Institute at Otago Polytechnic (a culinary educational institute that undertakes new product development as part of their curriculum) in the innovation space. Incremental innovations were found to be the primary output of the Silver Fern Farms' stage-gate innovation process. Meanwhile, the Food Design Institute's design thinking innovation process leads to more creative and radical innovations. Maintaining a competitive advantage requires the proactive response to the drivers listed above and the consideration for designing radical innovations. Several opportunities were identified for Silver Fern Farms and New Zealand's red meat industry in general to maximise the co-creation of value for themselves, consumers, and socio-ecological systems. The majority of opportunities identified employ collaboration with other industries and organisations, especially those that utilise different frameworks and have expertise in niche markets. Opportunities include pathways for creating radical innovations and strategies for responding to the challenges.

*Keywords:* *design thinking, red meat industry, value co-creation, collaboration, innovation process, innovation ecosystem*

## Master of Design Enterprise

This thesis is submitted in partial fulfilment and final phase of the Master of Design Enterprise (MDE) degree to the School of Design at Otago Polytechnic Limited. See below for the other phases of this programme.

MDE401 Design Dunedin - A service concept report for the COVID-19 recovery primarily within the tourism and hospitality industry using design thinking.

MDE404 Experience Design and Theatre - A presentation for Olveston Historic Home on how a theatrical framework can be used to co-create more meaningful experiences for their customers.

MDE501 Discover Develop Deliver - An investigation into innovation processes and systems within New Zealand's red meat industry.

## Declaration

I declare that to the best of my knowledge, the work in this thesis titled 'Discover, Develop, Deliver - An investigation of innovation processes and systems within New Zealand's red meat industry has been carried out by me in the School of Design. The information derived from the literature and other sources has been duly acknowledged in the text with a list of references. No part of this thesis was previously presented for another degree or diploma at this or any other institution.

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# 01

## PROJECT FRAMEWORK RESEARCH DESIGN

This chapter outlines the general approach to the research project, including the tools used to gather data and gain insights. The objectives of the research project are also outlined. Finally, the structure and layout of the report will be discussed.

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## 1.1 Purpose

This project aims to investigate product innovation in the red meat industry as part of the fast-moving consumer-goods (FMCG) sector, innovation processes and systems of the new product development (NPD) models, and systems around innovation that inform innovation processes and organisational relationships. Silver Fern Farms (a meat processor owned by the cooperative and Shanghai Maling) and the Food Design Institute at Otago Polytechnic (an educational institute that undertakes NPD projects as part of their curriculum) are the case studies explored in this research. They were chosen because of the emerging partnerships that exist between them in the innovation space. The study objective are:

- To define and outline the complexity of innovation and its relationship to the red meat sector and Otago Polytechnic.
- To identify challenges and opportunities for value-adding and (collaborative) innovation within the red meat sector.
- To identify and suggest pathways for the development of radical innovations.
- To identify areas for opportunities for the creation of shared value.
- To map the innovation systems and processes used by Silver Fern Farm and Otago Polytechnic.

## 1.2 Project Framework

Complex systems, such as those involved with innovations, require a framework to investigate their structural, dynamic, and sociopolitical complexity (Gürdür & Törngren, 2018). A hybrid approach combining design thinking, systems thinking, and regenerative thinking, along with their associated tools, is required to explore these complex innovation systems, as seen in Figure 1. The following sections detail each framework and how they were used in this project.

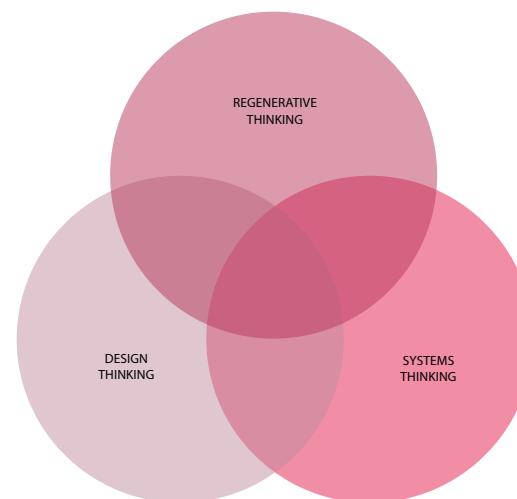


Figure 1 – Hybridised project framework.

### 1.2.1 Design Thinking

Design thinking is a framework (see Section 3.4.1) that emphasises a human-centred approach to problem-solving (IDEO U, n.d.; Interaction Design Foundation, n.d.-c). Within the context of this project, it has been used to analyse notes from research, synthesise insights and opportunities, design visualisations and format the thesis. This is the result of the following principles Brown (2008) listed below as essential to design thinking that underpins this project:

- Empathy towards their team, clients, and users.
- Co-creation with users as part of the ideation and validation process.
- Multidisciplinary thinking and use of tools from software development, engineering, anthropology, psychology, the arts, and business disciplines among others.
- Collaboration with experts from their respective fields.
- Experimentation and iteration as a process that gains insights.
- Intuition and tacit knowledge that prompts a particular avenue of thought.
- Optimism and flexibility when facing challenges and uncertainties.

Luchs (2015) includes other principles important to design thinking:

- Empathetic language, visualisations, and tactile communication as important ways to creatively articulate ideas and solutions.
- Holistic thinking concerning relationships, interactions, and connections of systems.

## 1.2.2 Systems Thinking

Systems thinking is a problem-focused framework used to investigate problems on a large and complex scale (Interaction Design Foundation, n.d.-e). This perspective enables the researcher to look beyond the problem and consider the relationships and other influences. In this sense, it allows us to redefine the problem as a symptom of a larger problem. Systems thinking heavily encourages visualisations as a key tool of communication, as it describes processes, systems, and relationships in a more empathetic way (Kim, 1999). Systems thinking led to a whole systems understanding of how the data, study context, and theory relate to each other through visualisations. The iceberg model (see Figure 2) is a systems thinking tool used to identify hidden patterns, supporting structures, and mental models that influence the visible event.

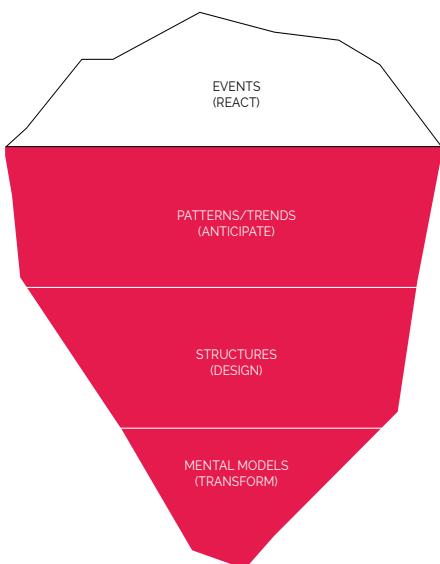


Figure 2 – Iceberg model. (Adapted from Goodman, 2002)

## 1.2.3 Regenerative Thinking

Regenerative thinking is a whole systems perspective that values the togetherness of humanity alongside the environment (Lyle, 1996; Wahl, 2016). It acknowledges that the practices of today are destructive to both aspects of humanity and the ecosystem and seeks to restore what was destroyed. Raworth's (2012) doughnut economics model (see Figure 3) is a circular economy that shifts the focus from the Gross Domestic Product index of traditional economics models to the flourishing of humanity. It is a model that is a manifestation of regenerative thinking. To achieve transformations at such a scale requires regenerative design, a whole systems approach to problem-solving when designing regenerative systems (Wahl, 2016). These solutions require the ability to shift collective paradigms, values, intentions, and behaviours. Similarly, the principles of systems thinking and design thinking, co-creation, an interdisciplinary approach, and holistic thinking are essential to regenerative thinking and design.

Additionally, Wahl (2016) emphasises the impact that Indigenous knowledge and wisdom has on regenerative thinking. This is because the majority of Indigenous people throughout human history have practised non-destructive and renewable ways of harvesting resources from the local and regional ecosystems. In essence, Indigenous cultures acknowledged themselves as being part of the ecosystem, not separate from it. Within the context of New Zealand, a regenerative approach considers the collaboration and consultation of takata whenua when regarding mātauraka Māori. Mātauraka Māori is an Indigenous knowledge system that incorporates the Māori philosophy, holistic perspective, and way of being (Marsden & Henare, 1992), providing important insights for understanding and managing the ecosystem (Lyver et al., 2008).



Figure 3 – Doughnut economics model. (Adapted from Raworth, 2012)

## 1.3 Research Design and Process

The research utilises qualitative research methods. This includes a desktop study of innovation practices, the gathering and analysis of secondary (documentary) evidence, and observations of the innovation processes in practice. The data obtained in relation to the Bachelor of Culinary Arts programme and the design thinking framework was the result of autoethnographic (participant) observation due to having experienced the programme and using the framework. The analysis undertaken was used to inform insights that were developed via an iterative process of analysis, feedback (testing with the organisations being studied), and iteration. The data captured from the research were translated into findings and insights using the iterative processes of sketching or mapping followed by sensemaking (see Section 9.1 for examples of the process). Figure 4 illustrates the research and insight synthesis process.

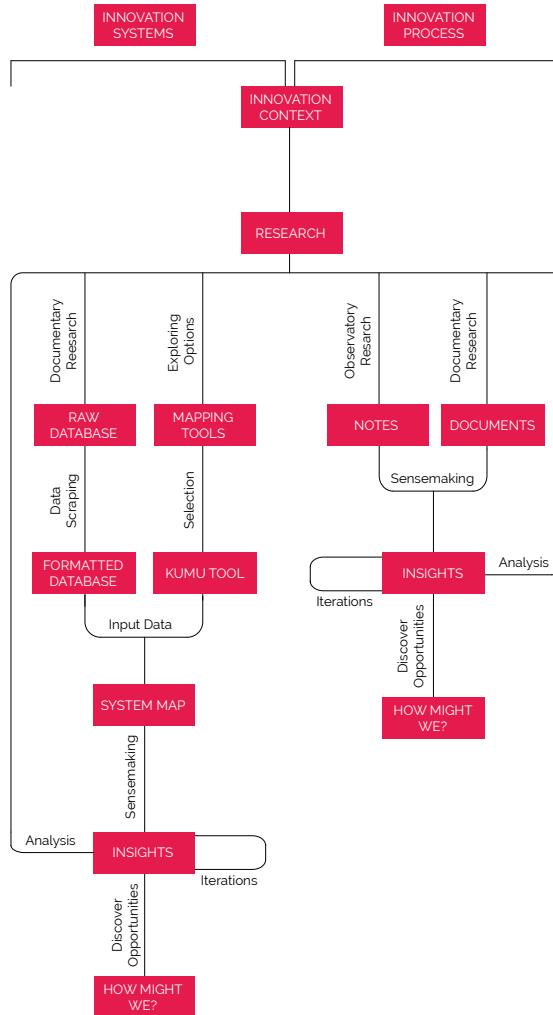


Figure 4 – Research analysis and insight synthesis process.

### 1.3.1 Design Research

The area of investigation and outputs of this research project can be categorised using Frankel and Racine's (2010) map of design research categories (see Figure 5). Frayling (1994) categorises design research into three distinct but interrelated categories: research for design, research through design, and research for design. Research for design is about research that provides descriptive and prescriptive information that enables designers to inform their specific design projects better (Downton, 2003). Meanwhile, research about design involves the investigation of designers and the design process itself (Buchanan, 2007). Finally, research through design revolves around the creation of knowledge (Jonas, 2007) or an explanation or theory within a broader context, not the actual project solution (Frankel & Racine, 2010).

This project encapsulates all three categories of design research. However, it primarily focuses on the research for design and research about design categories (see Figure 5). The research outputs for design involve insights as contextualisations of the business practices concerning innovation theories and the opportunities identified from the investigation. Research about design encompasses the investigation of the innovation processes used by Silver Fern Farms and the Food Design Institute, including the theories that underpin them. Research through design is not presented in this report as it has to do with personal reflection and professional development.

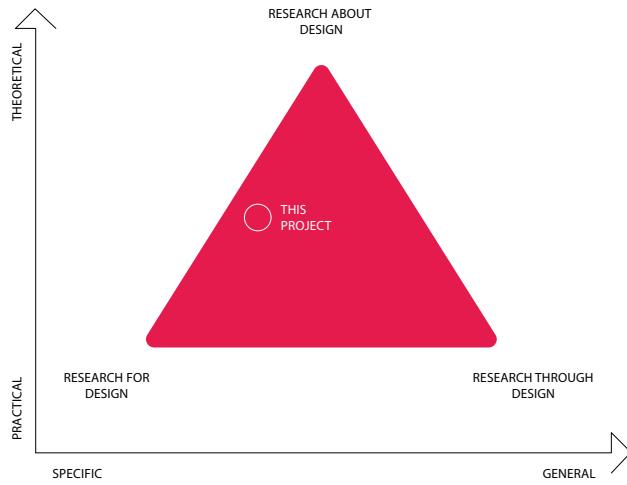


Figure 5 – This project plotted on the map of design research categories. (Adapted from Frankel & Racine, 2010)

### 1.3.2 Ethical Considerations

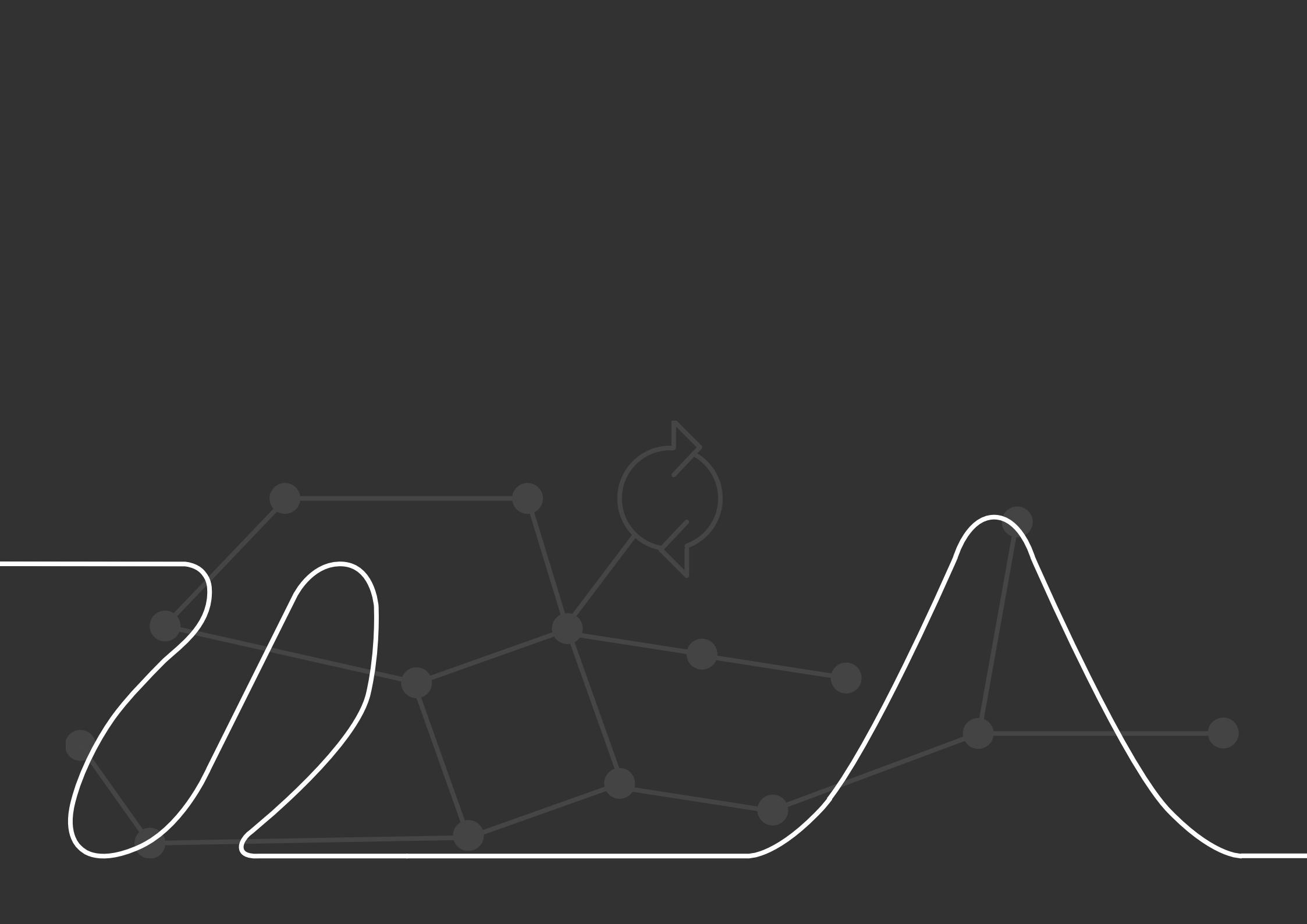
Discussion concerning ethics with the Otago Polytechnic School of Design Ethics Chair lead to the conclusion that a formal ethical approach was not required due to several conditions: 1) the work formed part of an extended internship where the work was under the guidance/direction of a senior staff member of Silver Fern Farms, 2) the vast majority of the data was from secondary sources that were willingly supplied by Silver Fern Farms and the Food Design Institute, and 3) ethnographic observations were of processes rather than individual's behaviour. A non-disclosure agreement was signed with the meat industry partner to ensure the confidentiality of any sensitive information. The publication of this report was accepted upon negotiation with the organisations involved.

### 1.4 Report Structure

Each chapter discusses a meta concept of innovation and is divided into the following broad sections and formatting:

- Innovation contexts – Discussion of innovation theories and concepts
- *Insights – Descriptive insights linking the theory to the red meat industry and Otago Polytechnic*
- *Opportunities – 'How might we?' statements as opportunities for innovation, value creation, and collaboration.*

The report starts off with a chapter introducing the world of FMCG and the red meat industry, including current and emerging challenges. The next chapter (2) describes what innovation is and establishes the two frameworks of innovation processes. Chapters 3, 4, 5, and 6 go into depth about the different phases of the innovation process. Chapter 7 describes how innovation systems affect innovation processes. The final chapter (8) summarises the findings and opportunities discovered in this report.



# 02

## STUDY CONTEXT

This chapter briefly introduces FMCG, the contextual background of the red meat industry within New Zealand, and the challenges and opportunities the industry faces. The chapter finishes with a summary outlining the drivers pressuring the red meat industry to innovate.

## 2.1 Fast-Moving Consumer Goods

FMCG, also referred to as consumer-packaged goods (CPG), are products that generally have a high inventory turnover that is sold quickly at relatively low costs (Brierley, 2002). In addition to being sold in high volume at low costs, FMCG also involves low engagement, a high frequency of purchases, short shelf life, and rapid consumption. Supermarkets, warehouses, and convenience stores are retailers that stock up on FMCG. Modern supermarkets capture a significant portion of consumer FMCG spending, two-thirds of which are categorised as food (Coriolis Research, 2001).

Innovation within FMCG is now seen as a hygiene factor, a necessity for businesses to survive in a highly dynamic and competitive environment where innovation metrics are strongly interrelated to a company's growth and performance (Singh & Vidhya, 2011). Although businesses within the red meat industry have now been growing and economically performing well as a whole, in contrast to historical average or poor financial returns, they are currently facing new and emerging challenges requiring the analysis of their innovation processes and systems.

## 2.2 Red Meat Industry

New Zealand's red meat industry is comprised of the production of the meat of sheep, beef, venison and other co-products, including further processing and exports (Beef + Lamb New Zealand & Meat Industry Association, 2020). This industry accounts for a large portion of the nation's economy, including social contributions (see Figure 6) (Beef + Lamb New Zealand & Meat Industry Association, 2020).

According to Stafford (2017), 95% of sheep meat, 90% of wool production, and 80% of beef and veal are exported, the rest is consumed domestically. The industry faces many challenges, including the COVID-19 situation, the environmental concerns of current production methods, new and emerging consumer trends, and the introduction to alternative proteins. Making Meat Better (n.d.) is a website outlining the current state of the red meat industry, addressing areas of animal welfare, individual diets and health, the environmental situation, and broader communities for consumers.



Figure 6 – Economic and social contributions from New Zealand's red meat industry.  
(Adapted from Beef + Lamb New Zealand & Meat Industry Association, 2020)

## 2.3 Coronavirus Disease 2019

The coronavirus disease 2019 (COVID-19) pandemic is currently afflicting the world, resulting in countries entering lockdown to control the spread of the disease. New Zealand businesses experienced disruptions in the global trade and supply chain that then flowed into the domestic economy; however, global trades were encouraged to continue the flow unimpeded, ensuring the availability of essential goods and medical supplies (New Zealand Ministry of Foreign Affairs, n.d.). In addition, the government implemented a spending program to reduce the lockdown's adverse economic effects, targeted at supporting businesses and employees whose jobs were at risk or lost (Baker et al., 2020). New Zealand is now in a post-elimination phase due to early and effective lockdown implementation and an empathetic collective leadership approach. However, this phase still does house its own uncertainties (Baker et al., 2020).

The meat industry in New Zealand was considered an essential industry with the ability to continue processing operations, albeit with new safety and protection protocols (Meat Industry Association, 2020). The Red Meat Report (Beef + Lamb New Zealand & Meat Industry Association, 2021) found that after the initial impact of the lockdown on trade, the meat industry was able to divert exports to other markets. Though trade was affected, the industry reported a 7% increase in export value compared to the previous year. This resulted from the red meat sector's diverse market portfolio, strong market relations, and ability to pivot. The report also mentions that farmers, on the other end of the supply chain, successfully adapted their farming systems, managing the range of climatic and process restrictions despite the challenges of COVID-19.

In addition to the impact on the primary industries and the domestic economy, consumer behaviour has changed in response to the lockdown and risk mitigation measures; however, it is uncertain at present if the changes are permanent or temporary (Mehta et al., 2020). Quelch and Jocz (2009) have identified patterns in the changes in consumer behaviour in response to recessions, as shown in Figure 7.

## 2.4 Environmental Impact

<b>Consumer Segments</b>	<b>Low Risk of Sales</b>	<b>Med-Low Risk of Sales</b>	<b>Med-High Risk of Sales</b>	<b>High Risk of Sales</b>	
	<b>Downturn</b>	<b>Downturn</b>	<b>Downturn</b>	<b>Downturn</b>	
Slam on the Breaks	<i>Seeks lower cost products and brand substitutes</i>	<i>Reduces or eliminates treats and seeks lower cost substitutes</i>	<i>Puts off all durable purchases</i>	<i>Eliminates purchases in this category</i>	<b>High Reaction Levels</b>
Pained but Patient	<i>Seeks out favourite brands at lower prices</i>	<i>Cuts back somewhat on frequency and quality</i>	<i>Delays major purchase (repair rather than replace)</i>	<i>Deeply curtails expendables</i>	<b>Med-High Reaction Levels</b>
Comfortably Well Off	<i>Continues to buy favourite brands at pre-recession levels</i>	<i>Is more selective in purchasing luxuries</i>	<i>Seeks better quality for the price (negotiates)</i>	<i>Rarely regards any purchase as unjustifiable but may reduce the large consumption</i>	<b>Med-Low Reaction Levels</b>
Live for Today	<i>Continues to buy favourite brands at pre-recession levels</i>	<i>Continues to buy favorite brands at pre-recession levels</i>	<i>May buy if there is a great deal, otherwise may postpone</i>	<i>Is reluctant to regard any customary purchase as unjustifiable</i>	<b>Low Reaction Levels</b>

Figure 7 – Consumer segment's changing behaviour during a crisis and recession; green stable, black mixed, red declining. (Adapted from Quelch & Jocz, 2009)

The agriculture sector, primarily the dairy, lamb, and beef industries, is responsible for almost half of the total carbon emissions in New Zealand (Ministry for the Environment, 2020). Blackman (2019) stated that although New Zealand has made international commitments along with the existing mitigation efforts, the response in practice has been insufficient. To combat this, the Climate Change Response (Zero-Carbon) Amendment Bill 2019 was introduced, acknowledging the insufficient action up to that point.

This bill outlines emission reduction targets, including a five-year budget and an independent Climate Change Commission to advise on climate change policies (Meat Industry Association, 2020). In addition to this, the government suggests that consumers can limit their emissions by taking the following actions: reducing their meat and dairy intake, buying local and sustainable food products, purchasing more environmentally friendly food options, growing their own vegetables and fruits, preventing food waste, and limiting the use of packaging (Ministry of Health, 2019).

The Meat Industry Association's (2020) report released a statement that they were disappointed with the targets outlined in the Zero Carbon Bill. They are concerned with the government not considering the long-term consequences of the other implemented actions of the bill on the economy and social aspects. The Meat Industry Association (2020) has commissioned AgResearch to update the life cycle assessment of the red meat farm-to-fork system to more thoroughly understand its environmental impact, enabling the accountability of farmers and lending credibility to the proposed environmental impacts.

Regenerative agriculture is a concept of high interest both in New Zealand and globally (Beef + Lamb New Zealand, 2020). Beef + Lamb New Zealand (2020) has taken the opportunity to research regenerative agriculture from the perspectives of consumers, markets, retailers, food service businesses, the government, and experts. However, this investigation was done prior to the adoption of any regenerative agriculture to ensure that there were benefits to the industry's sustainability work, ultimately creating more value for New Zealand, consumers, and the industry. In addition to the meat industry, the Ministry for Primary Industries (n.d.) has called for research proposals around regenerative agriculture funded through the Sustainable Food and Fibre Futures co-investment fund. More on regenerative agriculture is explored in Section 4.6.1.

## 2.5 Consumer Trends

Consumer trends are becoming increasingly critical in new FMCG as innovation processes become more user-centric (Singh & Vidhya, 2011). Understanding consumer trends allows innovating businesses to predict the current and emerging needs of users, including the introduction and implementation of new technologies and new competing business offers. CBInsights (2020) released a report on FMCG trends exploring the necessary (high adoption and market strength), transitory (high adoption, low market strength), threatening (early adoption, high market strength), and experimental (low adoption and market strength) FMCG trends. Figure 8 shows the trends in relation to the adoption-market strength matrix. The trends of interest related to the red meat industry are targeted shopper marketing, dairy alternatives, plant-based meats, rapid product innovation, gut microbiome health, products-as-a-service, AI-based food traceability, dehydrated products, and lab-grown meat. A Beef + Lamb New Zealand (2019) report also outlined several emerging trends related to the red meat industry: alternative health models and the explosion of health data, AI and machine learning in business-consumer relations, the revaluation of modernity and interest in traditional practices, and interest in alternative proteins.

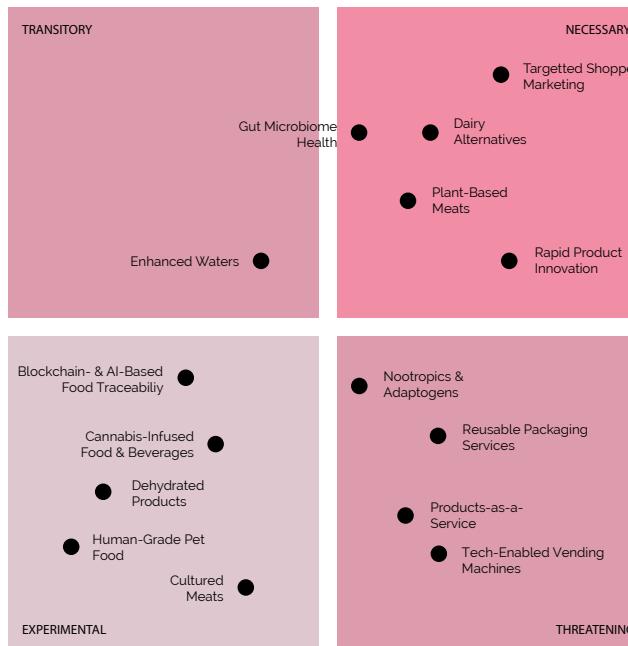


Figure 8 – FMCG trends to watch in 2020. (Adapted from CBInsights, 2020)

### 2.5.1 Alternative Proteins

The previous section stated the increasing interest in alternative proteins in consumers. The Hungry for Plant-Based report (Food Frontier & Life Health Foods, 2019) found that over 1.5 million New Zealanders are eating less meat overall and that six in ten people are interested in trying plant-based meat alternatives. The primary reason stated by consumers is better physical well-being with the environment, animal welfare, cost, and the increasing variety of plant-based options being additional factors of consideration. This is consistent with the suggestions made by the Ministry of Health (2019) report for consumers to reduce their meat and dairy intake for both environmental and health reasons, in addition to other suggestions.

Beef + Lamb New Zealand (2018b) has defined alternative proteins as 'plant-based protein, cultured meats, and edible insects providing a substantial amount of protein but that require fewer natural resources to produce than the most common protein sources, meat and fish. These are composed of different sequences of amino acids than conventional meat.' They acknowledge the potentially disruptive impact that alternative proteins may have on the meat industry informed by the emerging consumer trends stated previously. Figure 9 provides examples of businesses operating in this industry, including product properties and opinions.

<b>Brand/Company</b>	<b>Beyond Burger</b>	<b>Impossible Burger</b>	<b>Memphis Meat</b>	<b>Insect Flour</b>	<b>New Wave (Seafood)</b>
<b>Product Type</b>	Plant-Based Burger (competes with beef burger)	Plant-Based Burger (competes with beef burger)	Exploring range of meat. initial focus chicken	Ingredient to be added to other foods (bars, cakes, medical nutrition)	Shrimp alternative
<b>Technology</b>	Mixing known plant based ingredients together to create a beef patty form	Extracting the protein molecules from plants and building a product from the protein molecules up	Cellular based	Raising, roasting and grinding from insects such as crickets	Extracting the protein molecules from plants and building a product from the protein molecules up
<b>Nutritional Profile</b>	(4-oz. patty) Calories: 290 total fat, 22g saturated fat, 0mg cholesterol, 450g sodium, 20g protein, 25% iron daily value	(3-oz patty) Calories 220, 13g total fat, 11g saturated fat, 0mg cholesterol, 270g sodium, 21g protein, 10% iron daily value	Proposed to be as per its traditional raised equivalent	Superior protein source	Proposed to be as per its traditionally raised equivalent
<b>Expert Opinion about Nutrition</b>	Good source of protein although not a direct substitute.	Not as good as the real thing due to processing	Not as good as real thing due to processing	Good source of protein to add to mix	n/a
<b>Claimed Benefits</b>	Climate, animal welfare, general health	Climate	Climate, animal welfare	Climate, health	Climate, animal welfare, health
<b>Price</b>	\$5.99 2 x 4-oz patty	Premium circa \$4 (above regular burger price)	Not commercially available. Having significantly reduced cost of production at proof of concept stage.	\$12.38 (premium at 25-30% more than other organic powders)	Planned to be premium although not as highly priced as wild caught shrimp

Figure 9 – Alternative protein businesses and their product information. (Adapted from Beef + Lamb New Zealand, 2018b)

## 2.6 The Need to Innovate

The alternative proteins sector is currently more consistent with both the consumer and industry trends while also addressing the environmental concerns compared to the efforts within the red meat industry. These forces and desires of the marketplace discussed in the previous sections are driving the need for more effective and rapid innovations (see Figure 10). Achieving this will require a nuanced and whole systems understanding of innovation processes and systems.

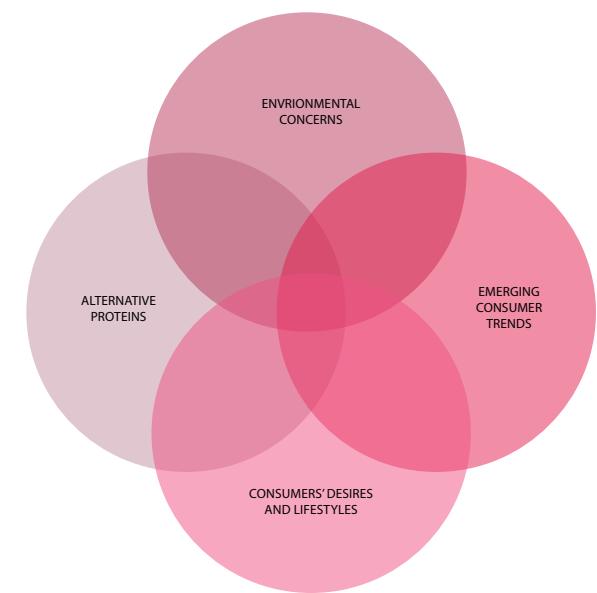


Figure 10 – Challenges driving the need for innovation within the red meat industry.



# 03

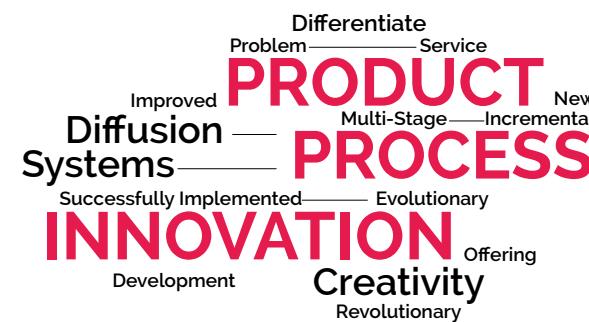
## INNOVATION

Innovation is increasingly becoming a more important concept within business organisations, governmental bodies, and academia as marketplaces become more dynamic (Gürdür & Törngren, 2018; Ketonen-Oksi & Valkokari, 2019; Singh & Vidhya, 2011; Smorodinskaya et al., 2017). The need to innovate is a response to the changes in consumers' desires and lifestyles and the discovery of new opportunities in technology. The importance of innovation now goes beyond satisfying the desires of the shareholders and end users; academia, government, businesses, and society at large are now acknowledging their impact on socio-ecological systems. This chapter identifies the common themes used in the different definitions of innovation. The next section describes the innovation process and introduces two different frameworks used for the process.

### 3.1 What is Innovation?

The definition of innovation is not universal due to the concept's use in a variety of research disciplines and their associated dominant paradigms (Baregheh et al., 2009). Baregheh et al. (2009) has found that there are overlapping terms and themes in the definitions of innovation. However, the lack of a clear and shared definition causes practitioners and researchers to limit their understanding of the complex concept. Keeley et al. (2013) went beyond this and commented that the overuse and misuse of 'innovation' have caused it to lose meaning and value.

Following their analysis of multiple definitions of innovation, Baregheh et al. (2009) arrived at the following definition of innovation: 'the multi-stage process whereby organisations transform ideas into new/improved products, services, or processes in order to advance, compete, and differentiate themselves successfully in their marketplace.' Meanwhile, Keeley et al. (2013) has developed their own practitioners' definition of innovation as 'the creation of a viable new offering. Innovating requires identifying the problems that matter and moving through them systematically to deliver elegant solutions.' Another definition of innovation can be derived from the post-disciplinary field of design (Büscher & Cruickshank, 2009). IDEO is a design and consulting firm that has adopted a creative, human-centred, and design-thinking approach to creating innovation. They have defined the concept as '... the ability to generate and execute new ideas—incremental, evolutionary, or revolutionary—and it starts with creativity' (IDEO, n.d.). Innovation systems is a concept that is also discussed within innovation literature. Edquist (2006) investigated this topic and has defined innovation as 'the determinants of innovation processes - all important economic, social, political, organisational, institutional, and other factors that influence the development, diffusion, and use.' The innovation process is described as having two phases: the fuzzy front-end and development phases (Cooper, 2017; Koen et al., 2001). Figure 11 combines all the definitions of innovation into a word cloud, identifying common words and themes.



*Figure 11 – Innovation definitions word cloud*

The previous definitions were developed with a deep and practical understanding of innovation. However, businesses in New Zealand generally have ascribed innovation with a different meaning. Pells and Howard (2019) found that businesses associated innovation with adopting and adapting other's innovations, continuous improvement, the development of new products and operational processes, meeting customers, technology and making life easier. Some businesses do not view innovation as a necessity to their business. These findings suggest that these businesses have a limited understanding of the concepts and theories of innovation.

### 3.1.1 Radical and Incremental Innovation

Most innovations are minor, incremental improvements on existing business models, products, and services, while some innovations are considered radical breakthroughs that create new product categories and disrupt the market (Baregheh et al., 2009; Hopp et al., 2018; Norman & Verganti, 2014). Incremental innovation is the continuous process of improving a product, service, or business model, enhancing the performance and desirability whilst lowering its cost (Baregheh et al., 2009; Hopp et al., 2018; Norman & Verganti, 2014). Hopp et al. (2018) found that these improvements usually require no change in organisational or user behaviours. On the other hand, radical innovation can introduce new industries or previously unimagined products and services via a transformative business model where the creation of new knowledge and technology enables the discovery and implementation of these radical ideas (Baregheh et al., 2009; Hopp et al., 2018; Norman & Verganti, 2014). Hopp et al. (2018) stated that the shift in organisational structures and business models transforms how it engages with the marketplace. They suggested that incremental and radical innovation efforts within businesses are part of their competitive strategy; short-term gains result from incremental innovation, and long-term gains result from radical innovation.

### 3.1.2 Components of Innovation

Analysing the definitions above led to four common themes considered essential to understanding innovation processes and systems. The four components the will be discussed are reframed into the following (see Figure 12):

- Discover (Chapter 4)– The first phase of the innovation process used to identify opportunities and generate ideas.
- Develop (Chapter 5)– The second phase of the innovation process where the innovations and their production systems are designed and tested.
- Deliver (Chapter 6) – The diffusion of the resulting innovation to users and society and its market impact.
- Systems of Innovation (Chapter 7) – Associated actors and their relationship to the entity pursuing innovation.

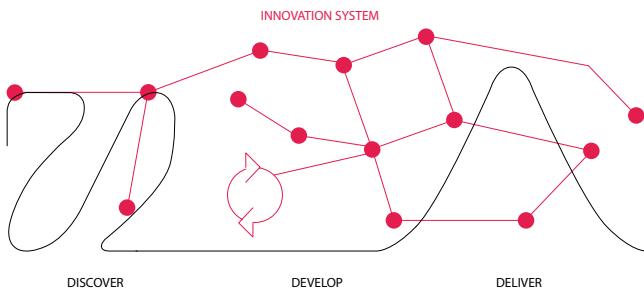


Figure 12 – The four components of innovation and their relationship.

These innovation components house other concepts of innovation and value creation to assist in further analysis of the meat industry, meaning that they are used to frame the insights and opportunities gained during this research. As such, the results (insights) and opportunity statements (conclusions and recommendations) are discussed throughout each of the chapters that follow. The next sections introduce what the innovation process is and two frameworks that are used during that process.

### 3.2 Innovation Process

The life cycle of innovations is shortening as new technologies are introduced, creating a fast-changing competitive environment (Herstatt & Verworn, 2004). In response to this, businesses require effective and efficient innovation processes to implement innovations successfully. There are three phases to the innovation processes (see Figure 13): the discovery phase, the development phase (Cooper, 2017; Koen et al., 2001), and the delivery phase (Baregheh et al., 2009). There are several complementary and contrasting frameworks that overlay on the innovation process model, all with their own distinctive approaches, philosophies, strengths, and limitations. These frameworks are stage-gate and design thinking.

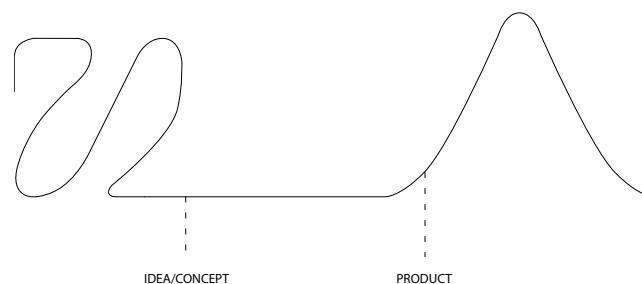


Figure 13 – The innovation process. (Inspired by Newman, 2010 and Rogers, 2003)

### 3.3 Stage-Gate

Cooper (1988) introduced the stage-gate as a conceptual and operational map for new product development. Stage-gate originated from Cooper when he investigated how successful firms operated to generate innovative products. He found that these firms used highly managed and structured waterfall processes with meetings between each stage, leading him to create the stage-gate model. See Figure 14, where stage-gate fits into the innovation process model.

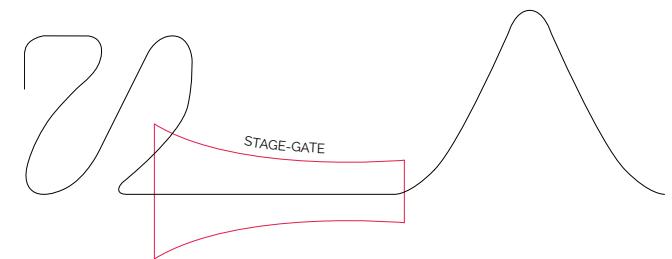


Figure 14 – Stage-gate model in relation to the innovation process.



### 3.3.1 Traditional Stage-Gate Model

Cooper's (2017) stage-gate model divides the new product development project into distinct stages of certain activities that are separated by gates that assess the performance (see Figure 15). The stages are not organisational or disciplinary-oriented; instead, the stages are determined by what activities are appropriate for achieving the desired outcome. Each stage is designed to collect and validate specific information, where it is then presented to the gates as deliverables. The gates are typically a committee of managers that review and access the deliverables, deciding whether to approve, kill, hold, or recycle the project. Gate criteria are a tool for which the gatekeepers judge the deliverables. A list of 'must meet' checkpoints or knockout questions is designed to eliminate unfit projects. Projects considered not in alignment with an organisation's strategy or values, those that are of too high risk, or those that require too many resources are examples of unfit projects.

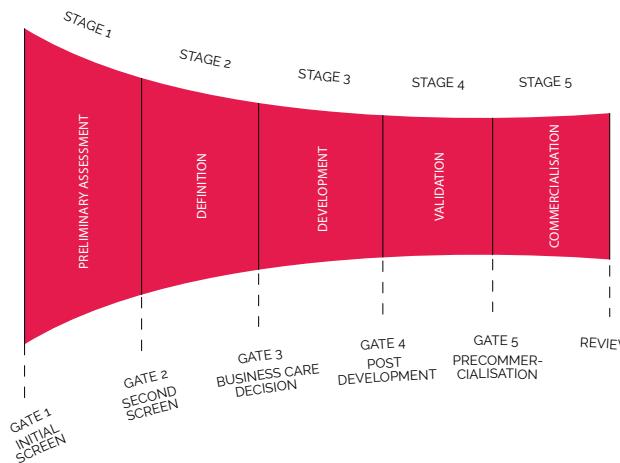


Figure 15 – The stage-gate model. (Adapted from Cooper, 1988)

There are several limitations to this traditional stage-gate model. The highly structured initial phases of stage-gate keep the discovery phase short, limiting their exploration and ideation potential and thus resulting in incremental innovations (see Section 3.1 for more on incremental innovation) (Jetter & Albar, 2016; Narayanan & O'Connor, 2015). Grönlund et al. (2010) found this model to be too time-consuming, too bureaucratic, and to have a lack of focus. Becker (2006) included that the model is also overly linear, too rigid, and not adaptive; it is excessively financially focused, a one-size-fits-all model, and includes work that is not value-adding. Becker also suggested that the failure of outcomes using this model may actually be the result of the poor implementation of stage-gate rather than a flaw in the model itself.

Cooper (2017) has introduced new stage-gate model variations in light of new information on how businesses are performing, including addressing some of the limitations of the traditional model. The new models were influenced by the open innovation concept (Grönlund et al., 2010) and agile approaches (Cooper, 2014, 2017; Cooper & Sommer, 2016) to create an effective and efficient new product development model. The traditional stage-gate model generally creates incremental innovations that maintain their marketplace effects (Jetter & Albar, 2016), targeting the late majority or laggard market users whose desires are well defined with no technological risks (Cooper, 2014).

### 3.3.2 Modern Variants of Stage-Gate

The traditional stage-gate model revolves around a closed system model or closed innovation model where all inputs originate from within the firm (Cooper, 2017). Businesses now acknowledge that not all good ideas come from within the firm. An open innovation system involving inputs from both internal and external sources can maximise returns from new product development (Grönlund et al., 2010). Cooper's (2017) open innovation stage-gate model introduces new activities to encourage firms to engage with customers, start-ups, and small companies more often, including employee idea capturing that empowers employees with a sense of ownership (see Figure 16). New inputs from other businesses and employees with newly introduced tools provide more operations within the discovery phase of the innovation process whilst still maintaining a manageable organisation.

Cooper (2014) investigated a new approach to stage-gate, incorporating the triple-A (adaptive, agile, accelerated) system (see Figure 16). An adaptive and flexible approach opposes standard operating procedures, incorporating iterative development and early customer engagement despite a vague product definition; agile approaches are where deliverables are created in a short time frame with little bureaucracy and busy activities; and accelerated approaches are where activities and phases overlap, creating a lean and agile system (Cooper & Sommer, 2016).



Figure 16 – The three stage-gate models and their relationship.

### Insight 1

[SECTION AND FIGURE REDACTED  
DUE TO THE COMMERCIAL NATURE OF  
THE INFORMATION CONTAINED WITHIN IT]

Figure 17 – Silver Fern Farms' stage-gate model. [Retained caption for readers to follow]

The following section describes an alternative framework to the innovation process, design thinking, where the principles are in direct contrast with stage-gate.

## 3.4 Design Thinking

Design thinking is an effective and creative solution-based approach to solving problems and creating innovations (IDEO U, n.d.; Interaction Design Foundation, n.d.-c; Luchs, 2015). See Figure 18 for where design thinking fits into the innovation process. It is a process that can be used for new product development as well as solving complex problems to create value for society (Brown & Katz, 2019). The desires and needs of the early adopter group are generally fuzzy and undefined through traditional discovery activities of the stage-gate model (Cooper, 2017; Luchs, 2015; MacCormack et al., 2012). Businesses can utilise a design thinking framework, by contrast, to help gain insights into users, as they will then have a toolkit that develops deep empathy with users (Brown & Katz, 2019).

Brown and Katz (2019) discuss that the introduction of design thinking was to communicate the processes and mindsets of designers to non-designers. The designers' process involves matching people's needs with what is technologically feasible through a viable business model, creating value for users. Businesses adopting a design thinking approach to innovation opens up their toolkit throughout the new product development phases, thus creating more innovative solutions and products that result in differentiation and a competitive advantage. Some of the world's largest businesses, such as Google, Apple, and Airbnb, have adopted design thinking as part of their innovation operations and strategies (Design Foundation, n.d.); it is also becoming part of many government operations (including New Zealand's) and is taught as part of college curriculum (Brown & Katz, 2019).

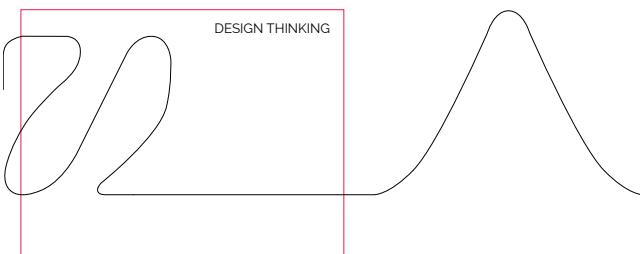


Figure 18 – Design thinking in relation to the innovation process.

### 3.4.1 The Design Thinking Framework

There are several varieties of design thinking depicted by different firms, but all emphasise the human components to problem-solving (IDEO U, n.d.; Interaction Design Foundation, n.d.-c). The process of design thinking (see Figure 19) is the following: *empathise*, to understand and gain insights into the users whilst challenging biases and assumptions; *define*, to clarify problems or unsatisfied desires of users as problem statements, opportunity statements, or personas to maintain project focus; *ideate*, the creative process of 'outside-the-box' idea generation through a series of divergent and convergent thinking; *prototype*, to experiment and produce low-cost and scaled-down prototypes as a way to validate concepts; and *test*, to rigorously assess and critique prototypes (d.school, n.d.; Interaction Design Foundation, n.d.-c). It is important to note that design thinking is not a waterfall process and is entirely nonlinear; that is, insights gained during one phase may inform and encourage further investigation of others.

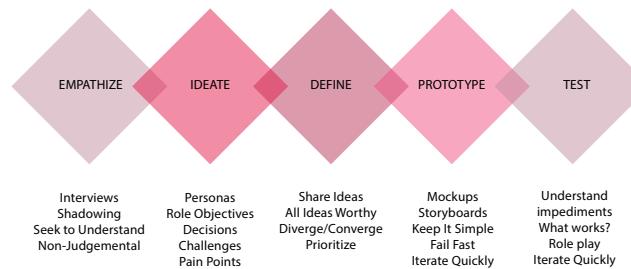


Figure 19 – Design thinking process. (Adapted from Interaction Design Foundation, n.d.-c)

Another way to contextualise design thinking is that each phase has a set of tools used when appropriate during the discovery and development phase of the innovation process. Design Kit (n.d.), hosted by IDEO, released a set of open-source methods and tools used throughout the design thinking process to assist designers in creative problem-solving. Additionally, design thinking can also be considered a set of principles that underpin the framework and tools (see Section 1.2.1).

Although design thinking can create more radical and revolutionary innovation offerings relative to the stage-gate model, true radical innovations are often driven by technological advancements without any formal design research of the users' needs (Norman & Verganti, 2014).

## Insight 2

The Bachelor of Culinary Arts (BCA) programme taught by the Food Design Institute at Otago Polytechnic has adopted design thinking as a framework and a toolkit for students to use throughout their projects (Otago Polytechnic, n.d.). Cheffing, entrepreneurship, innovation, businesses, management, product design, experience design, systems design, journalism, and photography are just some areas students may investigate due to the exploratory and self-driven nature of the BCA programme (Otago Polytechnic, n.d.).

The Food Product Design paper during the second year of the programme introduces students to the world of FMCG (Mitchell & Woodhouse, 2018). In this course, students first require a deep understanding of and empathy towards their assigned persona group. A contextualised investigation into the persona's values, lifestyles, problems, and desires is required to empathise. This sense of empathy, as well as knowledge of current and emergent consumer trends and market exploration enables students to ideate informed product attributes. Design thinking provides the tools for empathy, ideation, and product testing and development necessary for completing the project. Throughout this process, the lecturers mentor students, acting as sources of industry and consumer knowledge and as a validator of business aspects and products.

The project is structured similar to the Design Council's (2015) double diamond design model, where divergent thinking during exploration is followed by convergent thinking of filtering solutions (see Figure 20). The series of divergent thinking followed by convergent thinking is an effective model used in design thinking (Dam & Siang, 2020a). The project emphasises the consideration and development of a business model and brand concerning the product their assigned persona. The project ends with a presentation to a panel of industry experts. The programme is adaptable and allows students to continue to pursue product design and development further if they wish. The discovery and early developmental phases of the innovation process is where the course primarily operates with outputs of concepts and prototypes and ends at the transition between the discovery and development phases of the innovation process.

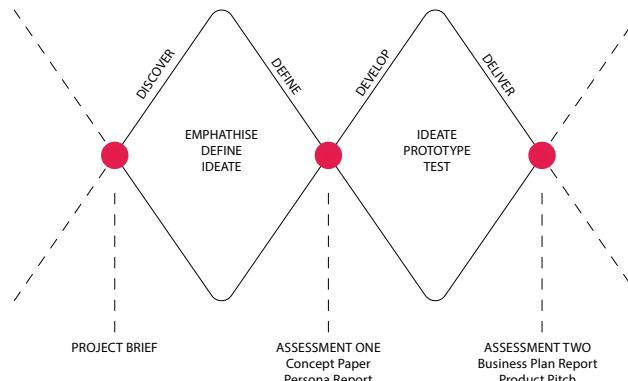


Figure 20 – Food Product Design project process. (Adapted from Design Council, 2015)



## 3.5 The Hybridisation of Design Thinking and Stage-Gate

Design thinking and stage-gate models have often been thought of as unrelated new product development processes. However, in practicality, there is an opportunity to utilise both models to maximise the productivity of the new product development process, as shown in Figure 21, where design thinking and stage-gate are focused on different phases of the innovation process. Design thinking provides the principles and a host of effective tools during the discovery phase to identify opportunities and generate desired ideas. There is an additional benefit where design thinking is taught as part of some tertiary educational curricula (Cooper, 2014). Graduates, therefore, have knowledge and experience in the actual use of this framework and tools for businesses. In contrast, stage-gate concerns the development phase, where the structure and means to transition that idea into development and implementation once users' needs have been clarified (Cooper, 2017; Luchs, 2015).

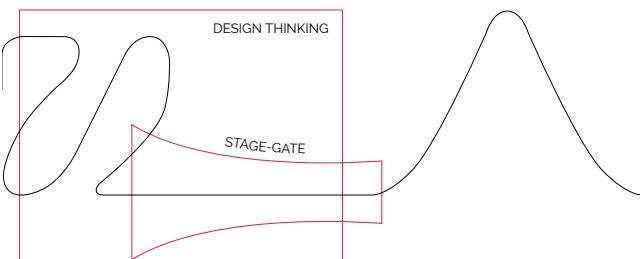


Figure 21 – Relationship between stage-gate, design thinking, and the innovation process.

### Insight 3

*There are two collaborative projects Silver Fern Farms and the Food Design Institute have engaged in together: third-year students' Major Project and second-year students' Food Product Design project. These projects have taken different approaches, which was the result of different briefs and where the activities occurred within the innovation process.*

#### **Major Project Collaborative Model (Pull-Model)**

*Silver Fern Farms discovered an opportunity within the meat snacking market. They reached out to the Food Design Institute to pursue this project as a collaborative project. The project brief outlined the required deliverables and documentation, product attributes, and other areas of consideration. This provided students with the freedom to explore whichever design framework they saw fit.*

*A third-year BCA student, during his final self-directed project, accepted the opportunity to undertake the project. The student used a human-centred design model. Figure 22 outlines the student's process in relation to Silver Fern Farms' current new product development phase. The project operated under a helix model where the self-directed nature of the project led to several meeting points with their supervisors and Silver Fern Farms. The student designed high-value prototypes not seen in the current market resulting from a complex synthesis of design thinking insights and activities. Although the this project operated within the desktop phase of stage-gate, the student was unimpeded in discovering and ideating other potential products, though they were still grounded around the brief. However, it was inevitable that the first project that Otago Polytechnic and Silver Fern Farms operated collaboratively would have some bugs.*

*Some of the limitations came from the development of the design brief. This is evident in the causal reasoning or goal-oriented brief, where the emphasis is on the research and design of a meat snack with specific properties. The actual value of design thinking lies in a more liberal brief. Students can explore throughout the discovery phase with the resources they have at the starting line rather than solely focusing on the end goal. This less formalised approach typically generates more radical ideas (Jetter & Albar, 2016). It is important to note that this project was based on a pull-model where Silver Fern Farms discovered an opportunity rather than it being an opportunity found by the student.*

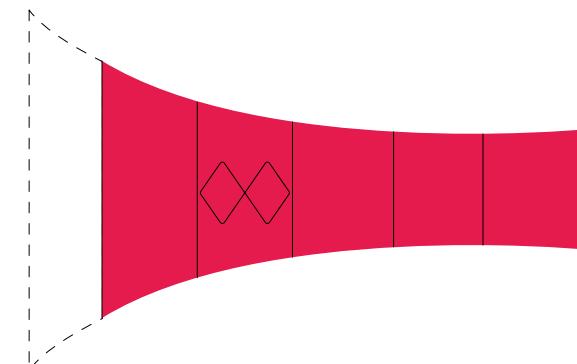


Figure 22 – Major Project process model in relation to Silver Fern Farms' stage-gate model.

### Food Product Design Collaborative Model (Push-Model)

Silver Fern Farms was associated with another project that contrasts with the previous project. The Food Product Design course was part of a collaboration with Silver Fern Farms and Leaft Foods. One of the outputs of the brief was to design two food products: one where the main ingredient is meat and the other with alternative proteins. In this project, Silver Fern Farms' role was fundamentally different to the previous project, as they were ultimately observers and experts within their field rather than a client. This led to students' ability to explore the discovery phase more liberally and to express their creativity (see Figure 23), resulting in a more radical but grounded product.

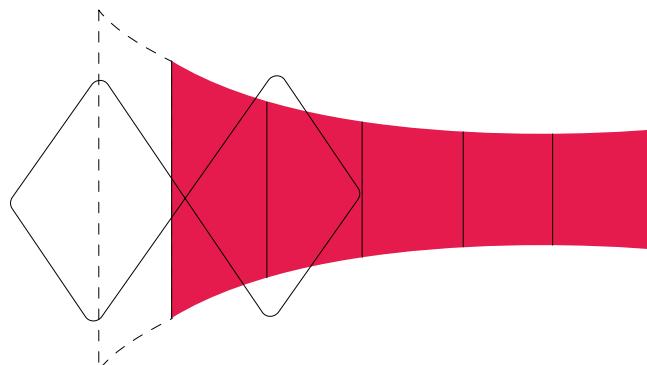


Figure 23 – Food Product Design project process model in relation to Silver Fern Farms' stage-gate model.

The Food Product Design course served different needs for the students than the meat snack project. Figure 24 describes the benefits and drawbacks of each model. The collaboration and co-creation of the brief is an essential process in designing a project that creates value to the client and shared value with the educational institute and the students participating in them.

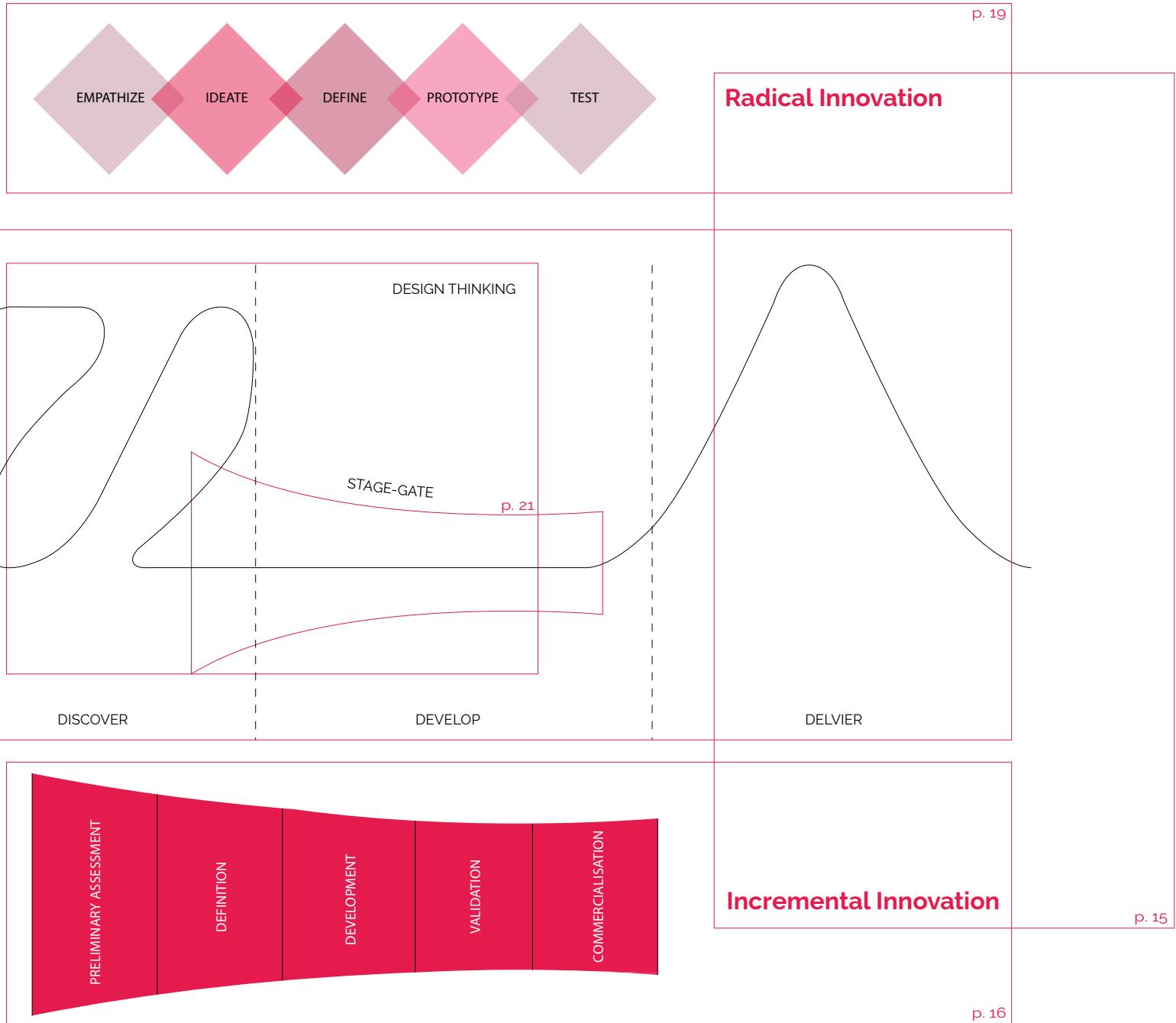
Collaborative Project	Major Project	Food Product Design
Purpose	The research and deliver a prototype and report based on brief designed by Silver Fern Farms	To conceptualise, design and prototype a FMCG given an assigned persona group
Project Model Type	Pull-model	Push-model
Value Creation for Students	Experience gained through working with the industry	Feedback from industry experts
Value Creation for Silver Fern Farms	A report used to inform the feasibility paper during the desktop stage of stage-gate	A presentation of the product prototype and how it satisfies the assigned personas' problem in their lifestyle
Limitations	Does not properly utilise the value of design thinking	The boundaries created due to the education curriculum, although there is an opportunity to continue the project.

The next few chapters describe the discovery, development, and delivery phases of innovation more in-depth. This includes how design thinking and stage-gate (and the organisations that use each framework) are used concerning other innovation concepts.

Figure 24 – Value created and limitations of the different projects.

**How might Silver Fern Farms and Otago Polytechnic better create a project brief for themselves and students to maximise the shared value co-created for all stakeholders?**

### 3.6 Chapter Summary



Concept	Description or Definition	Insight	Opportunity
Radical and Incremental Innovation (p. 15)	Radical innovation refers to the breakthrough and transformative products, services, and business models. Incremental innovation refers to improvements on the current business offerings.		
Four Components of Innovation (p. 16)	Discover, develop, and deliver are components related to the innovation process, the final one being systems of innovation.	An understanding of these components leads to a whole systems understanding of innovations.	
Stage-Gate (p. 16)	A five-staged and gated model for the development of innovations starting from an idea. Although the traditional model is product-focused and linear, agile and open models are now being implemented. Improved productivity, reduced logical and operating costs, secured supply, and improved quality and profitability.	Silver Fern Farms primarily uses a variation of the agile and open models of stage-gate, including more activity in the discovery space. This primarily creates incremental innovation.	
Design Thinking (p. 19)	A five-phase framework to solving problems and creating innovations. It is a human-centred, creative, iterative, and nonlinear approach.	The Food Design Institute primarily uses this model, or abstracts its tools, throughout projects. Activities typically focus on the discovery and early development (conceptual and prototyping) phases. This has the potential to create radical innovations.	<p><b>How might Silver Fern Farms and Otago Polytechnic better create a project brief for themselves and students to maximise the shared value co-created for all stakeholders?</b></p>
Hybridisation of Stage-Gate and Design Thinking (p. 21)	Utilising the most effective parts of stage-gate and design thinking will maximise the potential outcomes of innovation, with design thinking at the front-end and stage-gate on the back-end.	The collaborative project between Silver Fern Farms and the Food Design Institute resulted in value creation for all stakeholders. The push-model project resulted in insights of higher value due to the front-end application of design thinking.	



# 04

## DISCOVER

The discovery phase is the first phase of the innovation process. It is a phase the focuses on researching the current situation, identifying opportunities (Cooper, 2017; Koen et al., 2001), and understanding users (IDEO U, n.d.; Interaction Design Foundation, n.d.-c). This chapter first introduces the discovery phase as the fuzzy front-end of innovation and discusses why this phase is difficult to navigate. The next few sections detail the concepts and principles around value creation and opportunities discovered in its investigation. The chapter finishes off by describing the different ways users are framed.

## 4.1 The Fuzzy Front-End of Innovation

The fuzzy front-end of innovation is a model used to describe the earlier phase of the new product development process where businesses are discovering opportunities with no current development goal (Cooper, 2017; Koen et al., 2001). The model is illustrated as messy and fuzzy in the front end, whereas the tail end is linear and straightforward, as depicted in Newman's (2010) design squiggle (see Figure 25). Activities occurring in the fuzzy front-end of innovation are critical in determining the success factors and properties of the innovation (Calabretta & Gemser, 2015; Cooper, 2017; J. Kim & Wilemon, 2002). Although managers increasingly recognise the importance of this phase (Calabretta & Gemser, 2015), the term 'fuzzy' could imply that this portion of the innovation process is unknowable and uncontrollable, which may result in the attitude that this part of the process has factors that can never be managed. Thus, Koen et al. (2001) have proposed 'front-end of innovation' as an alternative term. Conceptualising why the model is fuzzy and why it may be interpreted in this way is essential to truly understanding the early phase of innovation processes (Jetter & Albar, 2016).

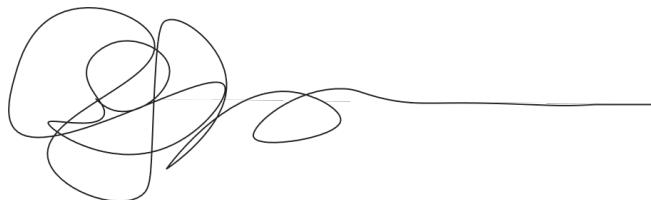


Figure 25 – Fuzzy front-end of innovation model. (Adapted from Newman, 2010)

### 4.1.1 The Fuzziness Property

The fuzzy front-end of innovation is a challenging phase that hosts a set of challenges for managers and decision-makers due to the information available. The lack of current and emerging information on technologies, markets, user trends, and competition projects are the environmental factors that cause uncertainty (Calabretta & Gemser, 2015; Jetter & Albar, 2016; Kim & Wilemon, 2002). Kim and Wilemon (2002) suggest that this phase of innovation is often unstructured and traditionally associated with low levels of formalisation. Meanwhile, Jetter and Albar (2016) highlight that this phase is also categorised as experimental, chaotic, and a challenge to plan. The unknowable and unstructured nature of the fuzzy front end of innovation creates difficulty in designing a business strategy to plan innovation projects effectively, allocate resources, or even acknowledge their capabilities and limitations (Jetter & Albar, 2016; Kim & Wilemon, 2002).

Businesses often engage in conventional risk management tactics (likelihood and severity documentation) to manage uncertainties during this phase (Jetter & Albar, 2016). This allows managers to make informed decisions, thereby minimising the risk from uncertainties (Calabretta & Gemser, 2015). Although these tactics are used, uncertainty is an inherent part of innovation projects and decision-making agents. Milliken (1987) has discerned three types of uncertainty: 1) state uncertainty, the inability to predict future states of variables; 2) effect uncertainty, the inability to judge the impact of changing variables; and 3) response uncertainty, a lack of information about responses and their effects. Jetter and Albar (2016) found that traditional risk management tactics are ineffective in influencing these forms of uncertainty, as the patterns and relationships between emergent technologies and dynamic markets are all but known. Sommer et al. (2008) have identified trial-and-error learning as a tool along with traditional risk management tactics. Trial-and-error learning involves gaining response uncertainty insights through the experimentation of early version products or mock-ups with users. 'Prototyping' is the term used within the design thinking framework that describes the exact same process and insights gained (Interaction Design Foundation, n.d.-d) as trial-and-error learning. Meanwhile, Cooper and Sommer (2016) later introduced early prototyping in their agile-stage-gate model.

### 4.1.2 Activities and Outcomes

The activities that organisations engage with during the fuzzy front end of innovation are categorised as being in the pre-development phase of the new product development phase (Cooper, 2017). Two phases exist within the fuzzy front-end of innovation: phase one involves exploratory research, information collection, opportunity discovery, and idea generation; phase two entails concept development, product planning, and market analysis (Herstatt & Verworn, 2004; Kim & Wilemon, 2002; Reid & Brentani, 2004). Previously discussed in Insight 3, this sequence of divergent and convergent thinking is also used in design thinking (Dam & Siang, 2020a).

The following sections discuss the relationship between innovation and value creation, then investigates several value-creation topics important for the first phase of discovery.

## 4.2 Innovation as Value Creation

Innovation and value creation are interconnected concepts (Smorodinskaya et al., 2017). Understanding what value is and is not, who value creation is for, and how value is created is essential to our understanding of why businesses need to innovate. It is easy to focus on innovation as tangible products or intangible goods, but as Baregheh et al. (2009) pointed out, other areas of innovation (new organisational structures, business models, processes, and activities) can be hidden under that perspective, and these too can add value. So, in the context of this project, for example, innovation becomes increasingly important for the red meat industry when it comes under pressure from external drivers such as those summarised in Section 2.6. This is particularly the case when it comes to the confluence of the environmental pressures of climate change and the advent of alternative protein sources, which help consumers gain value from purchases that help them to reduce their environmental impact and achieve aspirational transformations.

### 4.2.1 What is Value and Value Creation?

Value creation is a concept discussed in a wide range of social science literature and thus is not universally understood or defined. Haksever et al. (2004) has defined value as '... the capacity of a good, service, or activity to satisfy a need or provide a benefit to a person or legal entity'. They further describe value as having tangible or intangible properties that positively contribute to one's quality of life, knowledge, prestige, safety, and security. Woo (1992) includes that value is perceived and subjective and not necessarily about the actual utility gained. On the other end of the spectrum, value destruction can occur when intentional or unintentional activities remove access to some benefit for specific stakeholders (Davidow, 2018; Haksever et al., 2004). It is important to note that efficiency is not the same thing as value. Efficiency is a term related to operational processes and a reduction in time and resources, and it tends to be the main focus within the world of business (Davidow, 2018). These terms are factors in the overall effectiveness and productivity within a business but are limited due to their initial premises and firm-centric view.

Haksever et al. (2004) and Lepak et al. (2007) have discussed the debate within the literature on who the value creation is for: the shareholders or all stakeholders. They have found that modern literature from multiple disciplines and stakeholder theory supports the idea that value creation should include the shareholders, employees, suppliers and supporting industries, the end users, and the wider community. Davidow (2018) also includes the ecological system as a target for value creation. The relationship between these stakeholders is shown in Figure 26.

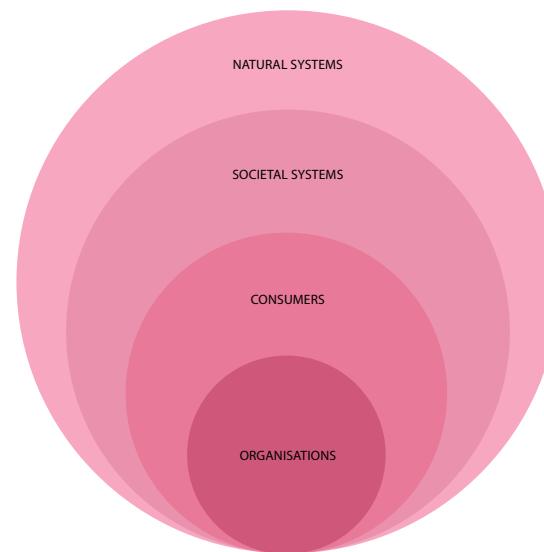


Figure 26 – Different stakeholders as targets for the value created by innovation.

Vargo and Lusch's (2004) 'service-dominant logic' introduces the concept of co-creation of value and is a paradigm shift from product-dominant logic. They stated that an axiomatic statement of the service-dominant logic is that customers are considered a co-creator of value and that there is no value until it is experienced and perceived as essential. Galvagno and Dalli (2014) explored the co-creation concept through a systemic lens and defined it as 'the joint, collaborative, concurrent, peer-like process of producing new value, both materially and symbolically'. Roser et al. (2009) include that it is an active, creative, and social process, the indication being that value creation is interactional and dependent on relationships. Businesses require customers for co-creation in order to maximise the creation of value; in this context, 'customers' can refer to any stakeholders.

The link between innovation and value creation is an important one to understand because it allows us to define the purpose and meanings of innovation beyond the creation of something new. In doing so, it allows us to think about the different types of users beyond end users as targets for innovation. The notion of co-creation of value or innovation emphasises a collaborative approach to innovation processes. The next few sections of this chapter discuss value-adding concepts in relation to the different levels of stakeholders.

## 4.3 Organisational/Industrial-Level Value Creation

Individuals, shareholders, and employees within the organisation can be targeted for value creation. Haksever et al. (2004) discussed that they could gain financial, nonfinancial, or time-related forms of value because of the implementation of innovation. When profits and an increase in net worth increase within a firm, shareholders gain financial capital, which may not only cause strategic investments into new technology and innovations but also lead to a more enjoyable life due to increased financial security. Wages, salaries, bonuses, stock options, insurance, memberships, paid holidays, a safe working environment, and both engaging and challenging activities are all forms of value for the employee. Creating value in these areas through innovation efforts are not discussed enough within businesses. Regenerative businesses shift their paradigm from business-centric to whole systems, thus expanding value creation from the business staff members towards the socio-ecological systems (Hahn & Tampe, 2020). For more on socio-ecological-system-level value creation, see Sections 4.5 and 4.6.

### 4.3.1 Value Chain

The value chain tool takes another perspective on this. Porter (2001) introduced the idea of the value chain as a set of activities that a firm operating in a specific industry performs to deliver a valuable product or service for the market. Figure 27 illustrates that a business can be organised into business units. These business units have activities that add value, which are passed on to the next business unit. The value chain, as a strategic framework and mapping tool, can help businesses to maximise the process of value creation while minimising costs.

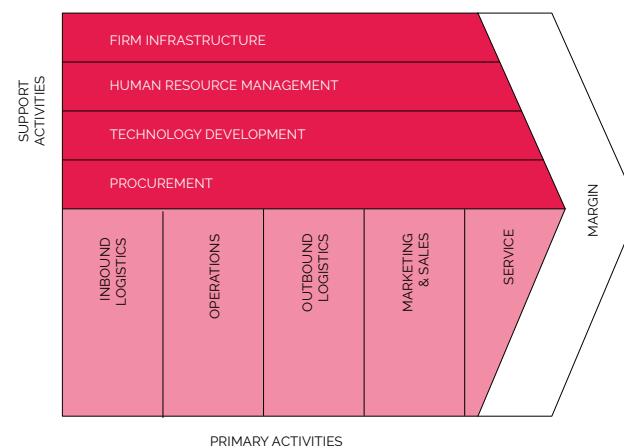


Figure 27 – Value chain model. (Adapted from Porter, 2001)

### 4.3.2 Value System

Porter's (2001) value system extends beyond the organisation to include the meta-system of suppliers, distributors, and retailers, as illustrated in Figure 28. The establishment of formal or informal relationships enables the sharing of knowledge. This systems-led approach can identify opportunities for improvement within the value system, increasing the overall productivity and value created.

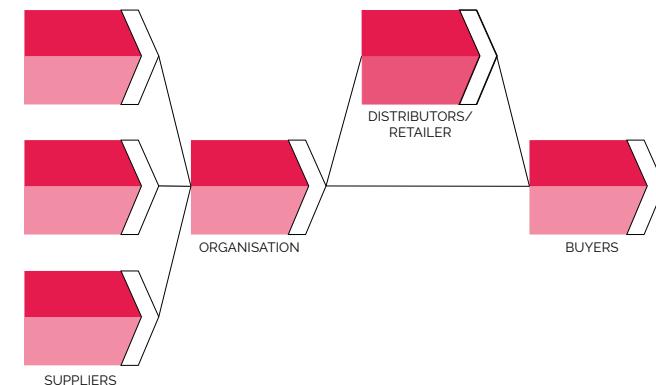


Figure 28 – Value system model. (Adapted from Porter, 2001)

### 4.3.3 Radical Transparency

Radical transparency describes an organisation's efforts, actions, and approaches that drastically increase the openness of an organisation's processes and data (Sifry, 2011). Veselinova and Samonikov (2017) state that this approach follows from the principle of being a values-driven company, achieving harmony with natural and social environments and a more meaningful workplace. They conclude that implementing radical transparency thereby creates brand equity and parallel value for both the consumers and the organisation. Figure 29 shows the five categories of brand equity and the value they create.

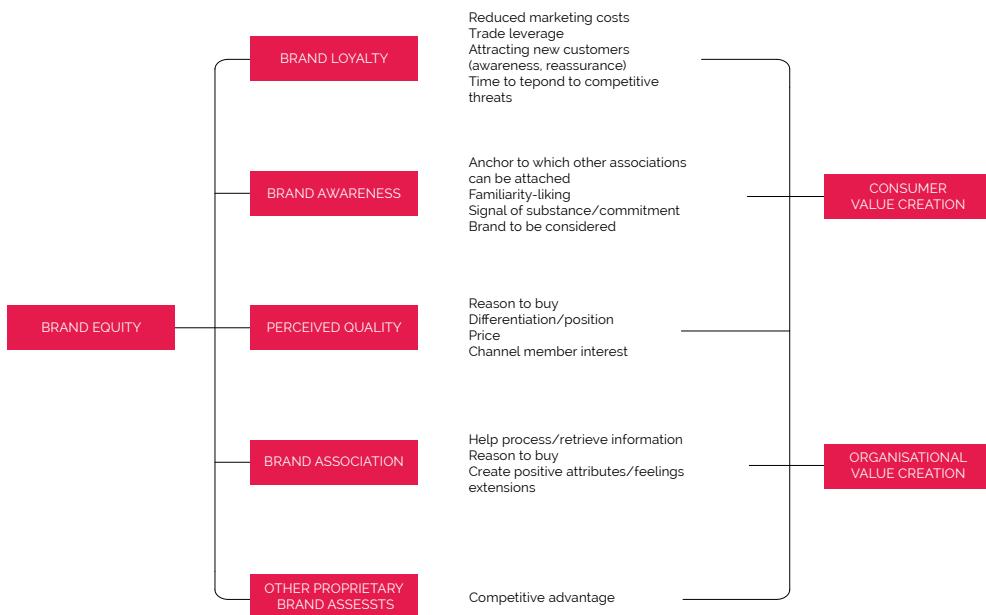


Figure 29 – The brand equity model. (Adapted from Veselinova & Samonikov, 2017)

### Insight 4

*Silver Fern Farms is a participating member of the industry wide New Zealand Farm Assurance Programme (NZFAP), a programme detailing quality standards while sharing knowledge of best practices (NZFAP, 2020). This is an example of value-adding within their value chain and system, where Silver Fern Farms is a participating member. In addition to that programme, Silver Fern Farms' eating quality (EQ) grading system acts as an incentive to produce increasingly higher quality products to increase their value for the end users (Silver Fern Farms, n.d.c).*

*The introduction of traceability within the Silver Fern Farms value chain can add value to the company's business units and its shareholders/farmers, as it provides visibility within the value chain (Silver Fern Farms, 2013). Traceability adds value to the end users; a QR code on the product packaging connects them to the farmers and their stories in their region. Although traceability creates some degree of transparency along the value system, it can be considered as functional rather than a strategy towards building brand equity.*

**How might Silver Fern Farms implement radical transparency so that they can build brand equity and create value for consumers?**

## 4.4 Consumer-Level Value Creation

This level of value creation is often the primary focus of innovation efforts within businesses, as creating offerings for the consumers, or end users, ultimately generates profits (Pine & Gilmore, 2011). So far in the discussion of innovation, businesses offer products and services to users; however, there are other business offerings of higher value.

### 4.4.1 The Experience Economy

Pine and Gilmore (2011) introduced the experience economy model, which expands the traditional understanding of what businesses could offer to their users. Figure 30 illustrates the relationship between commodities, goods, services, experiences, and transformations. Although transformative offerings are not described in detail by Pine and Gilmore (2011), Kotler (2019) found that consumers are now seeking market offerings that can help achieve a transformation in the mind and body. Additionally, 'consumer spirituality'—the desire for products, services, and experiences that house properties of sacredness, resulting in inner satisfaction and self-actualisation (Kelemen & Peltonen, 2005)—is another transformative concept relating to the transformation economy. This framework can be used as a tool for competitive strategies of innovation where the understanding of what the business is offering, its market positions and relevancy, perceived value to users, and level of customisation can help the business compete with those offered by the competition. Regenerative design focuses on both presenting and implementing transformative offerings but takes a holistic approach (Wahl, 2016). It may mean transforming how users use their products radically to the benefit of the socio-ecological systems. Regenerative design can be seen as a tool for strategic change at scale.

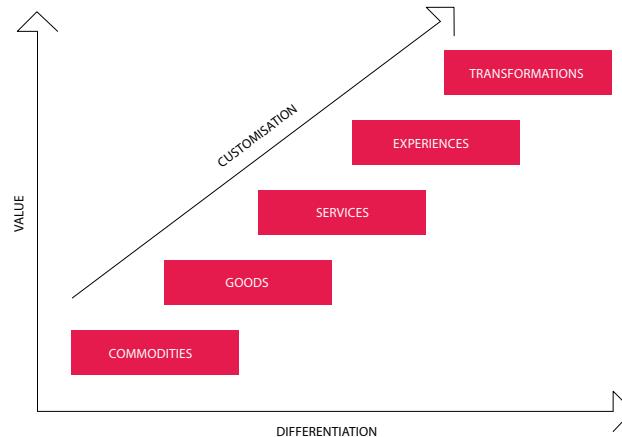


Figure 30 – Experience economy model. (Adapted from Pine & Gilmore, 2011)

### Insight 5

*Meat processors provide commodities in the form of bulk meat to the next set of users, sometimes within the same organisation. The bulk meat commodities are processed into FMCG and are then offered to the next set of users. The products are then prepared by the restaurant industry or end users, transforming into a service or experience. Silver Fern Farms' offerings are comprised primarily of commodities with a small percentage as branded FMCG. This focuses their innovation strategy on research into the early areas of the value system (see Section 4.3).*

*Alternative protein products are economic offerings beyond goods and services. There is a surreal initial experience when consuming the product, as it can be indistinguishable from real meat. This can also be a transformational offering for specific users where it acts as a catalyst to a meat-reduced diet. This realm of alternative proteins also has a vast network of users that communicate about the experience and offer free support services. This is a challenge for the meat industry, as there is a clear distinction between the value propositions for meat versus alternative proteins.*

*Beef + Lamb New Zealand (2019) discovered an opportunity to think beyond exporting commodities and products to export a food culture. Creating a New Zealand food story can better enable agritourism communication in hopes to maximise value creation. They have also suggested better understanding and empathy towards the premium market to better communicate the unique intrinsic qualities of New Zealand beef and lamb.*

*How might the red meat industry better provide customised and transformative offerings for users to better maximise value creation and to help achieve their aspirations and transformative desires?*

## 4.4.2 Customer Engagement Behaviours

Jaakkola and Alexander (2014) suggest that consumers are no longer satisfied with the limited role as a buyer and user at the end of the value system. Consumers are proactive in the co-creation of value by engaging other stakeholders and contributing their resources towards common goals. These actions are known as customer engagement behaviours. Examples of these activities include customers sharing product ratings, engaging with social media or brand communities (Libai et al., 2010), and co-designing products (Füller, 2010). The role of customer engagement behaviours is directly linked with the emphasis on the interaction or contribution of resources after the purchasing phase (Jaakkola & Alexander, 2014).

### Insight 6

*Products can be transitioned into services through the Internet of Things (IoT), achieved by interconnecting the physicality of a product with digital services (Wortmann & Flüchter, 2015). As previously stated in Insight 2, connecting users with the farmers' stories with a QR code displayed on the tangible product, accessed via an internet-accessible device, is an example of this hybrid product-service, creating more value for the users that make use of this feature. The service supplies other information such as the plant's origin, farm region displayed on a map, the weather and time, cooking instructions, and recipe ideas. In addition to storytelling within the value system, there are also opportunities to inform consumers of Silver Fern Farms' social and environmental activities.*

*Introducing calls-to-actions will allow the transformation of consumers into agents of change, enabling the co-creation of value via contribution. An example of this is Air New Zealand's FlyNeutral programme, which gives consumers the means to offset their flight's carbon emissions (Air New Zealand, n.d.). The role of customer engagement behaviour extends beyond financial contribution. Cadbury allows consumers to create, submit, and vote on flavours through the Cadbury Inventor Competition, where the winning flavour joins into the existing range of products (Cadbury Competition Finds Winning Inventor of New Flavour for Dairy Milk Series, 2019). PureSalt (n.d.) has created a competition where users can submit an Instagram video along with the #CONSERVATIONHEROES2020 hashtag presenting the value of their local ecosystem. These forms of consumer engagement co-create value all across the different levels of stakeholders.*

*How might the red meat industry create more engaging hybrid product-services for users to better maximise value co-creation?*

## 4.5 Societal Level-Value Creation

Conventional business practices are now being viewed as a significant cause for social, environmental, and economic problems resulting from unabated financial growth at the expense of these sociocultural and environmental systems (Lyle, 1996; Reed, 2007). Businesses have the opportunity to break down the illusion that separates businesses from the environment they exist within in order to create value for these external stakeholders. The following subsections explore shared value and collective impact as competitive strategies that create value for both the participating organisations and communities in society.

### 4.5.1 Shared Value

Kramer and Porter's (2011, 2019) concept of shared value is a competitive strategy to take up the opportunity to reconnect with society and address its problems. They define shared value as 'policies and operating practices that enhance the competitiveness of a company while simultaneously advancing the economic and social conditions in the community in which it operates'. In addition to shared value, Kania and Kramer (2011) introduced the concept of collective impact, a collaborative effort to intervene in societal problems and create long-lasting value. They state that systemic problems require a collaborative and whole systems approach to solve them successfully. This approach can be considered a large-scale co-creation of value on a societal level.

Kramer and Porter (2011, 2019) suggested that companies should reconceive markets and products by better serving existing ones, accessing new ones, and pursuing innovation. The process for creating shared value is first to identify the social issues to target, to make the business case, then track the progress, and finally, measure the impact and gain insights (Porter et al., 2011). Porter's (2001) previous concept, the value chain (see Section 4.3), is part of the shared value concept where the supporting businesses and industries collaborate and share knowledge of their systems to create value for all participants. Cluster theory, another concept of Porter's (1998, 2000), involves extensive collaboration to increase productivity and effectiveness as part of the shared value and competitive strategy. Clusters and cluster development are explored in Section 7.3. Figure 31 describes how shared value creates value for both the business and society. Porter et al. (2011) found that those that incorporate shared value as part of their social objectives often lack a model to measure the real-world implications. The framework they designed requires iterations and divides them into four phases: identifying social issues, making the business case, tracking progress, and measuring results and creating insights. This enables organisations to create more effective social programmes and initiatives.

Levels of Shared Value	Business Results	Social Results
<i>Reconceiving product and markets. How targeting unmet needs drives incremental revenue and profits</i>	<i>Increased revenue, market shares and market growth, and improved profitability.</i>	<i>Improved patient care, reduces carbon footprint, and improves nutrition and education.</i>
<i>Redefining productivity in the value chain. How better management of internal operations increases productivity and reduces risks</i>	<i>Improved productivity, reduced logical and operating costs, secured supply, and improved quality and profitability.</i>	<i>Reduced energy use, water use and raw materials, and improved job skills and employee incomes.</i>
<i>Enabling cluster development. How changing societal conditions outside the company unleashes new growth and productivity</i>	<i>Reduced costs, secured supply, improved distribution infrastructure, and improved workforce access and profitability gains.</i>	<i>Improved education, health and incomes, and increased job creation.</i>

Figure 31 – Levels of shared value and their businesses and social results. (Adapted from Porter et al., 2011)

Although the shared value concept results in positive social changes, it is met with some critique. Beschorner and Hajduk (2017) and Crane et al (2014) discussed that the overall framing is fundamentally problematic because it maintains the illusion that businesses operate outside of society. Creating shared value is conceptualised as a firm-centric competitive strategy rather than a social and ethical responsibility. Despite the narrow view, they concluded that creating shared value will help influence businesses to consider the community to implement social programmes.

## **Insight 7**

*Beef + Lamb New Zealand and the Meat Industry Association (2020) reported on the economic and social contributions of the meat industry and found that it provided \$4.6 billion in household income, including the second-order effects from flow-on actions. Silver Fern Farms (2020) is part of the nationally based Meat the Need charity created to supply meat to city missions and food banks. Silver Fern Farms is supporting this initiative by allowing the use of their processing sites and supply chains nationwide. This is an example of a collective effort to create shared value for the needs of society. Scholarships are provided by both Silver Fern Farms (n.d.-b) and the Meat Industry Association (Meat Industry Association, n.d.), supporting education and potentially creating jobs. Insight 4 explores Silver Fern Farms' value creation within the value chain.*

*These are all examples of the meat industry creating shared value. However, the intangible and non-financial impacts of such social programmes and initiatives are not measured due to the complications in measuring such impacts.*

**How might the red meat industry better measure and report the real-world impact of their social programmes and initiatives to create shared value more effectively for society?**



## 4.6 Ecological-Level Value Creation

Businesses and society have begun to internalise the social and environmental impacts caused by lifestyles and ways of production (Lyle, 1996; Reed, 2007). This has important implications for natural systems because the current global economy heavily relies on exploitative and environmentally damaging practices that do not recycle natural resources back into the natural systems (Lyle, 1996; Wahl, 2016). Conscious consumers have begun to value these ecological systems and have taken the initiative to reverse these norms (Roberts & Bacon, 1997). This includes a willingness to use fewer wasteful products, recycle actively, restrict the use of products made from scarce resources, and other mindful purchasing decisions.

### 4.6.1 Regenerative Agriculture

Lyle (1996) describes that sustainable practices are a few steps up from conventional practices, as illustrated by Reed (2007) in Figure 32, where sustainability follows from 'doing no harm but no good', thus sustaining the system's current health. He continues that regenerative practices restore the capacity and resources of the natural state back into these systems. Although Section 4.2.1 previously stated that the focus of increasing efficiency is not necessarily related to value creation, it becomes more important concerning natural systems. This is because the reduction of energy, natural materials, water, and other resources used can be the result of implementing more efficient processes and technology.

Regenerative agriculture in this context, although lacking a universal definition, includes four widely understood principles: 1) maintaining continuous vegetation cover on the soil, 2) reducing soil disturbance, 3) increasing the amount and diversity of organic residues returning to the soil, and 4) maximising nutrient and water use efficiency by plants (Paustian et al., 2020). So, the question becomes, can regenerative agriculture and practices mitigate climate change along with food security, climate resilience, biodiversity, and soil health? Although Paustian et al. (2020) state that there are no single solutions to solving these wicked problems, they conclude that the science is absolute in how regenerative agricultural practices can have a real biophysical impact on both soil health and climate change mitigation. The challenge now revolves around the

socioeconomic and political barriers to achieve such a transition to scale. In a webinar discussion about regenerative farming, they discussed that regenerative farming must be a producer-led movement, as consumers don't necessarily understand the term nor implications (Julia Jones, 2020). Although this may be the case, Wahl (2016) suggests that incorporating and expressing both sustainable or regenerative practices and values is a primary source of value creation for users.

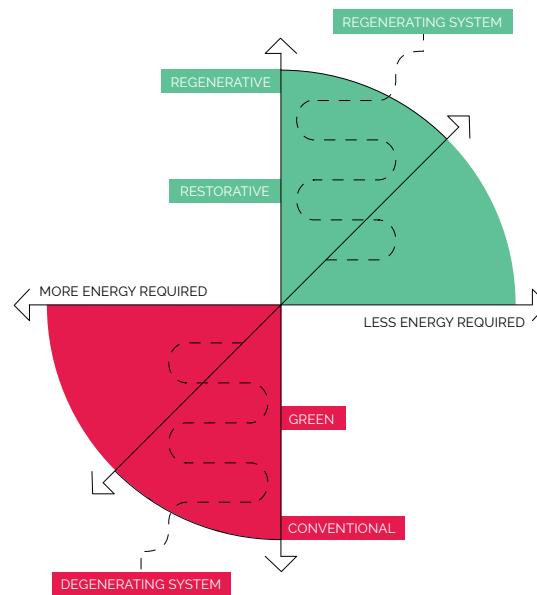


Figure 32 – Trajectory of environmentally responsible design model. (Adapted from Reed, 2007)

## Insight 8

Silver Fern Farms (2020b) has released a post discussing their practice and thoughts on regenerative agriculture. They have been applying sustainable farming practices for decades and is an integral part of their sustainable chain of care. Additionally, they have expressed interest in regenerative agriculture as an approach to a more sustainable future, wanting to take up an active role. Silver Fern Farms is committed to using integrated and transparent reporting of their emissions profile. This is achieved by developing partnerships with the Sustainable Business Council, Climate Leaders Coalition, The Aotearoa Circle, and Toitu Envirocare (Silver Fern Farms, n.d.-a). These partnerships revolve around publicly reporting emissions, setting resource reduction targets, and implementation of green actions. Silver Fern Farms, as an organisation, has successfully achieved the Carbon Reduced certification.

Case and Ryan (2020) were commissioned by Beef + Lamb New Zealand to study the net carbon position of New Zealand sheep and beef farms. They found that the woody vegetation of those farms is offsetting their on-farm agricultural emission between 63% and 118% and thus believe that these farms are well on their way to being carbon neutral by 2050. However, the Ministry for the Environment (2021) report found the actual amount of emission offset to be at 33%. This discrepancy occurred because the methodology Case and Ryan (2020) used excluded important considerations. In response, Beef + Lamb NZ also questioned certain areas in their methodology. Although there are disagreements as to the validity of each report, Beef + Lamb New Zealand were pleased to hear that the Ministry of the Environment report recognises there is significant sequestration (the process of capturing and storing atmospheric carbon dioxide) happening on sheep and beef farmland (Beef + Lamb New Zealand, 2021). It is important to note that these investigations are focused on the 'farm' part of the farm-to-fork system. Meat processing, transportation, exporting, and other organisational operations also contribute to the industry's carbon emissions.

**How might the red meat industry adopt and measure regenerative practices beyond agriculture so that the industry as a whole can eventually reach a carbon positive position?**

## 4.6.2 Incorporating Mātauraka Māori

New Zealand has the opportunity to design a regenerative agricultural system based on current regenerative research and Te Taiao (care for our natural world) (Ministry for Primary Industries, n.d.-a), which is recognised by government efforts and projects (Ministry for Primary Industries, n.d.-b). Additionally, Bruce-Iri et al. (2020) suggest that mātauraka Māori (the Māori way of being and engaging with the world, including Indigenous knowledge), along with Māori participation and Western science, is essential in supporting the transition from conventional practices to regenerative ones. Harmsworth and Awatere (2013) have identified several key environmental concepts concerning mātauraka Māori:

- Kaitiakitaka – An active stewardship or guardianship of the environment. (Marsden & Henare, 1992; McAllister et al., 2020).
- Manaakitaka – Māori values of generosity, giving and caring, and reciprocity. This can drive inclusivity in research practices where there is reciprocity between scientists and Māori (McAllister et al., 2020).
- Whakapapa – The connection, lineage, or genealogy between humans and other entities in the ecosystem (Harmsworth & Awatere, 2013; Te Rito, 2007)
- Mauri – An internal energy or life force derived from whakapapa providing life and energy to all living things and acting as the force that connects the physical to the spiritual worlds. Damage and contamination to the environment results in a loss of or damage to mauri (Harmsworth & Awatere, 2013).
- Ki uta ki tai – A whole systems approach to understanding and managing interconnected resources and ecosystems from the mountain to the sea (Harmsworth & Awatere, 2013)
- Mana – The authority to manage natural resources (Harmsworth & Awatere, 2013).
- Riteka – The customary practices and regulations of actions and behaviours in relation to the physical environment and its people (Harmsworth & Awatere, 2013)

Harmsworth (2005) created guidelines for the respectful and sincere collaboration with iwi/hapū, takata whenua, and urban Māori. This can only work if it is based on trust, respect, empathy, and inclusivity with constant interactions and engagement and an overarching desire for achieving positive socio-ecological outcomes. In doing so, takata tiriti becomes a true partner of takata whenua.

### Insight 9

*In a cultural impact assessment report (Te Rongo a Tahu and Rākautātahi marae, 2018), Silver Fern Farms Takapau have communicated with the takata whenua as they have taken efforts to reduce its physical impacts of a reduction in ground water levels and other effects from land discharge on the whenua and the Porangahau awa. The introduction of a monitoring system with continuous interaction will strengthen the already positive relationship. They conclude that they value the relationship they have with Silver Fern Farms and are committed to having an enduring partnership. This is an example of an appropriate approach to working with takata whenua.*

***How might the red meat industry better work in partnership with takata whenua to incorporate mātauraka Māori (so as to become a true takata tiriti partner) and regenerative practices to better mitigate environmental concerns and create value for the sector, product users, and wider systems?***

## 4.7 Framing the Users

Earlier in the chapter introduction, it was stated that the discovery phase is partially about understanding and defining the users. In doing so, their problems are identified, which then provides a foundation for the synthesis of opportunities with the value creation concepts previously discussed. To fully contextualise the users requires the consideration of products and settings, resulting in an understanding of their lifestyle (see Figure 33). There are two ways of defining users: market segments typically used by stage-gate (Zhang et al., 2011) and personas employed by practitioners of design thinking (Interaction Design Foundation, n.d.-b). The differences in approaches and the way they are presented are discussed in the following sections.

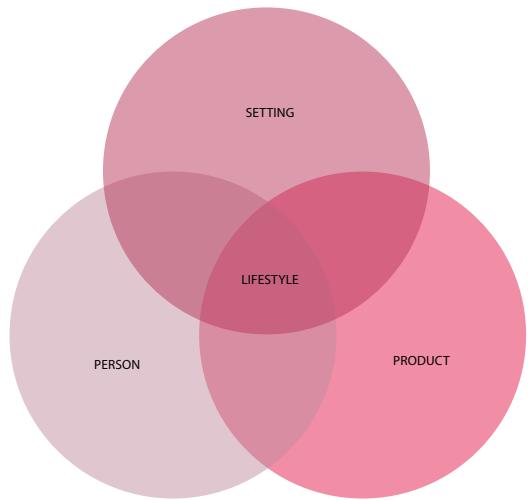


Figure 33 – Considerations for user framing (Adapted from Solomon, 2018)

### 4.7.1 Market Segments

Schiffman and Wisenblit (2015) discuss market segments as a tool used for understanding and marketing products and services via the process of market segmentation. Market segments enable businesses to avoid direct competition of users by differentiating their products based on the needs and desires of other markets. This results in appropriate advertising and retail selection consistent with the lifestyles of the targeted users. Market segment profiles (see Figure 34) are the result of large-scale research and analysis (primarily through questioning or observation) into both the demographics (age, gender, ethnicity, income, marital status, and location) and psychographics (activities, interests, and opinions) of a business's users, the emphasis being on psychographics (Schiffman & Wisenblit, 2015; Solomon, 2018; Yankelovich & Meer, 2006).

### Insight 10

*Silver Fern Farms has developed consumer segments, providing insights into both their consumers and those of the premium meat market. The types of information described in their segments are a brief personal statement, behavioural motivations, the range of demographics, and properties important to the consumer. It is consistent with the market profile example (Figure 34), where the market segments are highly contextualised within the products the Silver Fern Farm is involved in. This restricts divergent thinking to 'inside-the-box' thinking, limiting the opportunities discovered and thus resulting in incremental innovations to current products in the market. Additionally, the way typical segments are designed and represented lacks human characteristics and personality and is focused on the operating business, ultimately pertaining to the lifestyle section of Figure 33.*

Insight Categories	'Young and Serious' Market Segment Profile
Key Measures	<i>Around 10,000,000 people fit into this market segment in this country, stable with little growth, 10% of all consumers</i>
Consumer Behaviour	<i>Looking at modern facilities to get into shape, 1-2 years retention at a particular centre, reasonably price sensitive</i>
Description	<i>Located throughout the country but centralised in the inner city, aged between 18-30, well educated, single or in a relationship, sociable, enjoy travelling, career focused, and environmentally aware</i>
Communication Channels	<i>Big users of the internet, primarily consumes reality TV shows, are active users of media. Likely to engage with digital marketing and other related communication channels.</i>

Figure 34 – A market segment profile example. (Abstracted from Market Segmentation Study Guide n.d.)

## 4.7.2 Personas

Personas are described as fictitious groups of characters that provide the basis for research and divergent thinking as the result of research (Adlin et al., 2006; Interaction Design Foundation, n.d.-b). Personas are an essential tool for gaining a nuanced understanding of users using a high degree of empathy. They describe the research process involving an investigation of the users' demographics and psychographics, the implication being that personas can be the result of a market segmentation process. The way personas and market segments differ is how they represent the information and insights. Compared to the statement and listing nature of market segments, personas emphasise a well-informed story over bullet points (Interaction Design Foundation, n.d.-b), including visualisations (profile pictures, infographics, word clouds, spider charts, geo-maps, journey maps, and lifestyle pictures) (Dam & Siang, 2021). Referring back to Figure 33, personas consider the whole person, including the expansion of settings and products outside of the operating business. Although personas are valued by design thinking practitioners, the academic literature on the topic is light and currently lacks solid empirical grounding (Chapman & Milham, 2006).

A partial example of a persona that is humanised and relatable is Helix Personas by Roy Morgan's (n.d.) 201 Young and Platinum (for the full persona profile, visit their website) below. This persona section is formatted into a 'Walk with Me', a narrative synthesised from the demographics and psychographics of the users.

"I met my English husband Steve while working as an account manager at Ogilvy PR in London; we moved back to Wellington (my home town) after the Financial Crisis. He's a financial analyst, and got a job with a firm on Lambton Quay – really close to my office, actually.

We got married last year. Afterwards, I used everyone's iPhone footage from the day to make a wedding montage on my Mac — it's a hoot! For our honeymoon, we went to Paris and Lyon — it was divine, but we both stacked on the kilos! French cuisine is the best. We're addicted to good food and eating out, and try to go somewhere new each week. When I've got time, I love to whip up a home-cooked feast myself.

We're saving for a home deposit right now but not to the exclusion of everything else: we still like to have fun. Marriage hasn't slowed us down; we go out heaps. I like going to the movies a few times a month, especially if there's a film festival on. Steve's a Jackie Chan fanatic; I prefer films with something to say about life and the human condition. Some of our homegrown cinema does this really well — I can't get enough of Niki Caro.

Kids are on the horizon, but not till we travel a whole lot more. I've already been to Thailand, Hong Kong and the US, and next year we're going to Berlin and Milan, which will be amazing. I can't wait for the shopping! And the food . . ." (Helix Personas by Roy Morgan, n.d.).

### Insight 11

*The Food Product Design paper first introduces students to Helix Personas' profiles as a basis for the understanding of their assigned user group during the first phase of the project (see Insight 2 for more on the project process).*

*In addition to the starting point, they constantly act as a reference that ensures ideas, products, and brands are valid and desirable. Personas, in combination with the human-centred designers, clients, and emerging consumer trends and movements, provide the necessary structure for divergent and convergent thinking for this process (see Figure 35). The emerging global consumer trends and movements are indicative of potential markets. An example of this was outlined in Section 2.5.1, where the market for alternative proteins stemmed from health and environmental consumer trends. The focus on emerging trends encourages students to think creatively and 'outside-the-box', resulting in potentially radical innovations. Human-centred designers are other students and staff members able to provide product and brand feedback while considering the targeted users. Meanwhile, retailers as clients provide a convergent point for the project in addition to industry feedback.*

*As previously discussed in Insight 9, Silver Fern Farms' customer segments result in 'inside-the-box' thinking, limiting the opportunities for radical innovations due to the highly contextualised synthesis of the profiles.*

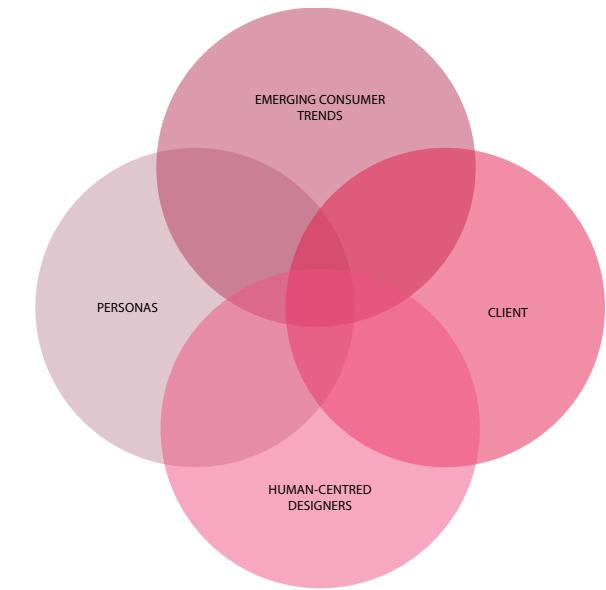
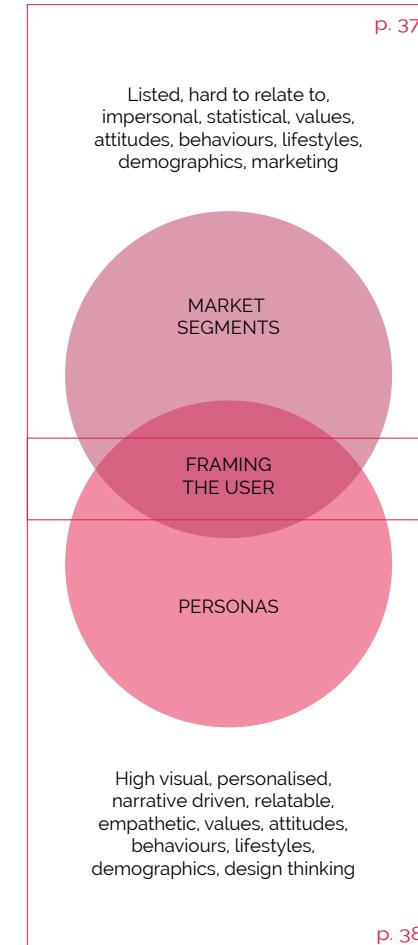
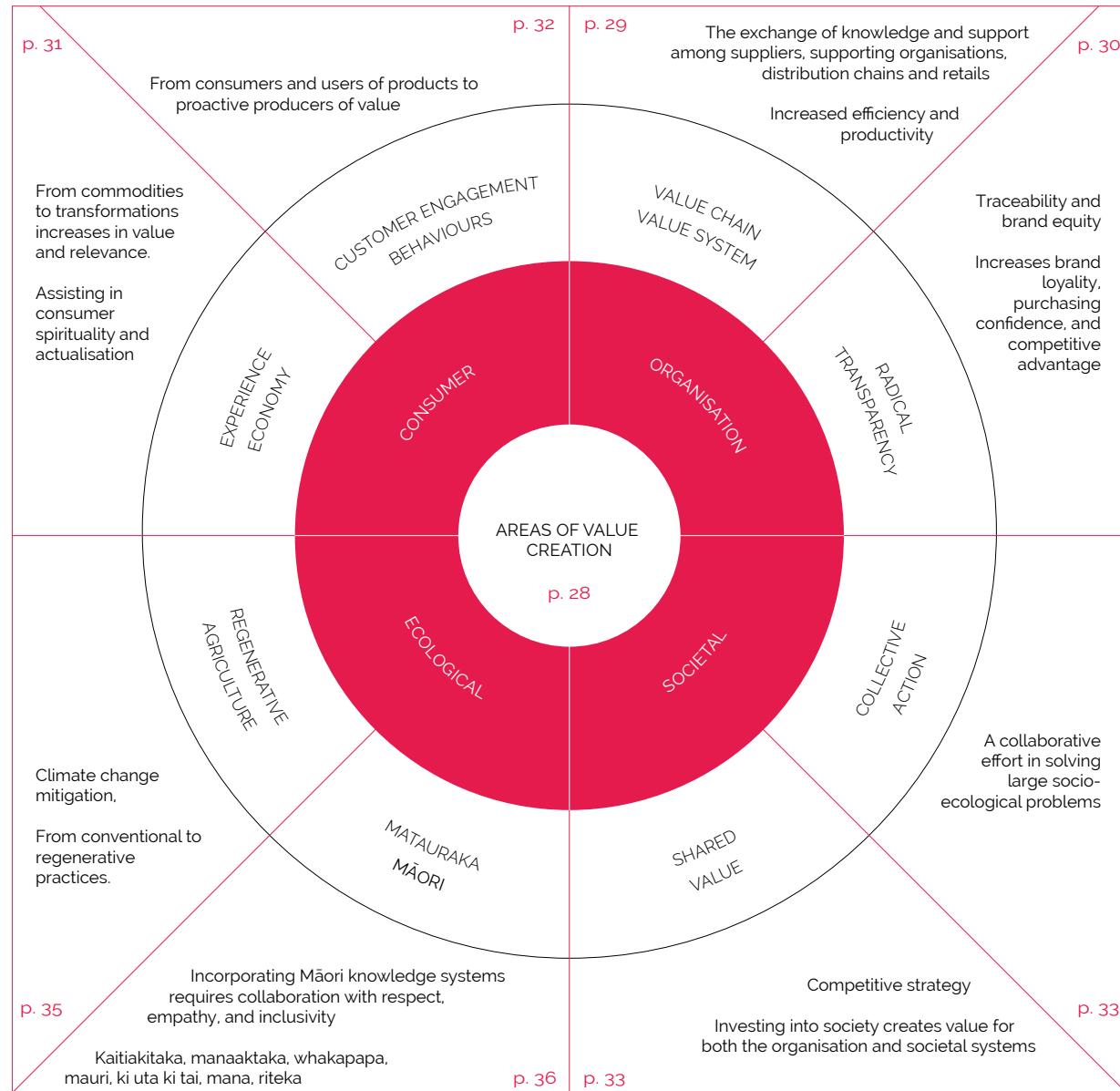


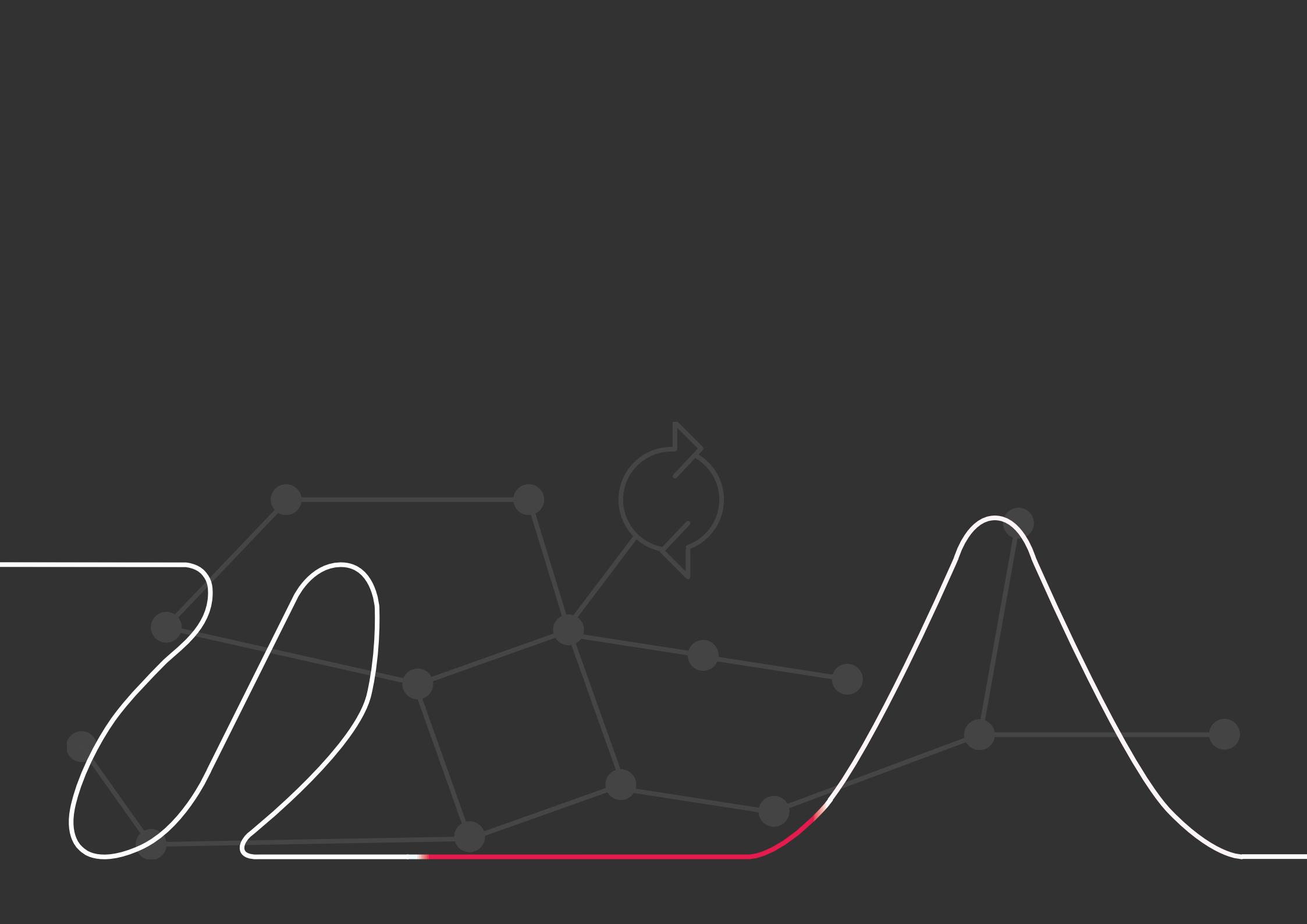
Figure 35 – Areas used for empathy and inspiration during the Food Product Design project.

**How might Silver Fern Farms adopt design thinking or collaborate with design thinkers to utilise personas in the generation of radical innovations for potential users of emerging markets?**

## 4.8 Chapter Summary



Concept	Description or Definition	Insight	Opportunity
Discover (p. 16)	The first phase of the innovation process where activities pertaining to the discovery of opportunities and understanding of the users are located.		
Value Creation (p. 28)	The perceived and subjective capacity for a tangible or intangible offering to satisfy a desire or provide benefits and knowledge.	Four levels of stakeholders were identified as targets for value creation: organisational, consumer, societal, and ecological.	
Value Chain and Value System (p. 29)	An organisation viewed as individual units that have an activity to add value. The value system extends to incorporate other businesses from suppliers, supporting organisations, distributors and retailers.	Silver Fern Farms has implemented programmes that share knowledge with suppliers, thus creating value along the value system.	
Radical Transparency (p. 30)	An organisation's efforts, actions, and approaches drastically increase the organisation's process and data openness.	Silver Fern Farms has introduced traceability along the value system primarily to create value for consumers.	<b>How might Silver Fern Farms implement radical transparency so that they can build brand equity and create value for consumers?</b>
Experience Economy (p. 31)	The categorisation of business offerings into commodities, goods, services, experiences, and transformations. Each level creates more value and becomes more differentiated and more relevant to the needs of users.	Silver Fern Farms primarily offers commodities, whereas the alternative protein industry operates on experiences and transformations.	<b>How might the meat industry better provide customised and transformative offerings for users to better maximise value creation and to help achieve their aspirations and transformative desires?</b>
Customer Engagement Behaviours (p. 32)	Customers are no longer interested in just being users, but rather co-creators past point of transaction.	The QR code on Silver Fern Farms' packages revolves around storytelling. Customers want further engagement to co-create value with the customer and organisation community	<b>How might the red meat industry better create hybrid product-services for users to better maximise value creation?</b>
Shared Value (p. 33)	The implementation of programmes and practices that advance the economic and social conditions whilst increasing the organisation's competitiveness.	The large presence of the red meat industry has provided economic and social contributions. Silver Fern Farms has also engaged with meat charities to support those who are unfortunate. Both have supported other associated businesses and educational institutes.	<b>How might the meat industry better measure and report the real-world impact of their social programmes and initiatives to create shared value more effectively for society?</b>
Regenerative Agriculture (p. 35)	Practices beyond sustainability that restores the capacity and resources back to the natural states of systems.	Both Silver Fern Farms and the red meat industry are interested in regenerative agriculture due to the potential mitigation of harmful environmental effects.	<b>How might the red meat industry adopt and measure regenerative practices beyond agriculture so that the industry as a whole can eventually reach a carbon positive position?</b>
Incorporating Mātauraka Māori (p. 36)	Organisations are increasingly acknowledging that Indigenous knowledge is important to the socio-ecological systems.	Mātauraka Māori is considered an essential part of the transition to regenerative practices.	<b>How might the red meat industry better incorporate mātauranga Māori and regenerative practices to better mitigate environmental concerns and create value for the sector, product users, and wider systems?</b>
Market Segments (p. 37)	Users categorised into groups that share similar demographics and psychographics.	Market segments are void of personality, making true empathy difficult. Silver Fern Farms uses market segments with more personality.	<b>How might Silver Fern Farms adopt design thinking or collaborate with design thinkers to utilise personas in the generation of radical innovations for potential users of emerging markets?</b>
Personas (p. 38)	Fictitious groups of characters (informed by research) that will enable designers to empathise with their users.	The Food Design Institute uses personas as a starting point for inspiration along with consumer trends and experts.	



# 05

## DEVELOP

This is a short chapter that discusses the development phase of the innovation process. It is the phase where the idea or solution has been selected for large resource investment regarding the innovation's design and operational systems. This chapter discusses how stage-gate and design thinking frame the development process. This includes the types of activities and tools used in their respective frameworks. The following sections discuss a fundamental assumption of the innovation process model and suggest alternative ways of developing innovations.

## 5.1 Stage-Gate

The stage-gate model is found to be highly effective in the development phase of innovation, where the products and its systems are designed to a degree where it can be produced and distributed at a mass scale (see Section 3.3). There are two stages and two gates of the stage-gate model associated with the development phase of the innovation process (see Figure 36): gate three business care decision, stage three development, gate four post development, and stage four validation (Cooper, 2017).

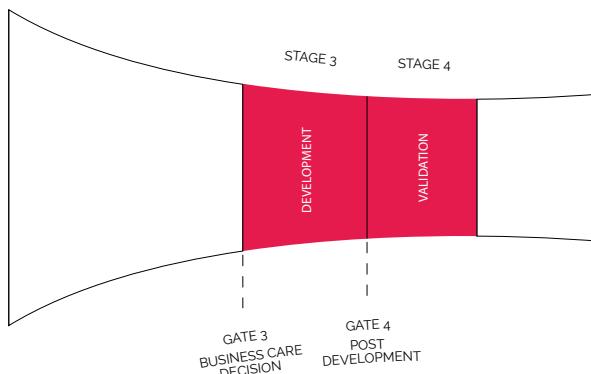


Figure 36 – Stage-gate stages and gates related to the development phase of the innovation process.

### 5.1.1 Gate Three – Business Care Decision

Gate three reviews all the discovery activity and planning work—including the plan for the next stage—in the prior stages (Cooper, 2017). This is a rigorous assessment due to the financial commitments the next stage requires. Areas reviewed include development plans, preliminary operations, product and prototype designs, and marketing plans. A cross-functional and empowered team is created if this review goes well and it is decided to proceed to the next stage. The project leader will be expected to find opportunities for collaboration with other organisations for importing expertise and technology (Grönlund et al., 2010).

### 5.1.2 Stage Three – Development

Stage three begins the implementation of the plan presented at gate three (Cooper, 2017). The process of product design and prototyping is then undertaken, where products at several stages of completion are made and tested in-house with staff members as well as focus groups representative of the target market. The agile variant of stage-gate heavily emphasises a series of product spiral iterations, ensuring the product desirable does not drift away from the users (Cooper & Sommer, 2016). The systems around the product, concerning the financials, supplies, operations, production, and facilities, are also mapped out, planned, and designed (Cooper, 2017). Additional areas involved with the development stage include the marketing plan and resolving the potential regulatory, legal, and patent issues.

### 5.1.3 Gate Four – Post Development

Gate four reviews the product, its systems, and any other planning activity of the previous stage, assessing whether the system plans are ready to be tested (Cooper, 2017). The application of an agile model will have these sorts of reviews as checkpoints throughout the development phase (Cooper & Sommer, 2016).

### 5.1.4 Stage Four – Validation

Stage four tests the viability of the project and desirability of the product itself (Cooper, 2017). The viability aspect of the review looks at the production and operation processes and the financials of the project. This can include field trials, limited and pilot productions and operations, simulated test markets, a soft launch, or even test markets. If all goes well, then the process proceeds to the following gate and stage involving the commercialisation and implementation of the products and their systems. However, if problems are found, the project may revert to stage three for further development and iterations.

Although it was stated earlier that this model is highly effective at the development phase (and limited in the discovery phase) of the innovation process, there are still limitations to this model. Günzel and Holm (2013) identified how the linearity design of a model (like stage-gate) restricts activities involved in the discovery phase, stating that these phases are and should be run sequentially. How might an innovation process run the discovery and development phases in parallel? This can be answered with how the design thinking framework functions discussed in the next section.

### Insight 12

*Silver Fern Farms engages the development phase of the innovation process as laid out by the three models of the stage-gate discussed above. However, they have adopted the agile approach, combining the development and validation stages and subsequently accelerating their innovation process (see Figure 37). Additionally, Silver Fern Farms employs prototyping prior to the development phase of the innovation process. Their model still has the limitations attached to stage-gate, including the financial commitments (amount dependant on the project type) in developing and testing the product and its systems.*

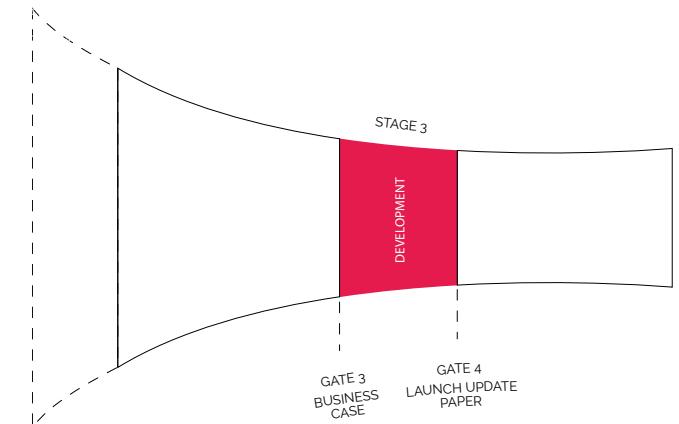


Figure 37 – Silver Fern Farms' stages and gates related to the development phase of the innovation process.

## 5.2 Design Thinking

Although the design thinking framework has phases (see Section 3.4.1), it is described as nonlinear (Dam & Siang, 2020b; Interaction Design Foundation, n.d.-c). This is because design thinking phases are not necessarily related to a process but instead, they house a set of tools. Eliminating the structures that separate these phases enables design thinkers to use tools associated with the discovery phase as part of the development phase. Additionally, the implication of how design thinking is framed is that it does not assume the existence, size, and type of organisation, thus is used among entrepreneurs (Robbins & Devitt, 2017), freelancers, and large organisations (Dam & Siang, 2020b).

These tools may also be categorised into multiple phases. An example of a tool that is categorised in several phases of the design thinking framework is the customer journey map (see Figure 38). This tool is used to visualise and understand the customer's experience in relation to a timescale, scenarios, touchpoints, channels, and thoughts and feelings (Interaction Design Foundation, n.d.-a). This can be used as a tool for empathy, to understand how and why customers interact with certain types of products, and in doing so, businesses can identify opportunities for creating new solutions. The customer journey mapping tool can also be used for prototyping products currently under development to identify touchpoints that require further investigation. The use of this tool can be more effective when informed by customer research and other tools such as an empathy map (Interaction Design Foundation, n.d.-a).

Almqvist (2017) identified that the literature on design lacked discussion in the development and commercial implication of innovations. This is a limitation of the nonlinearity of design thinking to non-design thinkers or those new to innovation development and commercialisation. However, IDEO's (2015) field guide outlined tools helpful in planning at getting started. Some examples are roadmaps (a time plan), creating a pitch (communicating ideas and getting advice), building partnerships (identifying funding and resource partners), and staffing your project (a multidisciplinary team that has the expertise, technical capacity, and outside partners).

Time	Morning	Early Workday	Late Workday	Evening	Evening	Night
Activities	Calls doctor's office to make an appointment for his mother	Checks phone to see if there are any missed calls	Gets phone call from mother while in meeting to ask when he will visit again.	Stops by the pharmacy on his way to his mother	Visits his mom to talk and warm up a frozen dinner he prepared over the weekend	Calls his mother to say goodnight before going to bed
Thinking	"I have to remember to ask about..." "If I leave in 5 minutes I will be at work on time" "I have to remember I can't set an appointment for the 15th"	"I hope everything is ok at mom's place" "I have to run to a meeting in 15 minutes" "I must remember to pick up medication at the pharmacy this afternoon"	"Her memory is getting worse" "Why don't the nurses help my mother" "keep track of who's coming?" "My boss is getting annoyed at the phone calls"	"I hope she's not becoming impatient for me to come over" "I hope I don't have to go to another shop for the vitamins"	"She was difficult to understand tonight" "Her medication should be helping more" "I need to go soon to eat dinner with my wife"	"She was difficult to understand tonight" "I hope the nurse found her new pills"
Feeling	It's stressful to keep track of everything, worried that the doctor won't be able to help	Worried about his mother, worried that his work will be interrupted, it's stressful to keep track of everything	Is annoyed with the phone calls, worried about his mother	Stressed, tired	Happy to spend time with his mother, scared for the changes dementia brings, guilty for not spending more time with his wife	Worried about his mother, looking forward to going to bed

Figure 38 – Customer journey map example (Adapted from Interaction Design Foundation, n.d.-a)

## Insight 13

During the Food Product Design project, the discovery phase slowly transitions into the development phase when users are defined, and products and brands have been conceptualised (more about this project process was discussed earlier in Insight 2). The business model canvas tool is used by students to map out and define the considerations related to the development phase. This is a stepping stone used to plan a strategic vision on how to actualise the business systems around the product and brand, forming the basis of their Assessment 2 (business plan and product pitch). However, there are limitations on how Food Product Design projects are structured.

This is primarily due to the brief design in the context of student learning outcomes around the discovery phase. As previously discussed in Insight 3, there are opportunities for students to continue their project if they so choose, which involves more activities within the development phase.

So far in the conversation, we have discussed the positives and negatives of stage-gate and design thinking concerning the development phase of the innovation process. However, there are other important considerations that can change how the development phase is approached.

## 5.3 Alternative Development Strategies

There are limitations to understanding the development phase of the innovation process as linear and straightforward as depicted by Newman's (2010) squiggle (see figure Figure 25), including the termination of at a market-ready product at the scale of mass production and distribution. This is because it filters out the possibility of developing radical innovations due to the uncertainties that exist in the market. Two strategies have been identified with an alternative development pathway that will enable radical innovations to be tested at relatively lower risk: first product release and brand architecture.

### 5.3.1 First Product Release Strategy

Jetter and Albar (2016) discuss the first product release as a multiphase strategy that gains real market insights before large-scale development and distribution (see Figure 39). This strategy starts off with a first product release designed to satisfy users' basic needs and to gain feedback and insights in the marketplace. Next follows a series of product releases with more complexity informed by the insights gained from the previous release. This strategy results in highly informed and more radicalised innovations that have been properly tested in the real marketplace.

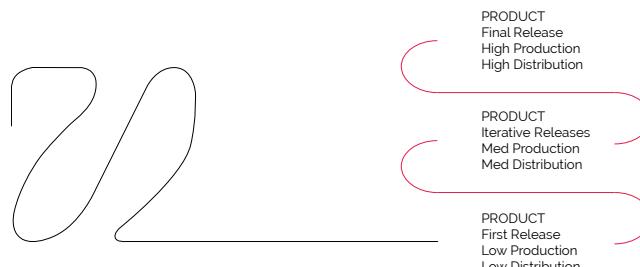


Figure 39 – First product release strategy of product development.

#### Insight 14

*Silver Fern Farms uses the conventional understanding of the innovation process, the one that results in new products not fully tested by the uncertainties hidden in the real marketplace prior to mass implementation. This results in a process that filters out the possibility for the development of any radical products in addition to the other limitations stated in Section 5.1. Adopting the multiphase strategy will enable Silver Fern Farms to design and test radical products at a lower risk cost compared to the current model.*

**How might Silver Fern Farms adopt a multiphase innovation development strategy that helps them create and test radical innovations in the marketplace at low risk?**

### 5.3.2 Brand Architecture Strategy

Creating a coherent brand architecture is a strategy that allows the creation of radical products despite the difference in value propositions. Aaker and Joachimsthaler (2000) defined brand architecture as 'an organising structure of the brand portfolio that specifies brand roles and the nature of the relationship between brands' with several strategies of interest.

Aaker and Joachimsthaler (2000) found that the house of brands strategy allows organisations to create multiple brands that target both mainstream and several niche markets (see Figure 40). Procter & Gamble has adopted this brand strategy with Head and Shoulders, Pert Plus, and Pantene all offering unique solutions with different targeted value propositions. The shadow endorser approach, a subcategory in this strategy, does not visibly connect the brands together, allowing the true expression of different brand values without contamination. Aaker and Joachimsthaler (2000) also discussed another approach called token endorser, an endorser strategy whereby a master brand is involved with several products and markets and has endorsed brands through statements (also see Figure 40). This approach provides reassurance and credibility in the quality of the endorsed brands whilst still allowing the freedom to offer different value propositions. The relationship between Sony and PlayStation is an example of this approach.

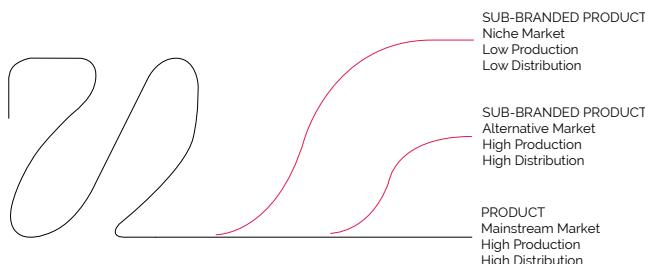


Figure 40 – Sub-branding strategy of product development.

### Insight 15

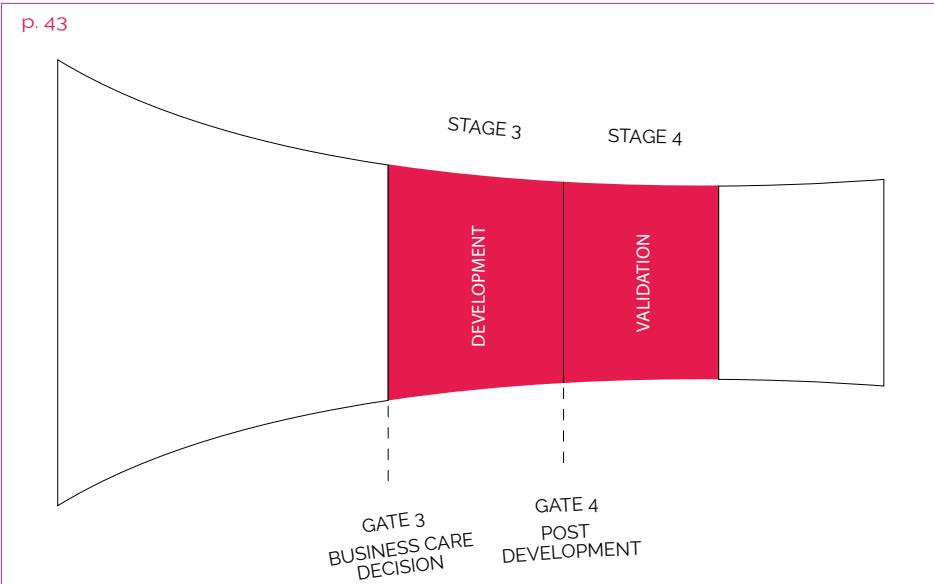
*The consumer products Silver Fern Farms offers are branded under that name. Although the brand Silver Fern Farms resonates with values of expertise, premium quality, and integrity, the brand has strong associations with offering raw meat products. Creating a brand architecture strategy that allows for experimentation and testing of new products in the marketplace without contaminating their strong brand image could allow Silver Fern Farms to create new offerings that provide targeted or niche value propositions before they attempt to 'cross the chasm' into the mainstream market. If an endorser brand strategy is used, Silver Fern Farms guarantees the quality of products whilst allowing the endorsed brand values to be featured. Partnerships with other businesses that have a nuanced understanding of niche markets can be a collaborative and effective way of trialling and developing radical innovations. In doing so, real marketplace insights of radical innovations can be translated into more radicalised innovations for the mainstream market.*

*For example, several wine companies use their brand architecture to trial new wine styles without contaminating their main consumer (majority market) brand (Hall & Mitchell, 2008). These companies have brands that are specifically targeted at 'wine connoisseurs' and 'wine lovers' who are novelty seekers and, therefore, typically early adopters. Some of these brands have been specifically developed with the early adopter market in mind, while others have been acquired because they fill this niche for the company. One such example is how Pernod Ricard used their Brancott Estate brand (a rebrand of Montana Wines) to introduce innovations such as low alcohol wines (through its Flight range) and canned wine (Flight and Brancott Estate). The innovative nature of the brand forms a core part of Brancott Estate's messaging:*

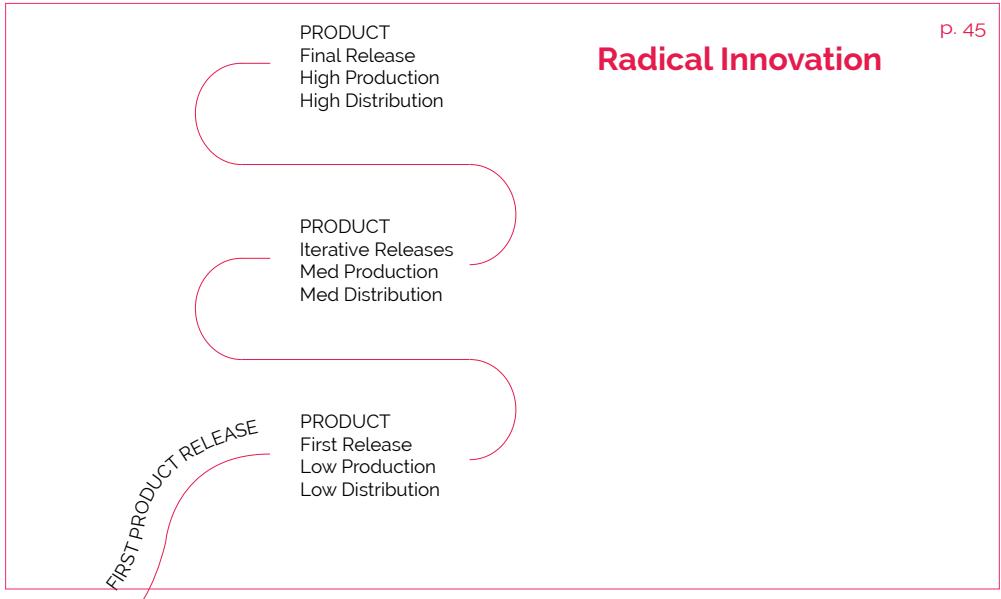
*"Our Passion: Here at Brancott Estate, we've had an eye on the future right from the start. From purchasing land across Marlborough and planting the region's first Sauvignon Blanc vines, to building a world-class winery and exporting globally – our forward-thinking mindset shapes everything we do. We want to inspire others to see the world with fresh eyes." (<https://www.brancottestate.com/en-nz/our-perspective/our-passion>)*

*How might Silver Fern Farms design a brand architecture so that they can test new products on early-adopter segments before entering mainstream distribution and marketing?*

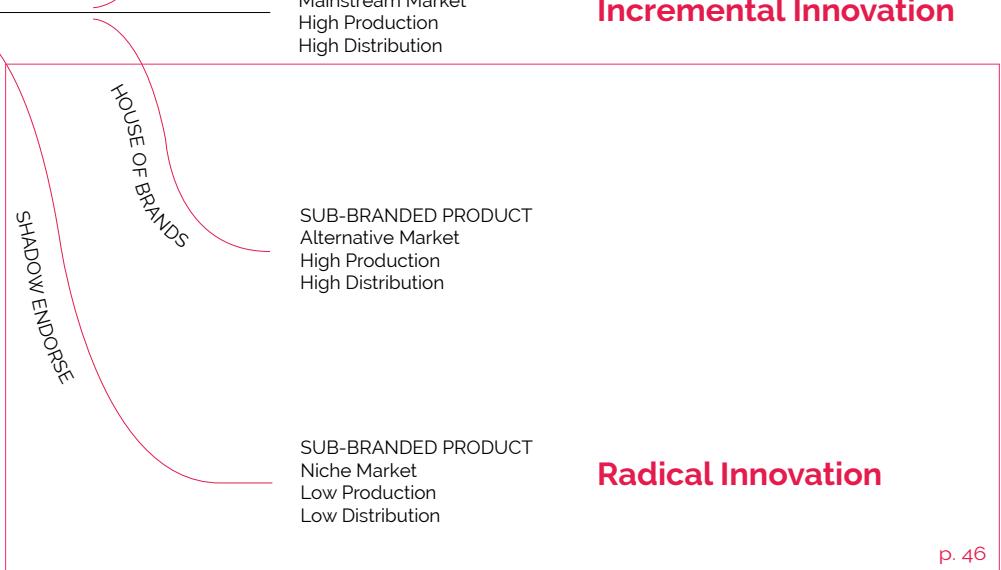
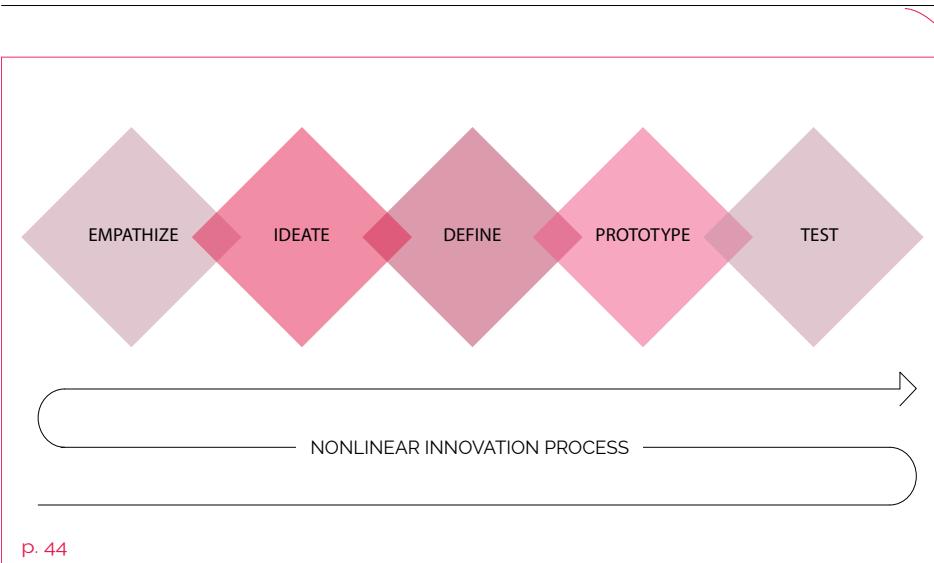
## 5.4 Chapter Summary



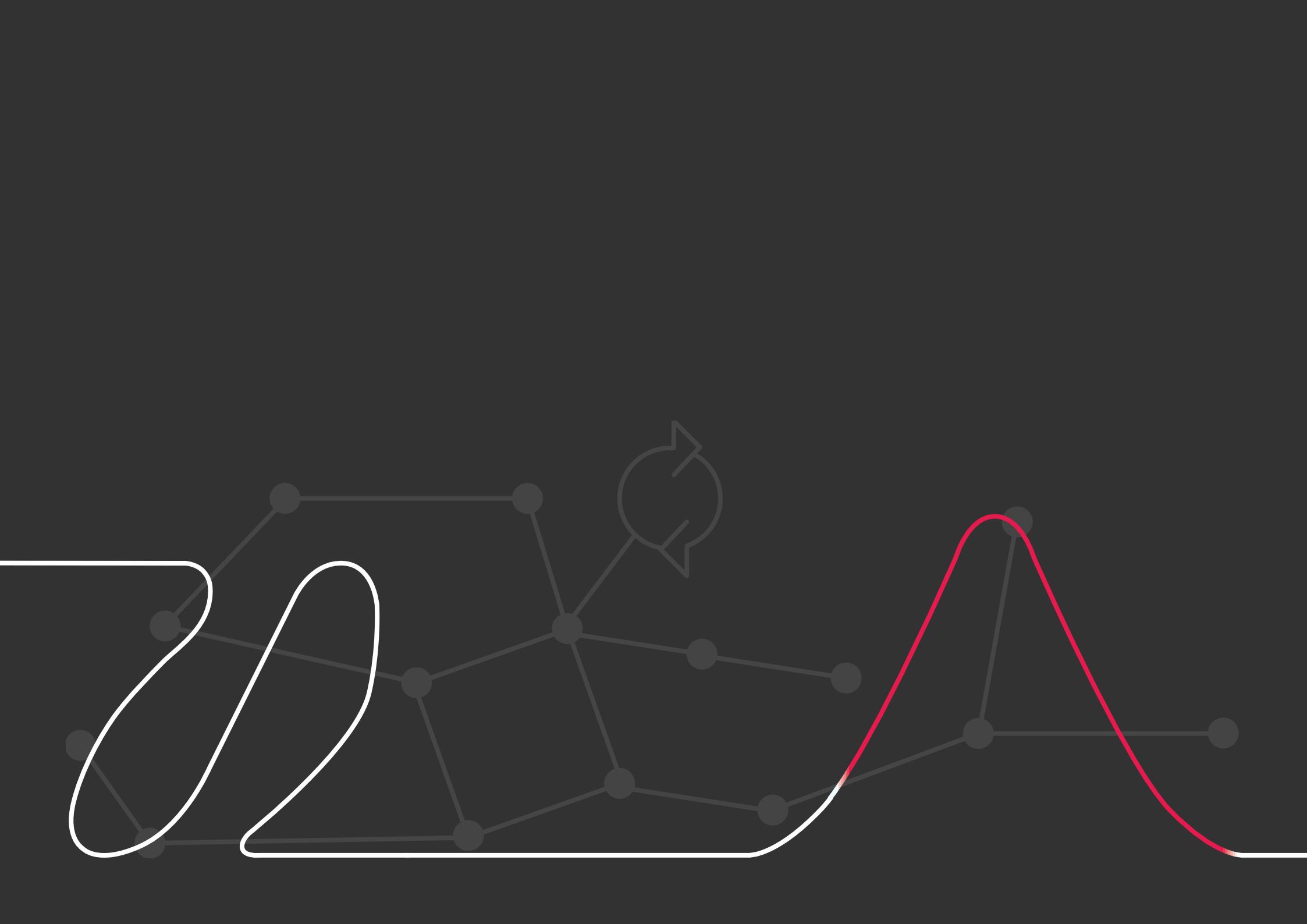
### Radical Innovation



### Incremental Innovation



	Description or Definition	Insight	Opportunity
Develop (p. 16)	The second phase of the innovation process. It concerns the product design and the systems for its implementation into the market.		
Stage-Gate (p. 43)	There are two stages and gates related to the development of innovations and their systems. There is a high financial commitment to the full design and production of the innovation.	Silver Fern Farms has adopted an accelerated model, combining the development and testing stages. Additionally, there are limitations to viewing the innovation process as developing a product at mass scale.	
Design Thinking (p. 44)	Design thinking is framed as nonlinear with the implication that its phases can be entered at any time. This is because each phase has a set of tools used throughout the discovery and development phases, including some individual tools.	The lack of structure during this phase limits a novice understanding on how to actually tackle the daunting task of designing and developing the product and its systems.	
First Product Release (p. 45)	A multiphase approach to developing innovations and products. The first product release is at a small production and distribution level. The following product releases use real market insights of their previous products to inform their iterations until their final product release.	Silver Fern Farms is currently using an innovation process model where the output is an incremental innovation at high production and distribution levels.	<b>How might Silver Fern Farms adopt a multiphase innovation development strategy that helps them create and test radical innovations in the marketplace at low risk?</b>
Brand Architecture (p. 46)	A strategy where an organisation dominates across the market by developing products with unique value propositions without unintentional brand contamination. This enables organisations to create radical innovations without losing their current user base.	Silver Fern Farms currently produces products under their brand. This limits their ability to create unique value propositions to different markets.	<b>How might Silver Fern Farms design a brand architecture so that they can test new products on early adopter segments before entering mainstream distribution and marketing?</b>



# 06

## DELIVER

Once an innovation has been developed and informed by value creation concepts and user desirability, the next step is the implementation into the market and gaining the acceptance of its users. The definitions of innovation (see Section 3.1) emphasise the successful implementation of innovations. Understanding how different types of innovations are adopted into society is essential to the design and development of innovations. This chapter explores how radical and disruptive innovations are adopted by groups in society. This is dependent on the type of innovation; they either are adopted by the diffusion of innovation model, disruptive innovation theory, or through targeting specific markets. Next, the following section identifies and discusses the challenges in how radical or disruptive innovations diffuse into the mainstream market. This is addressed in Moore's (2014) 'crossing the chasm' and theories of networked communications.

## 6.1 Diffusion of Innovation

The diffusion of innovation model, also known as the technology adoption life cycle, theorised by Rogers (2003), describes the complex mechanisms of how and why products, services, or ideas are adopted. The type of innovations that diffuse into society using this mechanism would be radical innovations (see Section 3.1.1 for more information) due to the radically new and unimagined products (see Figure 41).

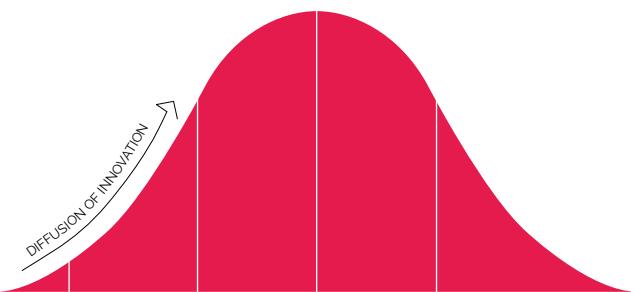


Figure 41 – Diffusion of innovation model. (Adapted from Rogers, 2003)

Innovation diffuses into society through a sequence of adoption groups, all with unique desires, lifestyles, and motivations.

### 6.1.1 The Five Adopter Segments

Rogers (2003) divides the population of adopters into five market segments based on their shared characteristics of demographics and psychographics (see Figure 42 for their relationship and market size). *Innovators* are adventurous, willing to take risks, and have the disposable income to try all new things first. Meanwhile, *early adopters* are willing to adopt an innovation if the benefits are proven. Once a broader market is reached, the *early majority* seeks innovation or incremental improvements to solve specific problems and expects the guaranteed performance of products. The *late majority* avoids risks but are still willing to adopt to avoid being left behind. Finally, *laggards* avoid adopting innovation and heavily dislike change; however, they adopt it if their desired products are now out of circulation. Radical innovations diffuse into society in the order as described above, although the innovation may not be considered radical at the point it enters the mainstream market.

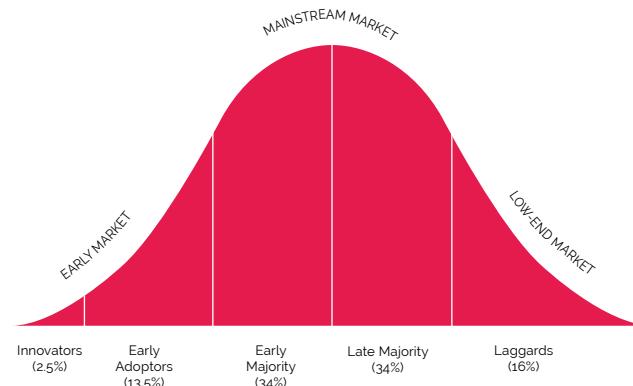


Figure 42 – Five adopter segments of the diffusion of innovation model. (Adapted from Rogers, 2003)

### Insight 16

Figure 43 plots alternative proteins, Silver Fern Farms' products, and other raw meat products onto the diffusion of innovation model. *Honest Burgers* are categorised as an incremental innovation due to the improvement of previous products enhancing its desirability. Alternative proteins, on the other hand, are radical innovations due to the adoption of new technologies. These innovations are driven by emerging consumer trends rather than the well-defined marketplace. Meanwhile, cultured meat products are estimated to be three to five years away from small-scale production and distribution (Beef + Lamb New Zealand, 2019).

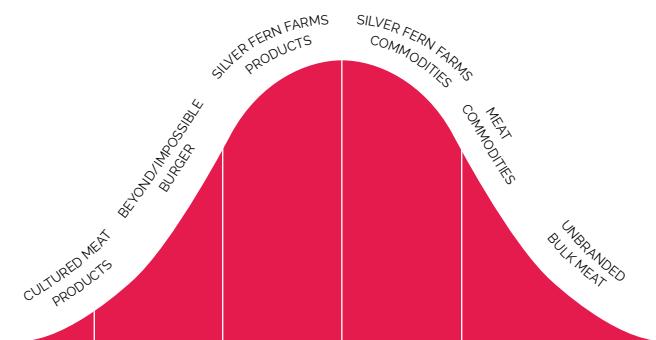


Figure 43 – Meat and alternative protein products plotted on the diffusion of innovation model.

Innovations successfully implemented through the diffusion of innovation mechanisms have certain properties.

## 6.1.2 The Five Success Qualities of Innovation

Rogers (2003) proposes five qualities that determine the successful adoption of radical innovations:

- Relative Advantage – The perception that the innovation is better than others.
- Compatibility – The consistency with the adopters' values and lifestyles.
- Complexity – Factors about the innovation perceived to be challenging to understand and use.
- Trialability – The degree innovation experimentation which lowers perceived risk.
- Observability – The visibility of the impact due to the innovation.

These qualities can be used in innovation development strategies to create success metrics and forecast the level of acceptance. During convergent phases of development and design, critique sessions and stage-gate meetings can utilise these success qualities to provide critical feedback to ultimately increase the chance of an innovation's acceptance and adoption.

### Insight 17

*The Food Product Design paper at Otago Polytechnic utilises a toolkit to answer the questions posed for designing successfully implemented innovations. Compatibility is one of the five qualities emphasised in the project. Analysis of the persona groups leads to an empathetic understanding of their values, lifestyles, and desires. This is then synthesised into key brand and product attributes—broad value statements that can apply to a range of products and services. During the prototyping phase of product design, these attributes are used to validate the desirability of the product. This process allows a creative but broad approach to designing innovative products. Silver Fern Farms uses a different model for assessing the compatibility of products. 'Drivers of Power in the Mind' are statements that describe consumers' product desires. These statements are generally specific to the meat industry (farms, animal, and meat) and are typically applied to a raw meat product. For more on how Otago Polytechnic and Silver Fern Farms understand users, see Section 4.7.*

There is also another type of innovation that diffuses into society through a different model, disruptive innovations.

**How might Silver Fern Farms use the five success qualities of innovation to better gauge and maximise the success of innovations for users?**

## 6.2 Disruptive Innovation Theory

Christensen et al. (2013) describe disruptive innovation as (see Figure 44) the process of entrants (newer, smaller businesses with limited resources) that have discovered the opportunities to address the needs of users in the low-end market often ignored by the incumbents (well-established businesses in the market). Products of the disruptive innovation process are also referred to as 'disruptive innovation'. These innovations are further categorised as passable, of low performance, and associated with a low profit margin. They also describe sustaining innovations as the process and result of incumbents focusing on their most demanding users whilst ignoring the needs of others. In this sense, sustaining innovations share a lot of similarities with incremental innovations (see Section 3.1.1 for more information) as businesses operating in the mainstream market focus on the development of incremental innovations (Hopp et al., 2018).

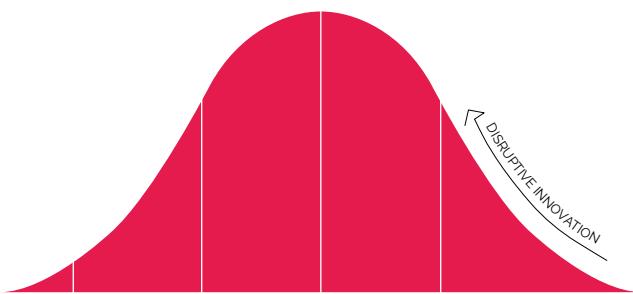


Figure 44 – The disruptive innovation model from the diffusion of innovation perspective.  
(Adapted from Ho, 2021)

Disruptive innovations are sometimes conflated and used interchangeably with radical innovations (Hopp et al., 2018) due to having a similar disruptive effect on the mainstream markets (Yu & Hang, 2008). This can be problematic due to their difference in classifying criteria, mechanisms, and motivations (Christensen et al., 2013). Within this context, radical innovations refer to high-end products as having potentially superior performance and high costs targeted towards the premium market, compared to disruptive innovations originating in the low-end markets (Yu & Hang, 2008). For more on radical innovations, see Section 3.1.1.

## Insight 18

An example of disruptive innovations categorised by Christensen et al. (2013) is Netflix. The initial service back in 1997 did not appeal to the majority of Blockbuster's users, as the small group of Netflix users had to wait several days for deliveries from the Netflix service. As new technologies were introduced, Netflix shifted to streaming videos over the internet, offering an abundant amount of high-quality on-demand videos at a low cost. The lack of attention paid to Netflix and Blockbuster's inability to pivot resulted in their closure. Meanwhile, according to the definition of disruptive innovations proposed by Christensen et al. (2013), Uber is not considered one despite its disrupting effects. This is because it did not originate in the low-end markets, and the mainstream users did not adopt it until the quality of innovation met their standards.

Within the food service industry, food trucks have been identified as an opportunity employed during the emergence of disruptive trends in the United States of America (Asmoro et al., n.d.). Food trucks were first introduced in Los Angeles as loncheras, or taco trucks, serving homemade meals to factory and construction workers on a fixed schedule. Due to their association with the working-class, unwelcomed immigrants, they were labelled as 'roach coaches' or 'maggot wagons'. During the 2008 recession, chefs and restaurant owners struggled to maintain financial sustainability of their businesses. They shifted towards owning food trucks, as they require significantly less investment, utilities, and overhead costs. Additionally, they identified that during this time, customers gravitated towards less expensive comfort food. When food truck owners began to use social media, a recent consumer trend, the industry ushered in the modern gourmet 'Twittering' food truck. Denouncing the 'roach coach' reputation, mainstream markets began to welcome food trucks as a social activity, fostering the local communities.

Although no food-related FMCG has been identified as disruptive innovations, anticipating disruptive innovations, or new technologies that may lead to disruptive innovations, this is an important strategy for maintaining competitive sustainability. Christensen et al. (2013) suggest that incumbents can respond to disruptive innovations in two ways: through a tactical approach or a strategic one. The tactical response requires an investment with their core users to maintain their current business model. Incumbents should not overreact because there is a period before the disruptive effects are felt, given that the innovation succeeds. The strategic approach requires an adaptation to the growth of opportunities that arise from the disruptive innovations, which may include an adoption of the disruptive business models. They suggest that a division be made within the organisation, keeping it separate from the core business. The shadow endorser approach from the brand architecture design (see Section 5.3.2) will enable an overarching organisation to succeed in this approach. These strategies should also apply to radical innovations due to the similar disruptive effects they can have on large businesses.

How might the red meat industry take up opportunities that arise from the disruptive effects of alternative proteins so that they can maintain their mainstream user base while gaining acceptance from the entrants' users?

## 6.3 The Challenges of Radical and Disruptive Innovation Adoption

Innovations being categorised as radical and disruptive is not a guarantee that the innovation will be adopted into the mainstream market. This is because adoptions of innovations, especially radical and disruptive ones, follow the diffusion mechanism of complex contagions (Centola, 2018). Complex contagion is the social phenomenon in which multiple sources of exposure to an individual are required before an individual adopts the innovation and changes behaviours required for radical and disruptive innovations. Simple contagion, unlike complex contagion, only requires a single instance of exposure to transmit to another individual. Examples of simple contagions are diseases and information.

Moore (2014) has investigated the diffusion of innovation model further and found 'cracks' and 'chasms' that challenge the adoption of radical innovations. Additionally, Keeley et al. (2013) found 96% of disruptive innovation fails to make a return on investment, enter the mainstream market, and truly challenge the incumbents. Ho (2021) has combined the diffusion of innovation theory, disruptive innovation theory, and the concept of Moore's (2014) chasm into a hybrid model (see Figure 45).

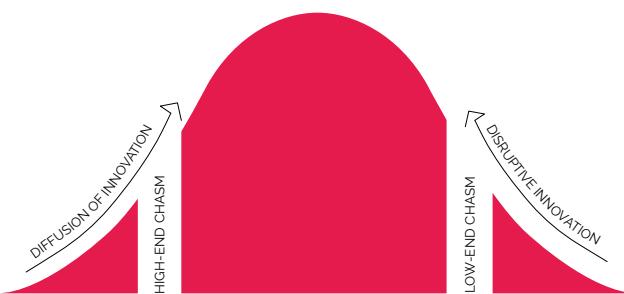


Figure 45 – Radical and disruptive innovation diffusion model. (Adapted from Ho, 2021)

### 6.3.1 'Crossing the Chasm'

Moore's (2014) chasm represents the difficulty of transitioning from the early market to the mainstream market. The difference between the adopters' pre- and post-chasm responses are their expectations and motivations. Moore found that the early adopters are looking for radical change from the old ways and accept the glitches and poor support. Their reason for adoption is to achieve an early competitive advantage in their business or individual self-image. In contrast, the early majority are generally more pragmatic, looking for an incremental improvement towards solving a problem. Moore concludes that crossing the chasm requires creating the whole product (the product and its support structures), market-competitive pricing, and targeted communication of each adopter group through the proper channels. Ho (2021) also attributes Moore's (2014) chasm as between the low-end market and mainstream market. This is because disruptive innovations also face crossing the chasm to 'disrupt' the incumbents of the mainstream marketplace, where the desires of the markets differ.

### Insight 19

Avis (2020) discussed two products fundamentally challenging the culture around 100% alternative proteins or 100% meat products. These products are considered in the meat-plant blend food category, combining both alternative proteins (and vegetables) and meats. Additionally, it was outlined that the products are marketed towards flexitarians or those eating meat-reduced diets with nutritional, ethical, and environmental motivations. Some examples of the meat-plant hybrid products are Raised & Rooted's 'The Blend Steakhouse', a combination of Angus beef and isolated pea protein patties, and Perdue's Chicken Plus line of chicken breast and vegetable dino nuggets (targeting kids' preferences). These products are in the premium market of innovators and early adopters and they are now challenged by the chasm between markets. These products are in direct contrast to the position of Silver Fern Farms' 97% Honest Burgers.

The Food Product Design paper at Otago Polytechnic considers the difficulty of mainstream market implementation, although it is not actualised due to the time restraints and other limitations. This is due to the consideration of the allocated persona group during the project. Several empathetic tools from design thinking (see Section 3.4) are available for students to use that will allow effective communication strategies towards the mainstream market. If the students decide to continue the project post-submission, they have the agency to transition to other persona groups, along with utilising the guidance and mentorship of the Food Design Institute and other possible collective networks (The Distiller Incubator).

Silver Fern Farms does not necessarily need to consider the chasm due to their users primarily being located in the mainstream market. However, understanding the tools and strategic marketing campaigns adopted by the alternative protein sector is necessary for marketplace survival, which will require a cross-sectoral strategic campaign. If Silver Fern Farms wants to shift the product-to-commodity ratio to produce more products than the current offerings, consideration of the chasm is required.

**How might the red meat industry collaborate with other sectors (health and environmental organisations) to create a meat-positive narrative to prevent the total mainstream market adoption of alternative proteins?**

## 6.3.2 Communication and Opinion Leaders

Rogers (2003) discovered that communication is a crucial factor in the adoption mechanism. Mass media channels are only more effective for early adopters that seek new experiences and innovation. However, the majority of users heavily rely on interpersonal channels of communication for discovery and acceptance.

Here, opinion leaders within the innovators or early adopters play a critical role in this communication. In the digital age, social media, blogs, forums, and other networking sites are providing a digital platform for opinion leaders to express their opinion on matters (San José-Cabezudo et al., 2012). Merwe and Heerden (2009) found three pathways to influence adoption behaviours: 1) acting as a role model to be copied, 2) word-of-mouth advertising, and 3) straightforward advice on purchase and use. 'Influencers' are another term brought up in the digital opinion leaders literature. Zak and Hasprova (2020) have defined influencers as an alternative term used for digital opinion leaders using social media platforms. Although they found other factors other than influencers affecting purchasing behaviour for food, they acknowledge that influencer marketing could have an effect.

### Insight 20

*Beef + Lamb New Zealand (n.d.-a) has introduced Iron Maidens as ambassadors and opinion leaders to communicate their positive relationship with the meat industry and their products. Although there might be some success initially, this is ineffective in truly influencing specific adoption market segments. What I've Learned (2021), a YouTube content creator, released a video titled 'Eating less Meat won't save the Planet. Here's Why' investigating some of the myths and misleading research articles of the US meat industry by consulting with specialists and citing opposing articles. The video was met with controversy when other content creators (Mic the Vegan, Earthling Ed, Unnatural Vegan) released response videos.*

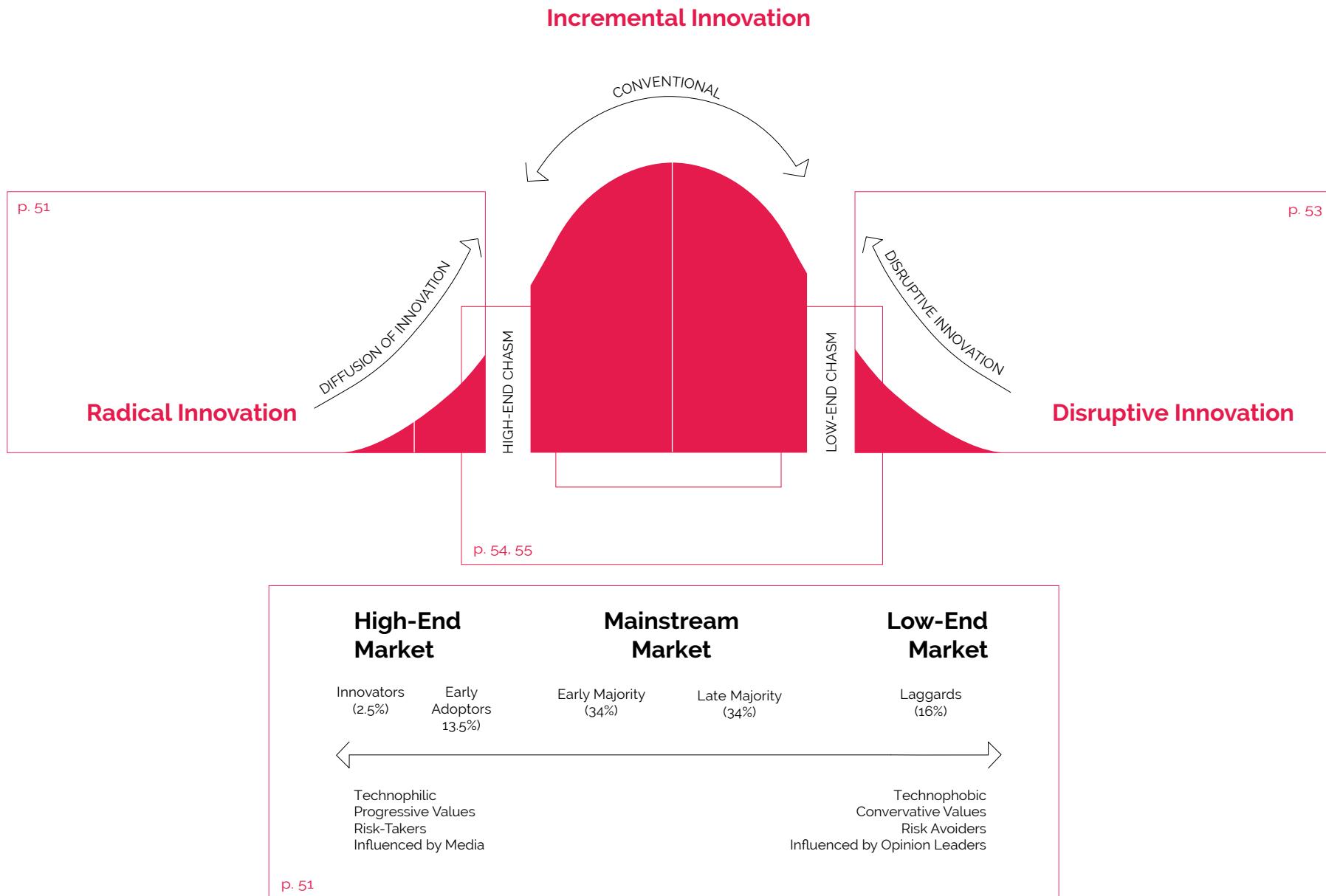
*A Beef + Lamb New Zealand (n.d.-b) report investigated the new cultural narrative around meat by influencers. They found that mainstream influencers are pushing for the reduction in red meat consumption as a mindful, healthy lifestyle choice in building energy, power, and performance benefits. Professional athletes (Williams sisters and David Carter), aspirational influencers (Bill Gates and Samuel L. Jackson), and pop culture at large (Netflix documentaries, the Veganuary movement, and bloggers) are all promoting the narrative of reducing the consumption of red meat.*

*If Silver Fern Farms and the red meat industry want to strategically respond to radical and disruptive innovations like alternative proteins, appealing to the same market and reflecting their business models is a necessity (see Insight 16). However, a cautious approach is advised. Highly connected influencers within personal networks may not only not help radical innovations succeed, but they can also inadvertently undermine any future attempts at innovation (Pescosolido & Smith, 2021). Exposure is only good for simple contagions like incremental innovations. This is what caused Google Glass to fail in entering the mainstream market. The pathway for implementing radical innovations requires clustering innovators and early adopters within the social network (Centola, 2018). This restricts commentary contamination from the mainstream market, preventing the severity of Moore's (2014) chasm, and enables innovators and early adopters to embrace their roles as opinion leaders, exposing the innovations to the mainstream market organically.*

*How might the red meat industry cluster innovators and early adopters together to assist the spread of radical red meat products in those adopter groups so that their roles as opinion leaders in the mainstream market can take place?*



## 6.4 Chapter Summary



Concept	Description or Definition	Insight	Opportunity
Deliver (p. 16)	Concerning the implementation and adoption of innovations into society.		
Diffusion of Innovation (p. 51)	The mechanism that describes the way radical innovations diffuse into society.		
Five Adopter Segments (p. 51)	Innovation is adopted into society through a sequence of adopter segments: innovators, early adopters, early majority, late majority, and laggards. This sequence follows a pattern of a reduction in technophilia, risk-seeking behaviours, and media influence.	Cultured meat products are in the innovators space or yet to be into the market; alternative proteins are in the early adopters group; Silver Fern Farms' products are in the early majority groups and late majority; meat commodities are located around the late majority; and unbranded bulk meat is in the laggards section.	
Five Success Qualities of Innovation (p. 52)	Radical innovations require five qualities to successfully diffuse into society: relative advantage, compatibility, complexity, trialability, and observability.	Silver Fern Farms uses market segments and the Food Design Institute use personas to qualify the compatibility of their users.	<b>How might Silver Fern Farms use the five success qualities of innovation to better gauge and maximise the success of innovations for users?</b>
Disruptive Innovation Theory (p. 53)	An alternative mechanism that describes the way disruptive innovations diffuse into society. These innovations are of low performance, just passable, and have low profit margins, where small businesses target the low-end market.	Strategies of disruptive innovation theory can apply to radical innovations of the diffusion of innovation model. This is due to the similar disruptive effects of radical innovations. Investing in their current users and appealing to the emerging markets is required to maintain long-term sustainability for the incumbents.	<b>How might the red meat industry take up opportunities that arise from the disruptive effects of alternative proteins so that they can maintain their mainstream user-base while gaining acceptance from the entrants' users?</b>
Moore's (2014) Chasm (p. 54)	There is a challenge for the adoption of radical innovations between the early adopters and early majority groups. Ho (2021) identified that there is also a low-end chasm between the laggards and late majority for disruptive innovations.	Silver Fern Farms currently produces products under their brand. This limits their ability to create unique value proposition to different markets.	<b>How might Silver Fern Farms design a brand architecture so that they can test new products on early adopter segments before entering mainstream distribution and marketing?</b>
Opinion Leaders (p. 55)	Innovators and early adopters can be categorised as opinion leaders, necessary for the acceptance of radical innovations by the mainstream market.	Clustering innovators and early adopters and restricting the access of the mainstream market are necessary for the early adoption of radical innovations. Alternative protein businesses have reached a critical mass in the social network which enables their innovations to diffuse into the mainstream market.	<b>How might the red meat industry cluster innovators and early adopters together to assist the spread of radical red meat products in those adopter groups so that their roles as opinion leaders to the mainstream market can take place?</b>



# 07

## SYSTEMS OF INNOVATION

The concept of the innovation system emphasises that the flow of technology, resources, knowledge, and information among individuals, enterprises, and institutions is essential in creating innovations. Several innovation system concepts are explored throughout this chapter. Firstly, this chapter describes what complex systems are and their relation to innovation systems. Then we define what innovation systems are their boundaries. Finally, innovation clusters (geographically focused) and innovation ecosystems (activity-based focus) are explored, finding insights and gaps in the systems.

## 7.1 What is a System?

Kim (1999) has defined a system as a group of interacting, interrelated, or interdependent elements that form a complex and unified whole that has a specific purpose. Systems express emergent behaviours as the elements are ordered, allowing the collective whole to function together, or rather, the whole is more than the sum of its parts. Innovation systems exhibit complexity, as there are many parts, and they contain multi-level interactions and relations (Carayannis et al., 2016). Investigating complex systems requires the attention of several properties listed below (see Figure 46):

- Self-Organisation – Complex systems have the ability to self-organise themselves based on both external and internal activities and feedback mechanisms (Carayannis et al., 2016). This allows systems to adapt and evolve.
- Multi-Level – Systems do not exist in isolation and are necessarily hierarchical. Systems interact with microsystems, macrosystems, and systems within the same level (Carayannis et al., 2016). Innovation systems operate at local, national, and transnational levels.
- Decentralised – The elements within a system are ultimately distributed without centralised control (Frenken, 2001). Although this applies to innovation systems, organisations have the ability to encourage and facilitate growth and development.
- Purpose – Complex systems have a purpose of carrying out a function (Kim, 1999). Within the context of innovation systems, the purpose is to develop, implement, and utilise innovations.
- Activities – Activities are carried out by agents to fulfil the system's purpose and are the key factors that determine the performance (Kim, 1999). Examples of activities within an innovation system are research programmes and new product development.
- Open Systems – A system considered open has inputs and outputs of resources between it and other systems or the environment (Gassmann et al., 2010). Open innovation refers to the inflows and outflows of an organisation's innovation process with other organisations.

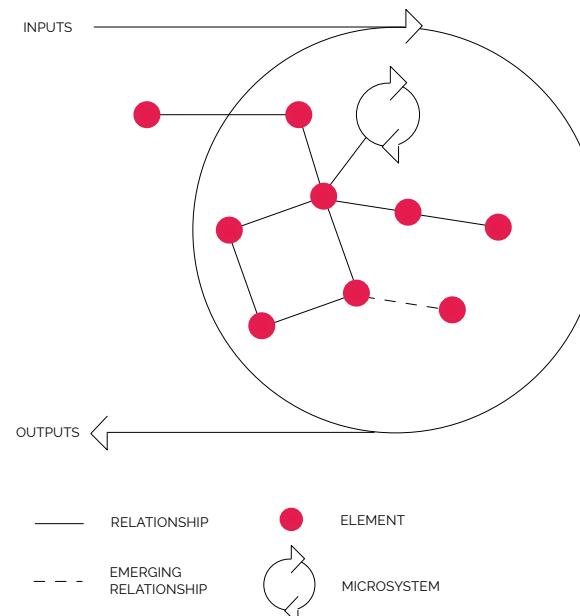


Figure 46 – Components of a complex system.

## 7.2 Innovation Systems

Organisations are now becoming more reliant on transdisciplinary networks and collaborations to maintain competitiveness as business environments have increasingly dynamic, complex, creative (Ketonen-Oksi & Valkokari, 2019), nonlinear, agile, and knowledge-based economies within the business environment (Smorodinskaya et al., 2017). The complexities on a whole systems level are illustrated in Figure 47, where the socioeconomic development is the result of continuous interaction and exchange of knowledge between and within entities and systems of society (Carayannis et al., 2016; Carayannis & Campbell, 2010). Activities and outputs are discussed in the Innovation (Chapter 3), Discover (Chapter 4), Develop (Chapter 5) and Deliver (Chapter 6) chapters.

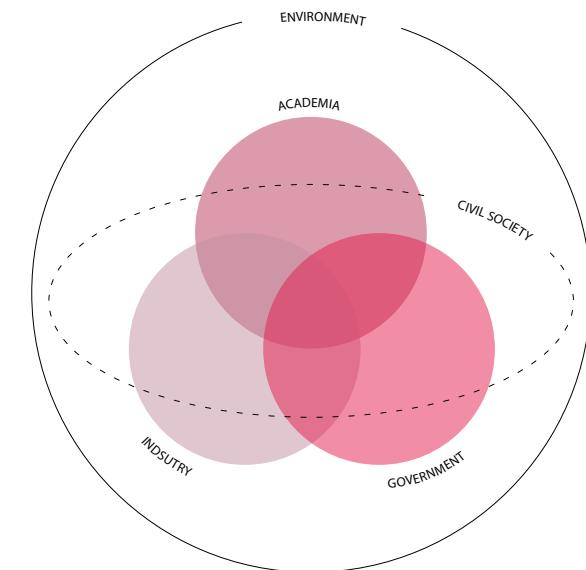


Figure 47 – Illustration of socio-ecological systems interacting. (Adapted from Carayannis & Campbell, 2010)

## 7.2.1 Boundaries of Innovation Systems

Investigating innovation systems requires the consideration and clarification of their boundaries as insights gained are based on how they are defined. Although Edquist (2006) found no universal definition of the boundaries of innovation systems, they concluded that boundaries are selected depending on the purpose of investigation. They have identified three boundaries of innovation systems: geographical, sectoral, and in terms of activities. The majority of innovation systems literature no longer reflects the highly dynamic and complex innovation environments (Smorodinskaya et al., 2017). Therefore, cluster theory and innovation ecosystems have considered those properties.

The following sections will explore the two derived but applicable theories of innovation systems. Porter's (1998) cluster theory emphasises a geographically bound innovation system, whereas innovation ecosystems tend to lean towards activities. It is important to note that cluster theory and innovation ecosystems are not mutually exclusive but instead take a different perspective and present different arguments. In this paper, sectorally bound innovation systems are not explored due to the limited value of identifying cross-functional and transdisciplinary gaps in innovation systems.

## 7.3 Cluster Theory

Companies are now able to source technology, information, goods, and other forms of capital due to a growing and easily accessible globalised market economy (Porter, 1998). This argument is based on the idea that a more open and globalised market will result in faster transportation, communication, and access to resources otherwise unavailable, thus neutralising location as a source for competitive advantage. Porter (1998) introduced cluster theory as a response to this, whereby developing a localised cluster provides a competitive advantage in a globalised economy.

Porter (1998) has defined clusters as '... geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions (universities, standards agencies, trade associations) in a particular field that compete but also cooperate'. Meanwhile, Menzel and Fornahl (2010) clarified the types of boundaries of cluster as containing both thematic (related industries and institutions) and spatial (geographically concentrated). See Figure 48 for their visualised interpretation of clusters. Cluster literature directly references the properties of complex dynamic systems (Smorodinskaya et al., 2017). Silicon Valley is an example of a renowned and highly productive cluster. The proximity and density of clusters enable the accessibility of specialised knowledge, human capital, and other resources (Porter, 1998). In addition to proximity, environmental features (airports and harbours) are elements worth considering that may affect the transportation activities of businesses.

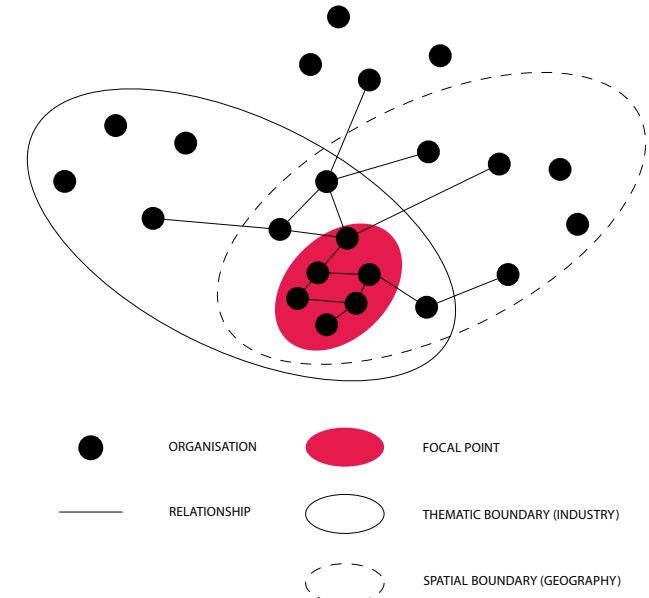


Figure 48 – Elements of clusters. (Adapted from Menzel & Fornahl, 2010)

Porter's (1998) cluster theory emphasises productivity as the central concept and output considered. Highly productive organisations require applying sophisticated methods and advantage technologies. However, Porter clarified that all businesses, including small- to medium-sized businesses, can utilise these methods and technologies if they are knowledge-intensive. In addition to productivity, efficiency, effectiveness, and flexibility are other advantages businesses gain in a cluster (Porter, 1998). Therefore, productivity can be viewed as activities of value creation or value-adding.

Clusters promote several activities that increase the productivity of organisations that participate: competition, cooperation, and innovation (Porter, 1998).

### 7.3.1 Competition, Cooperation, and Innovation

The literature on innovation systems excludes competition as an essential part of productivity and performance to a system of innovation. Porter (1998) stated that competition involves the gaining and retention of a user base and is considered a necessary activity both for the health of the organisation and the cluster. This is achieved by continuous innovation and being more productive with the inputs available rather than obsessing over input costs. Porter (1998) noted that in reality, businesses are not necessarily directly competing with each other despite offering highly similar products. This is because their offerings generally target different markets with different purchasing motivations and behaviours.

Porter (1998) has also identified that cooperation is another defining feature of clusters. The relationships between businesses, governmental bodies, and other institutions (universities, standard-setting agencies, think tanks, vocational institutes, and trade associations) are fundamental to the nature of clusters. These diverse organisations provide specialised training, education, information, knowledge, research, and technical support to those that interact with them, resulting in the increased productivity of participating organisations. In addition to proximity enabling the ease of communication, it also minimises transportation and cost of sourcing locally where both formalised (partnerships) and informal relationships are critical to the health of clusters (Porter, 1998).

A significant output of clusters that have been identified are innovations (Porter, 1998). This is achieved by sharing intimate knowledge of consumers within clusters to discover opportunities whilst providing the capacity and flexibility to act due to the ability to source locally swiftly. Formalised relationships, such as vertically integrated companies, hinder the ability to respond quickly due to the inflexibility of such organisational structures (Porter, 1998).

#### Insight 21

Dunedin is increasingly being identified as a hotspot of productivity and innovation. This is the result of a tight-knit network of cross-functional organisations that openly share knowledge and resources. DunedinNZ (n.d.) has listed organisations and programmes that contribute to Dunedin's innovation cluster development. Tertiary students can apply to Audacious if they wish to be mentored in starting up a business. Enterprise Dunedin, a local government body, provides free business clinics offering guidance and knowledge of government regulations. Start-up Dunedin contributes to the growth of the start-up ecosystem. The Distiller, Petridish, and Inno8HQ offer a coworking space for the early stages of development and a network of support. Otago Angels Ltd. may provide investment opportunities in addition to the national and global crowdfunding platforms. The Food Design Institute at Otago Polytechnic is doing their part in the local cluster development. As part of the Bachelor of Culinary Arts programme at Otago Polytechnic, several projects are grounded in the local business culture with collaborations spanning across other departments at Otago Polytechnic, the neighbouring university, a wide range of restaurants and food service businesses, the FMCG sector, and other related industries.

The question now becomes, is Dunedin considered a cluster? And if so, what stage is the cluster at? Menzel and Fornahl (2010) have identified four stages of a cluster's lifecycle: emergence, growth, sustainment, and decline. These stages depend on the number of small businesses, the employment rate, and technological diversity among the companies and institutions involved (see Figure 49). Clusters can transition from sustainment to a new stage of growth when knowledge heterogeneity increases through either incremental adaptation to changing environments or radical adoption of new technologies. The Dunedin cluster is categorised within the growth phase of a cluster's life cycle. This is because the number of employed individuals in Dunedin has grown just over 7,500 people from 2013 to 2018 (id, n.d.). However, further research is required to discover the relationship between this growth and the start-up community. DunedinNZ (n.d.-a) quoted notable individuals within the start-up community, stating that there was a growth in innovative Māori enterprises. In addition to this, it was also estimated that the survival rate of start-ups was at around 50-60% compared to the typical 10% typical in the start-up community. Klepper (2007) identified another indication of emerging and growing clusters is the

formation of spin-off firms (incubators and think tanks), which facilitate the creation and development of start-up businesses. This is consistent with the categorisation of the Dunedin cluster within the growth phase due to the interconnected start-up community previously discussed.

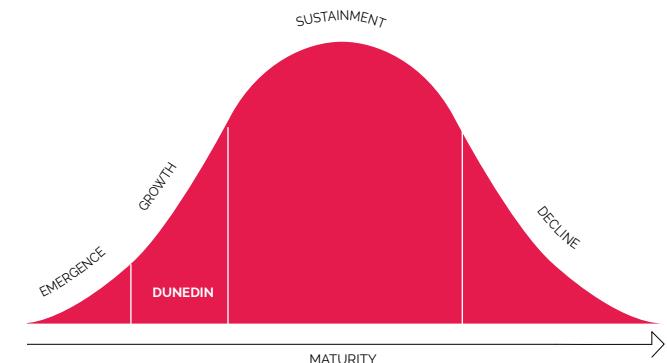


Figure 49 – Dunedin plotted on the cluster life cycle (Adapted from Menzel & Fornahl, 2010)

Silver Fern Farms is a business spread across the nation, collaborating with cross-sectoral organisations. Section 7.4 explores the types of organisations Silver Fern Farms are engaging with as part of their ecosystem. This insight will explore the engagement with Dunedin, the local community. Insight 7 explores the role of the red meat industry and Silver Fern Farms in shared value, a concept related to cluster health and development. Figure 50 displays the Silver Fern Farms' science partnerships and research projects. It is important to note that this visual focuses on research projects and does not fully represent their full local engagement. An example of an engagement not shown is Chef Greg Piner, a Silver Fern Farms' food consultant representing Dunedin's food scene. Silver Fern Farms currently does not engage with the large start-up community in Dunedin. This is worth noting due to their resources, knowledge, and innovation processes that could complement the partnerships already in place for Silver Fern Farms. Collaborations with these organisations or investigating their practices is an opportunity that may lead to insights in developing radical innovations. Additionally, the figure excludes competitive relationships, a necessary component of cluster productivity.

### 7.3.2 Cluster Thinking

Cluster thinking, or cluster-based thinking, is an approach that organisations can utilise to increase their productivity whilst enhancing the cluster and other organisations (Porter, 1998). There are four interconnected strategic agendas detailed below:

- Choosing Location – Location is an increasingly important consideration as it relates to innovation and productivity. Input costs, access to knowledge and specialised resources, and proximity to other organisations are all influenced by the location choice. An organisation's home base should be placed within a productive cluster.
- Engaging Locally – Communication and interactions facilitate the exchange of knowledge and other resources. Engagement should consist of personal relationships of in-person contact and shared interest activities to achieve a local presence. Local investments into schools and research groups are also necessary to foster continuous relationships. Shared value (Porter et al., 2011) is also a way to achieve engagement.
- Upgrading the Cluster – Efforts to develop the cluster are necessary for the cluster's health, including organisations that are active within the cluster. Upgrading the cluster brings long-term benefits not necessarily seen in the short term. Again, like the previous bullet point, creating shared value means investing and developing the cluster.
- Working Collectively – Trade associations are taking on additional roles as forums for the open exchange of ideas. These associations can lead in research activities and assist in the establishment of university or government communications.

[FIGURE REDACTED DUE TO THE COMMERCIAL NATURE  
OF THE INFORMATION CONTAINED WITHIN IT]

Figure 50 – Silver Fern Farms' collaborative research projects in Dunedin. (Modelled with Kumu, 2021) [Retained caption for readers to follow]

**How might Silver Fern Farms better engage with Dunedin's start-up community so that they can adopt practices that may lead to higher forms of value creation and radical innovations?**

Innovation ecosystems is another concept within the recent literature of innovation research (Ketonen-Oksi & Valkokari, 2019). The concept is derived and has branched from innovation systems that introduce new ideas from a more nuanced understanding of the nature of complex systems (Granstrand & Holgersson, 2020; Ketonen-Oksi & Valkokari, 2019).

## 7.4 Innovation Ecosystems

Innovation ecosystems literature emphasises value co-creation, competition, coevolution, and the importance of artifacts in addition to collaboration, unlike the research in innovation systems (Granstrand & Holgersson, 2020). Granstrand and Holgersson (2020) defined innovation ecosystems as '... the evolving set of actors, activities, and artifacts, and the institutions and relations, including complementary and substitute relations, that are important for the innovative performance of an actor or a population of actors'. They further clarify the definition of both artifacts and actors. Artifacts are any tangible or intangible inputs and outputs (knowledge, innovations, products, services, technologies, and other resources), and actors include institutional entities (universities, business schools, businesses, venture capitalists, research institutions, governmental supporting departments, funding agencies, and policymakers), which is comprised of material resources (funds, equipment, and facilities) and human capital (students, faculty, staff, industry researchers, experts, and representatives).

### 7.4.1 The 'Eco' in Ecosystem

Some scholars critique the use of the word 'eco' in ecosystems. Oh et al. (2016) states that the 'eco' qualifier is a flawed analogy to natural systems and adds nothing of substance. Innovation ecosystems add additional ideas and concepts to innovation systems research, including references to complex and natural systems. Smorodinskaya et al. (2017) describe ecosystems as having properties of self-organisation, the inability to be established directly, dynamism and agility, the co-creation of value, nonlinearity, the circularity of resources, and collaboration. These properties are not discussed within the literature of innovation systems, and thus that literature does not reflect today's dynamic and competitive business environment. They conclude that the distinction between innovation systems and innovation ecosystems is justified and valuable in its application to organisations and innovations research.

### 7.4.2 Collaboration as Co-Creation of Value

An innovation-conducive environment (innovation ecosystem) is the best way to nurture innovation and productivity in businesses, achieved through the co-creation of value through collaborative activity (Smorodinskaya et al., 2017). Ketonen-Oksi and Valkokari's (2019) analogy of 'growing the pie' and 'slicing the pie' encapsulates the dynamic balancing of value creation and sharing across stakeholders and organisations in an attempt to describe a healthy performing innovation ecosystem. Collaboration is not necessarily about the frequency of interactions but rather the holistic quality of the relationships, including various forms of interactive communication (Smorodinskaya et al., 2017).

Ketonen-Oksi and Valkokari (2019) have found that platforms, both physical and digital venues, enable and facilitate communications and interactions between actors. These venues can either allow selected actors to communicate with each other, one-on-one, or in a larger gathering where various actors are encouraged to join. Platforms, in turn, facilitate actors to become interested in project-based value co-creation. (Ketonen-Oksi & Valkokari, 2019). The digital platform leaders, such as Apple, Facebook, and Google, are fundamental to communication and collaboration within the knowledge society (Smorodinskaya et al., 2017); however, physical spaces are essential to a more human way of communication and understanding each other (Ketonen-Oksi & Valkokari, 2019).

### Insight 22

*Silver Fern Farms has started to engage in mapping their ecosystem. Note that Insight 19 explores Silver Fern Farms' local engagement with the Dunedin cluster, whereas this concerns collaborative activities. The boundaries of the ecosystem project were selected based on the utility Silver Fern Farms is interested in, which affected where the ecosystem maps were co-created. Their ecosystem has been mapped with Kumu (2021), a web-based network mapping tool, as part of the research using their database. The ecosystem is designed based on degrees of separation from Silver Fern Farms in the following order: areas of interest to Silver Fern Farms, collaborative research projects, and then participating organisations.*

*Figure 51 shows the Silver Fern Farms' ecosystem, and Figure 52 filters the ecosystem based on their current project stage. The majority of their projects are either in the preparation or research stages and have output times within the next five years. Most of the research Silver Fern Farms has engaged with has concerned the current practices located at the front end of the value. This is a response to the implementation of the government's carbon-zero policy. Additionally, the aim of creating low or net-zero carbon emissions creates value to their primary offerings of commodities (see Insight 2). The ecosystem map is currently still in its infancy, displaying insights of limited value.*

*However, the ecosystem is considered an interactive, living document. Iterations and experimentations of the document will lead to the discovery of gaps in the ecosystem, other insights, and opportunities.*

*[FIGURE REDACTED DUE TO THE COMMERCIAL NATURE  
OF THE INFORMATION CONTAINED WITHIN IT]*

*Figure 51 – Silver Fern Farms' ecosystem. (Modelled with Kumu, 2021)  
(Retained caption for readers to follow)*



*[FIGURE REDACTED DUE TO THE COMMERCIAL NATURE  
OF THE INFORMATION CONTAINED WITHIN IT]*

*Figure 52 – Silver Fern Farms' research project ecosystem. (Modelled with Kumu, 2021) [Retained caption for readers to follow]*

**How might Silver Fern Farms further develop and map their ecosystem to better visualise activities and organisations they are engaged with?**

**How might Silver Fern Farms use their ecosystem maps to identify gaps and opportunities for further collaborative activities?**

## Insight 23

Assessing the quality of Silver Fern Farms' ecosystem will require investigating the types of active collaborations. Pöyhönen and Smedlund (2004) have identified three types of knowledge networks critical for the health and effectiveness of clusters and ecosystems: production networks, development networks, and innovation networks (see Figure 53). An organisation engaged with clusters are involved with all types of networks, but they generally specialise in one type.

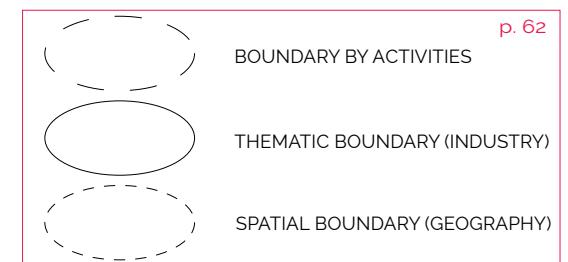
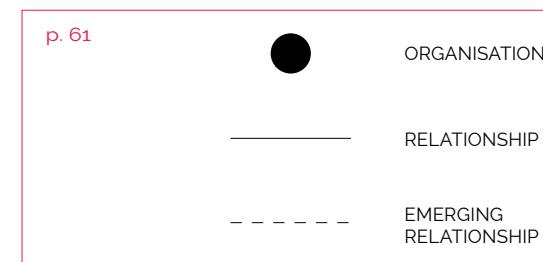
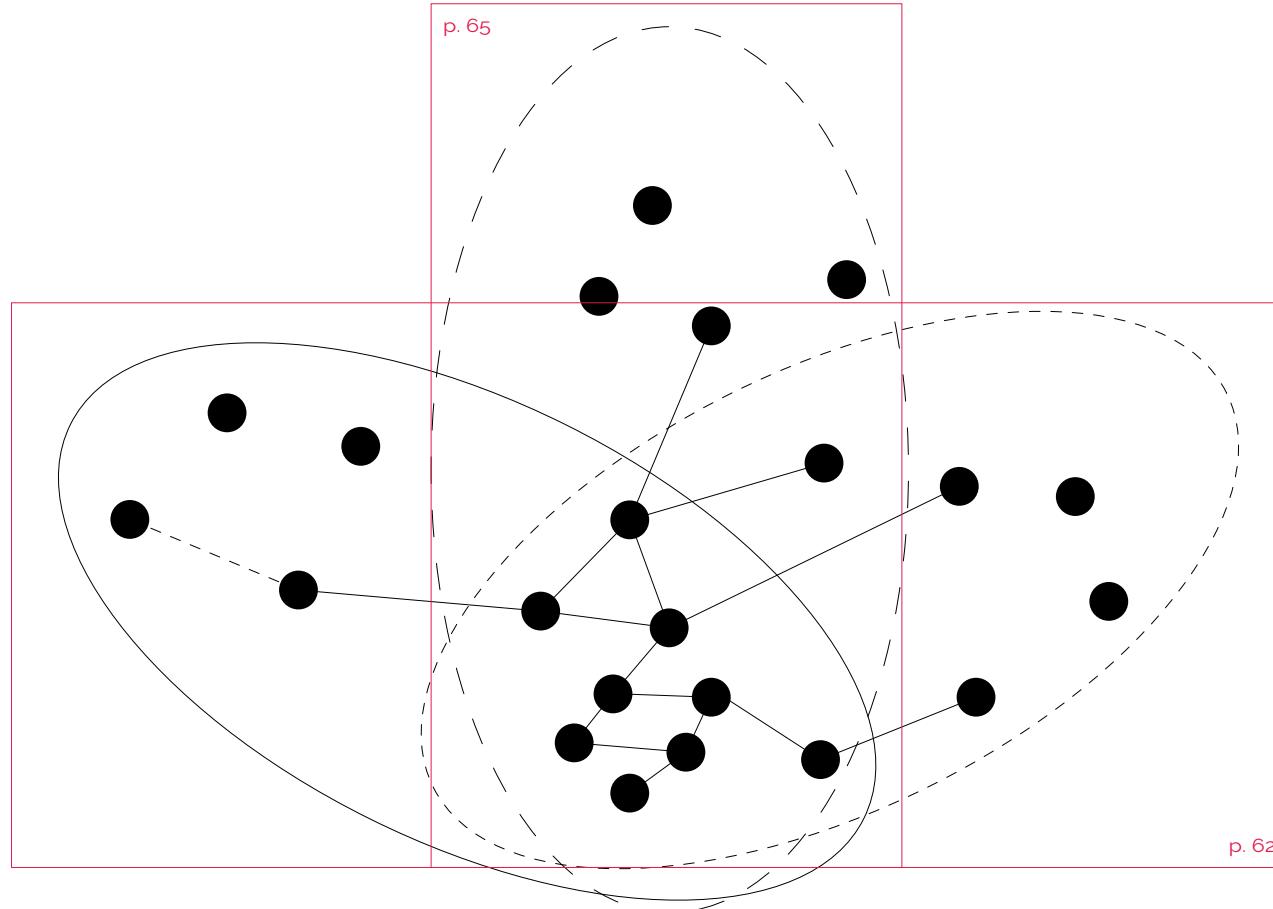
Silver Fern Farms is involved within the production network, as discussed using the concept of the value system (see Insight 4). The NZFAP (2020) is an example of top-down implementation of regulations. They require an effective production line to produce consumer goods. Silver Fern Farms' relationship with Otago Polytechnic would be considered an example of the development network. The organisations are represented with a few select individuals to maintain their relationships that generally requires personal communication. The collaborative projects are generally designed to share knowledge between the organisations, creating shared value for all participants (see Insight 3). The primary network Silver Fern Farms is specialised in is the innovation network. They have an abundant number of relationships with other organisations in order to create new knowledge around sustainable and regenerative practices.

These networks appear not to be mutually exclusive and have some overlap. The value system has two-way communication, and the exchange of tacit knowledge and feedback is required for the discovery of opportunities leading to research projects. Figure 53 explains further the types of activities Silver Fern Farms is engaged in in the innovation network.

Brand/Company	Production Network	Development Network	Innovation Network
Illustration			
Network structure	Mechanical, vertical, hierarchical	Organic, horizontal, reciprocal	Dynamic, diagonal spontaneous and abundant
Aim/Purpose	Efficiency in production, regulatory	Empowerment through the change of knowledge	Collaborative creation of knowledge and innovation
Relationship	Long-term, production-related	Either long or short-term	Until activities are completed
Communications	One-way, top-down, direct use of power, not geographically defined	Multi-way, face-to-face, locally defined	Complex, sporadic, in excess, both locally and not geographically defined
Knowledge/Competency	Defined, explicit	Experimental, hidden, tacit	Intuitive, potential

Figure 53 – Summary of the three types of knowledge networks. (Adapted from Pöyhönen & Smedlund, 2004)

## 7.5 Chapter Summary



Concept	Description or Definition	Insight	Opportunity
System (p. 61)	A group of interacting and interdependent elements that form a unified whole. Innovation systems incorporate complexity where systems self-organise, are multi-level, are decentralised, have a purpose and activities, and are considered open.		
Innovation Systems (p. 61, 62)	Innovation systems are reliant on transdisciplinary networks and collaborations to remain competitive and productive. Innovation systems are dynamic, complex, creative, nonlinear, agile, knowledge-based, and the result of socio-ecological systems interacting within and between each other.	Innovation systems have constructed boundaries depending on the purpose of investigation. These boundaries are either geographical, sectoral, or in terms of activity.	
Cluster Theory (p. 62)	Geographic concentrations of related companies where collaboration and competition happen. Cluster thinking is the perspective that engaging with the local region is a competitive advantage in a globalised world.	Dunedin is categorised as a cluster in its growth phase of maturity. This is because there is a surge in start-up companies where a social network of start-up related businesses, government bodies, and academia exists. However, Silver Fern Farms is currently not engaging with this network.	<b>How might Silver Fern Farms better engage with Dunedin's start-up community so that they can adopt practices that may lead to higher forms of value creation and radical innovations?</b>
Innovation Ecosystems (p. 65)	A set of evolving and related actors, activities, and artifacts of collaboration and competition where it strongly influences the innovation outputs. The 'eco' qualifier emphasises the importance of the natural system and the complex business environment. Co-creation of value is also considered a highly essential concept.	The Silver Fern Farms' innovation ecosystem is developed around collaborative projects, a small aspect of an innovation ecosystem. The primary areas of research identified from Silver Fern Farms' ecosystem were concerning value creation in the front-end of their value systems and the early product concept research. The ecosystem is currently in its infancy, where further development and investigation is required to identify gaps.	<b>How might Silver Fern Farms further develop and map their ecosystem to better visualise activities and organisations they are engaged with?</b>
			<b>How might Silver Fern Farms use their ecosystem maps to identify gaps and opportunities for further collaborative activities?</b>

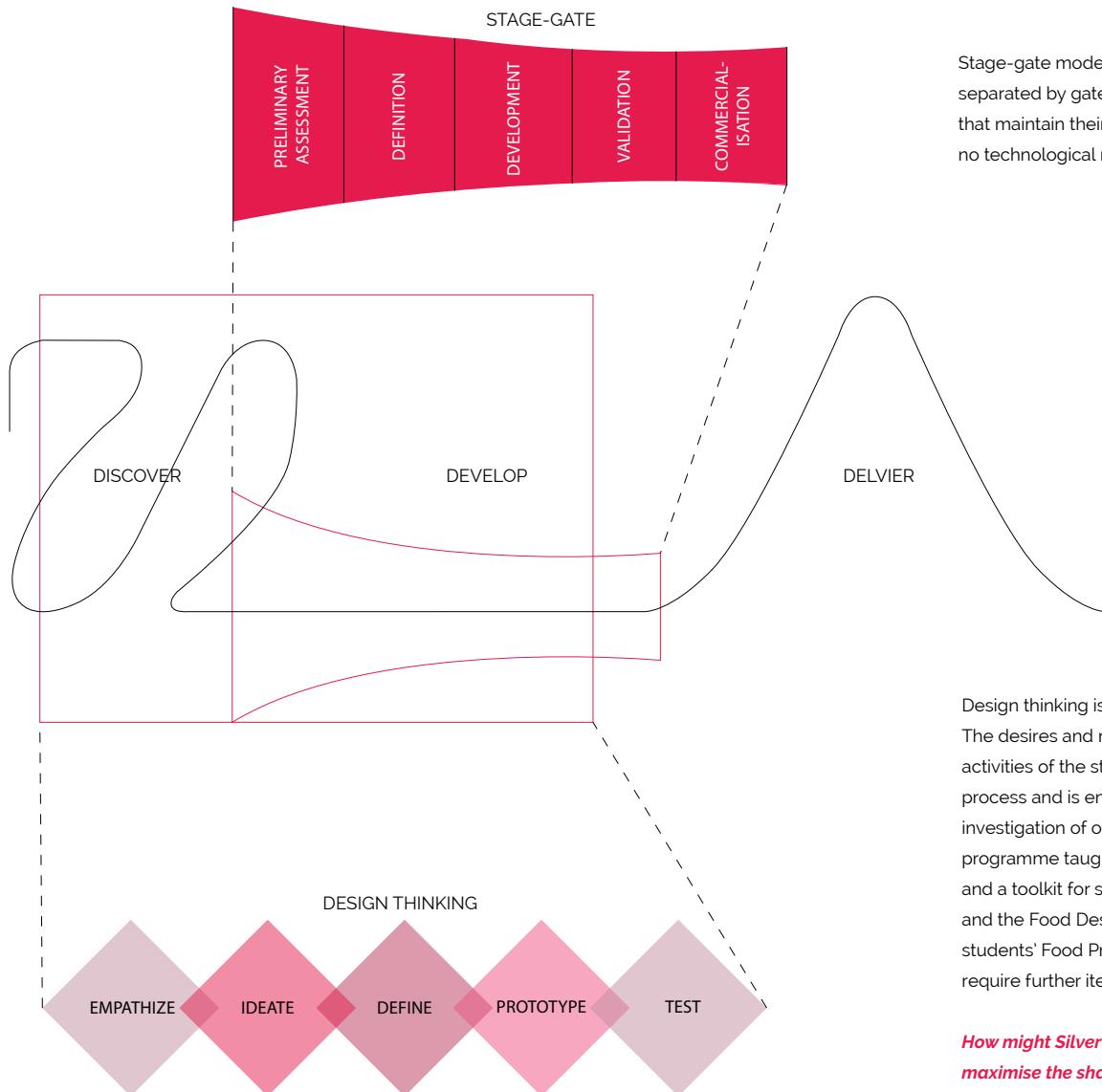


# 08

## EXECUTIVE SUMMARY CONCLUSION

This report investigated several significant concepts within innovation through a hybridised lens of design thinking, systems thinking, and regenerative thinking. The meat industry, their competitors, Silver Fern Farms, and the Food Design Institute were explored and conceptualised, given the central innovation concepts. This chapter first discusses the innovation process and associated frameworks. The following sections summarise the insights and opportunities within the innovation process, including the influence of innovation systems. This chapter finishes off with a discussion of the limitations of the report and further research considerations.

## 8.1 The Innovation Process and Associated Frameworks



Stage-gate model divides the new product development project into distinct stages of certain activities that are separated by gates that assess the performance. The stage-gate model generally creates incremental innovations that maintain their marketplace effects, targeting the mainstream market users whose desires are well defined with no technological risks. Silver Fern Farms has adopted and reframed the stage-gate depending on the type of project.

The innovation process—the process and paradigm used to research, design, and develop innovations—is an essential concept to innovation strategy. Three phases of the innovation has been identified: discover, develop and deliver. Design thinking and stage-gate are two innovation processes that organisations have adopted. The Food Design Institute utilises the design thinking model. Meanwhile, Silver Fern Farms operates using an adapted modern variation of the stage-gate model. Although these models are contrasting, there are several ways in which these models can be used together to maximise value creation.

Design thinking is an effective and creative solution-based approach to solving problems and creating innovations. The desires and needs of the early adopter group are generally fuzzy and undefined through traditional discovery activities of the stage-gate model. The process of design thinking is shown to the left, where it is not a waterfall process and is entirely nonlinear; that is, insights gained during one phase may inform and encourage further investigation of others. This framework has the ability to create radical innovations. The Bachelor of Culinary Arts programme taught by the Food Design Institute at Otago Polytechnic has adopted design thinking as a framework and a toolkit for students to use throughout their projects. There are two collaborative projects Silver Fern Farms and the Food Design Institute have engaged in together: third-year students' Major Project and second-year students' Food Product Design project. Additionally, both approaches have strengths and limitations and will require further iteration to develop a model that creates better value and outcomes to all.

*How might Silver Fern Farms and Otago Polytechnic better create a project brief for themselves and students to maximise the shared value co-created for all stakeholders?*

## 8.2 The Discovery of Opportunities and Framing the Users

Meat processors provide commodities in the form of animal carcasses to the next set of users turning them into products. Alternative protein products are considered transformational offering for specific users where it helps achieve aspirations.

*How might the red meat industry better provide customised and transformative offerings for users to better maximise value creation and to help achieve their aspirations and transformative desires?*

Consumers are no longer satisfied with the limited role as a buyer and user at the end of the value chain. Introducing calls-to-actions will allow the transformation of consumers into agents of change, enabling the co-creation of value via contribution.

*How might the red meat industry create more engaging hybrid product-services for users to better maximise value co-creation?*

Silver Fern Farms has expressed interest in regenerative agriculture as an approach to a more sustainable future, wanting to take up an active role. Additionally, New Zealand has the opportunity to design regenerative agricultural systems based on current regenerative research and mātauraka Māori.

*How might the red meat industry adopt regenerative practices that go beyond agriculture so that the industry as a whole can eventually reach a carbon positive position?*

*How might the red meat industry better work in partnership with takata whenua to incorporate mātauraka Māori (so as to become a true takata tiriti partner) and regenerative practices to better mitigate environmental concerns and create value for the sector, product users, and wider systems?*

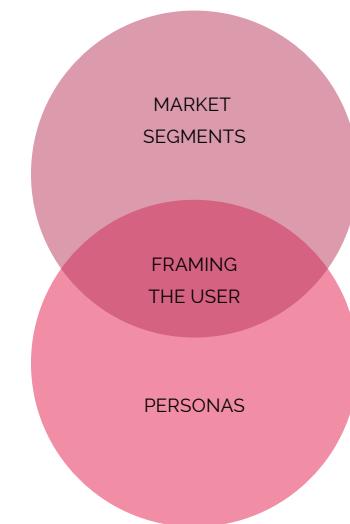
Silver Fern Farms' eating quality (EQ) grading system acts as an incentive to produce increasingly higher quality products to increase their value for the end users. Additionally, the introduction of traceability within the Silver Fern Farms value chain can add value to the company's business units and its shareholders /farmers, as it provides visibility within the value chain. It also creates value to the end users as their QR code on the product packaging connects them to the farmers and their stories in their region. Although traceability creates some degree of transparency along the value system, it can be considered as functional rather than a strategy towards building brand equity.

*How might Silver Fern Farms implement radical transparency so that they can build brand equity and create value for consumers?*

The red meat industry contributes \$4.6 billion in household income including the second-order effects. Silver Fern Farms is part of the nationally based Meat the Need charity created to supply meat to city missions and food banks. Scholarships are provided by both Silver Fern Farms and the Meat Industry Association, supporting education and potentially creating jobs. However, the intangible and non-financial impacts of such social programmes and initiatives are not measured due to the complications in measuring such impacts.

*How might the red meat industry better measure and report the real-world impact of their social programmes and initiatives to create shared value more effectively for society?*

Silver Fern Farms has developed consumer segments, providing insights into both their consumers and those of the premium meat market. The types of information described in their segments are a brief personal statement, behavioural motivations, the range of demographics, and properties important to the consumer. The market segments are highly contextualised within the products the Silver Fern Farm is involved in. This restricts divergent thinking to 'inside-the-box' thinking. Additionally, the way typical segments are designed and represented lacks human characteristics and personality and is focused on the operating business.



The Food Design Institute first introduces students to Helix Personas' personas. They constantly act as a reference that ensures ideas, products, and brands are valid and desirable. Personas, in combination with the super users, clients, and emerging consumer trends and movements. The focus in emerging trends encourages students to think creatively and 'outside-the-box', resulting in potentially radical innovations.

*How might Silver Fern Farms adopt design thinking or collaborate with design thinkers to utilise personas in the generation of radical innovations for potential users of emerging markets?*

### 8.3 Alternative Development Models for Radical Innovation

Stage-gate is described as a linear process. Meanwhile, design thinking does not have a dedicated process outlining the development phase. This is because design thinking phases are not necessarily related to a process but instead they house a set of tools. Silver Fern Farms engages the development phase of the innovation process as laid out by the model of the stage-gate. It is a rather linear process that results in incremental innovations at a high level of production and distribution. However, there are other important considerations that can change how the development phase is approached.



The first product release is a multiphase strategy that gains real market insights before large-scale development and distribution. This strategy starts off with a first product release designed to satisfy users' basic needs and to gain feedback and insights in the marketplace. Next follows a series of product releases with more complexity informed by the insights gained from the previous release. This strategy results in highly informed and more radicalised innovations that have been properly tested in the real marketplace. Silver Fern Farms innovation process model filters out the possibility for the development of any radical products. Adopting the multiphase strategy will enable Silver Fern Farms to design and test radical products at a lower risk cost compared to the current model.

*How might Silver Fern Farms adopt a multiphase innovation development strategy that helps them create and test radical innovations in the marketplace at low risk?*

The house of brands strategy allows organisations to create multiple brands that target both mainstream and several niche markets. The shadow endorser approach, a subcategory in this strategy, does not visibly connect the brands together, allowing the true expression of different brand values without contamination. Token endorser is an endorser strategy whereby a master brand is involved with several products and markets and has endorsed brands through statements. This approach provides reassurance and credibility in the quality of the endorsed brands whilst still allowing the freedom to offer different value propositions.

The consumer products Silver Fern Farms offers are branded under that name. Although the brand Silver Fern Farms resonates with values of expertise, premium quality, and integrity, the brand has strong associations with offering raw meat products. Creating a brand architecture strategy that allows for experimentation and testing of new products in the marketplace without contaminating their strong brand image could allow Silver Fern Farms. Partnerships with other businesses that have a nuanced understanding of niche markets can be a collaborative and effective way of trialling and developing radical innovations. In doing so, real marketplace insights of radical innovations can be translated into more radicalised innovations for the mainstream market.

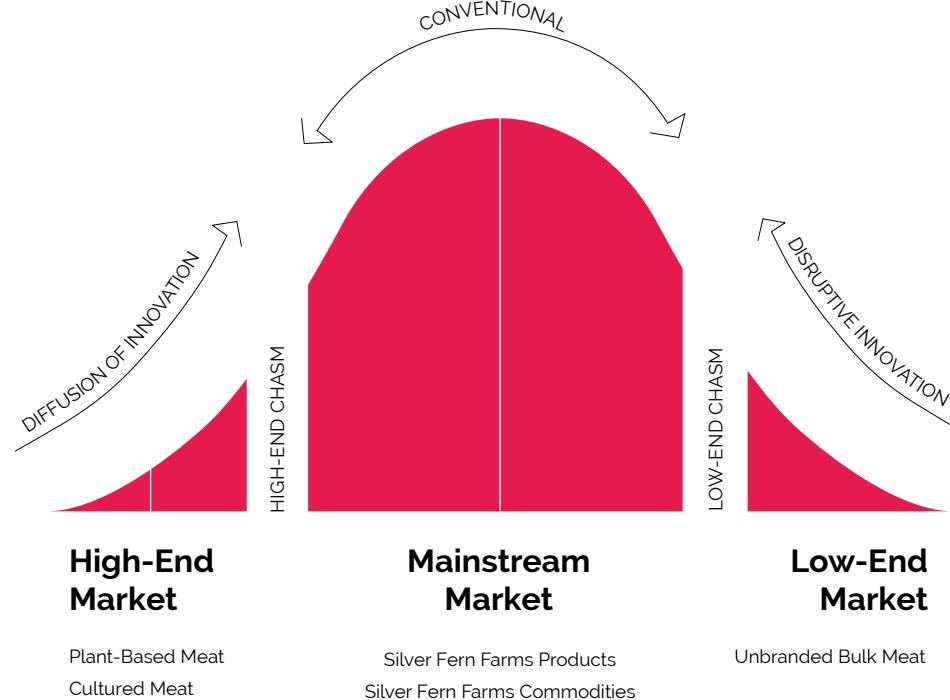
*How might Silver Fern Farms design a brand architecture so that they can test new products on early-adopter segments before entering mainstream distribution and marketing?*

## 8.4 The Adoption of Radical and Disruptive Innovations

There are two ways to respond to radical and disruptive innovations. The tactical response requires an investment with their core users maintaining their current business model. Incumbents should not overreact because there is a period before the disruptive effects are felt, given that the innovation succeeds. The strategic approach requires an adaptation to the growth of opportunities that arise from the disruptive innovations, which may include an adoption of the disruptive business models. They suggest that a division be made within the organisation, keeping it separate from the core business.

*How might the red meat industry take up opportunities that arise from the disruptive effects of alternative proteins so that they can maintain their mainstream user base while gaining acceptance from the entrants' users?*

The diffusion of innovation model describes the complex mechanisms of how and why products, services, or ideas are adopted. The type of innovations that diffuse into society using this mechanism would be radical innovations due to the radically new and unimagined products. Plant-based meats and cultured meat products are considered to be radical innovations that are being adopted into society through the diffusion of innovation model.



Disruptive innovation theory is the process where entrants (newer, smaller businesses with limited resources) have discovered the opportunities to address the needs of users in the low-end market, often ignored by the incumbents (well-established businesses in the market). Products of the disruptive innovation process are also referred to as 'disruptive innovation'. These innovations are further categorised as passable, of low performance, and associated with a low profit margin.

Moore's chasm represents the difficulty of transitioning from the early market to the mainstream market. The difference between the high-end, mainstream, low-end markets are their expectations, motivations, lifestyles and desires. Communication is a crucial factor to the adoption of innovations. Mass media channels are only more effective for early adopters that seek new experiences and innovation. However, the majority of users heavily rely on interpersonal channels of communication for discovery and acceptance. The red meat industry, in comparison to the alternative protein sector, does not have a well developed network that will enable the acceptance of radical innovations they design. If Silver Fern Farms and the red meat industry want to strategically respond to radical and disruptive innovations like alternative proteins, appealing to the same market and reflecting their business models is a necessity. However, a cautious approach is advised. Highly connected influencers within personal networks may not only not help radical innovations succeed, but they can also inadvertently undermine any future attempts at innovation. The pathway for implementing radical innovations requires clustering innovators and early adopters within the social network, restricting commentary contamination from the mainstream market. This enables innovators and early adopters to embrace their roles as opinion leaders, exposing the innovations to the mainstream market organically.

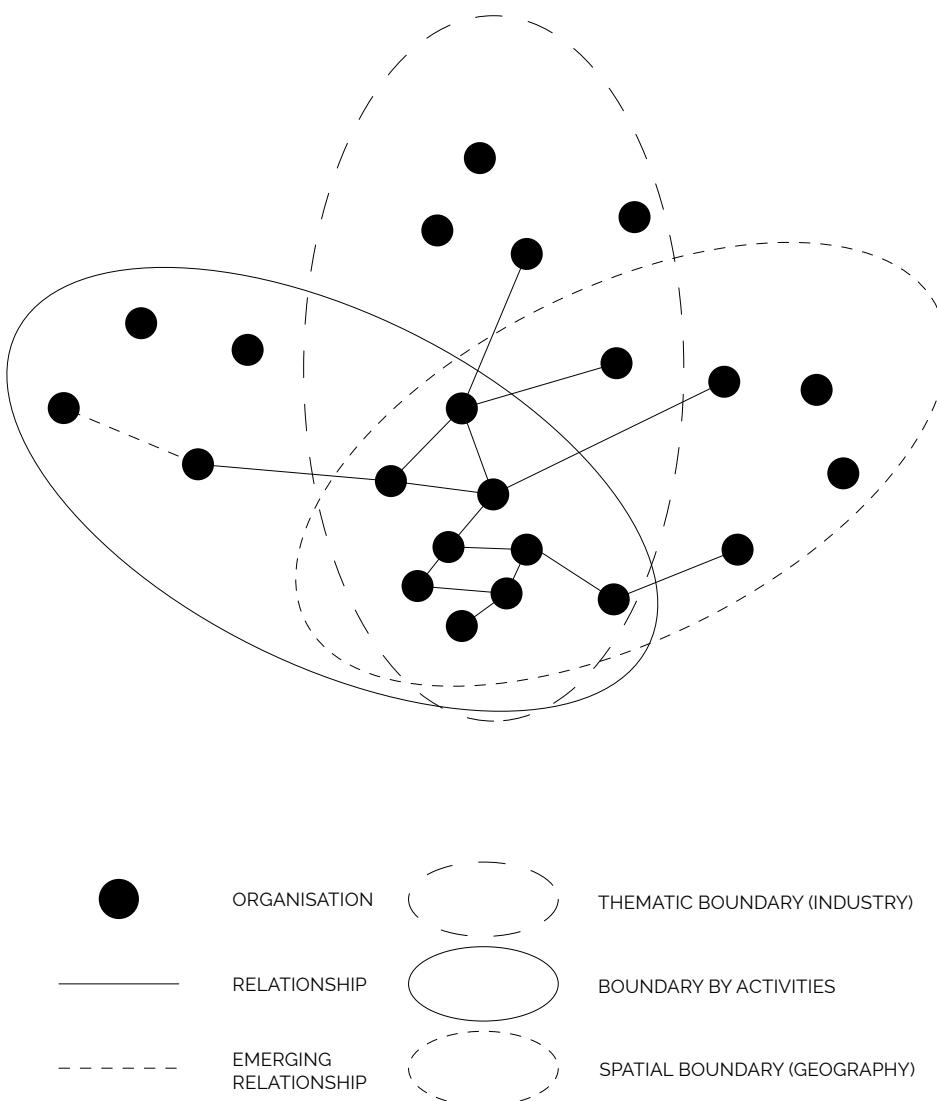
*How might the red meat industry cluster innovators and early adopters together to assist the spread of radical red meat products in those adopter groups so that their roles as opinion leaders in the mainstream market can take place?*

## 8.5 Innovation Ecosystems and Clusters

Innovation ecosystems are defined as '...the evolving set of actors, activities, and artifacts, and the institutions and relations, including complementary and substitute relations, that are important for the innovative performance of an actor or a population of actors'. They further clarify the definition of both artifacts and actors. Artifacts are any tangible or intangible inputs and outputs (knowledge, innovations, products, services, technologies, and other resources), and actors include institutional entities (universities, business schools, businesses, venture capitalists, research institutions, governmental supporting departments, funding agencies, and policymakers), which is comprised of material resources (funds, equipment, and facilities) and human capital (students, faculty, staff, industry researchers, experts, and representatives). In the diagram to the right, innovation ecosystems refers to activity-based boundaries (in this discussion). The investigation of Silver Fern Farms' ecosystem primarily focuses on collaborative research projects. The majority of their projects are either in the preparation or research stages and have output times within the next five years. Most of the research Silver Fern Farms has engaged with has concerned the current practices located at the front end of the value. This is a response to the implementation of the government's carbon-zero policy. Additionally, the aim of creating low or net-zero carbon emissions creates value to their primary offerings of commodities. The mapping of their ecosystem is currently still in its infancy, displaying insights of limited value.

*How might Silver Fern Farms further develop and map their ecosystem to better visualise activities and organisations they are engaged with?*

*How might Silver Fern Farms use their ecosystem maps to identify gaps and opportunities for further collaborative activities?*



Clusters are defined as '...geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions (e.g., universities, standards agencies, trade associations) in a particular field that compete but also cooperate'. In the diagram to the left, clusters concern the thematic and spatial boundaries of innovation systems. The proximity and density of clusters enable the accessibility of specialised knowledge, human capital, and other resources. In addition to proximity, environmental features (airports and harbours) are elements worth considering that may affect the transportation activities of businesses. Dunedin is considered a cluster within its growth phase due to the large increase in numbers of start-up businesses. Silver Fern Farms is a business spread across the nation, collaborating with cross-sectoral organisations. Silver Fern Farms currently does not engage with the large start-up community in Dunedin. This is worth noting due to their resources, knowledge, and innovation processes that could complement the partnerships already in place for Silver Fern Farms. Collaborations with these organisations or investigating their practices is an opportunity that may lead to insights in developing radical innovations.

*How might Silver Fern Farms better engage with Dunedin's start-up community so that they can adopt practices that may lead to higher forms of value creation and radical innovations?*

## 8.6 Limitations and Further Research

COVID-19 has heavily impacted this research project. The primary focus of the industry and organisations were to respond and develop strategies going forward. This has limited their availability, including other research opportunities. Additionally, COVID-19 has compressed this project time due to the earlier phases of this programme being extended, resulting in limited investigation of certain areas and time writing this report.

This report only explored only a few of several concepts in depth. Innovations as products were the primary focus of innovation, innovation processes, and innovation implementations. Further research into service, experience, organisational, and societal innovations are required to conceptualise the value of innovations fully. In addition to this, there are several other innovation processes that organisations use that need to be explored concerning design thinking and stage-gate. Agile, SCRUM, lean start-ups, and entrepreneurial are examples of other innovation processes that organisations have adopted. Understanding the processes and paradigms these other processes use is important to the broader discussion of innovation. The meat industry's innovation ecosystem, and Dunedin or New Zealand as a cluster, needs to be further investigated, as there are gaps that need bridging that could provide new perspectives and knowledge for better innovations.

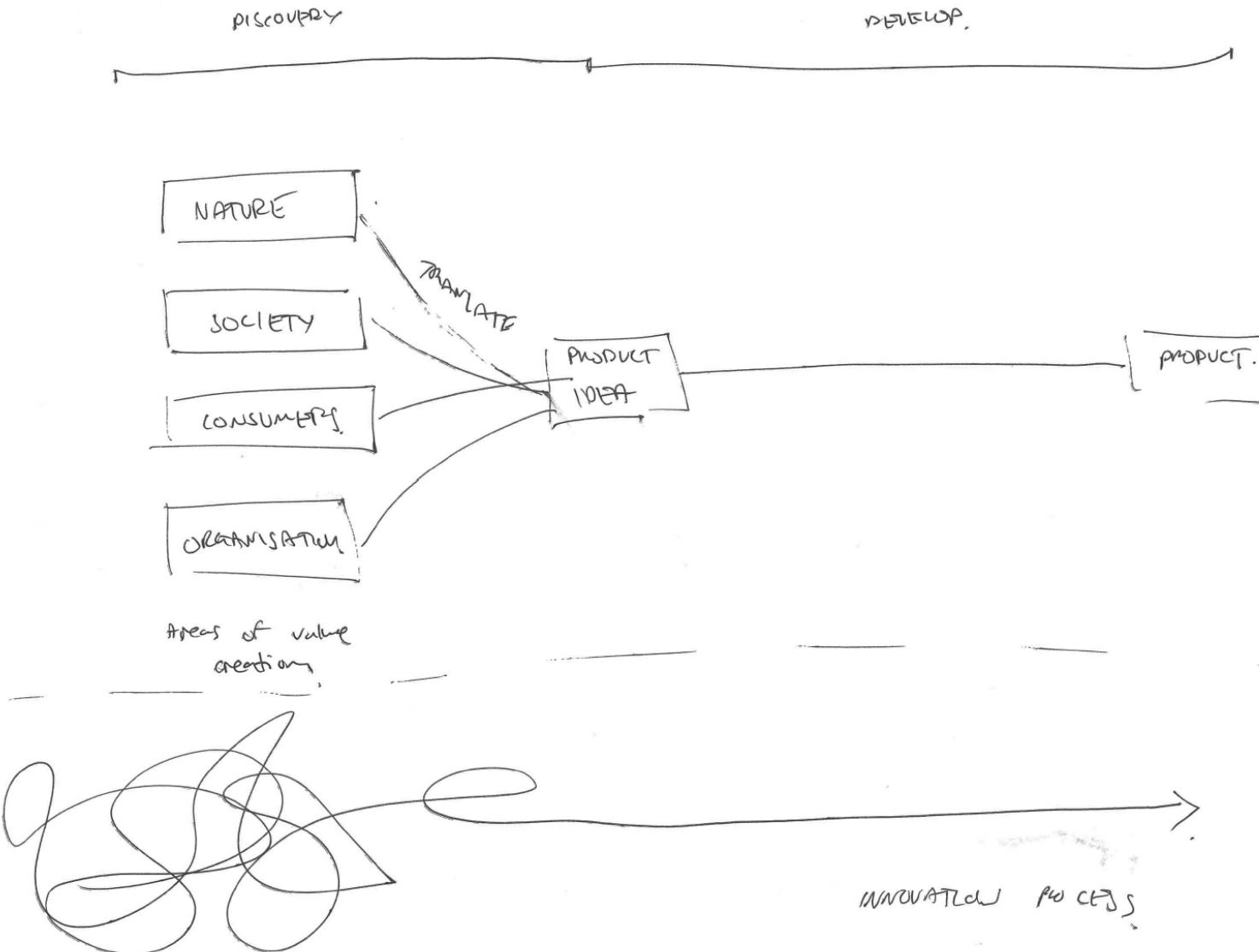




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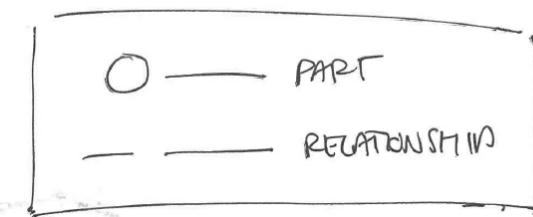
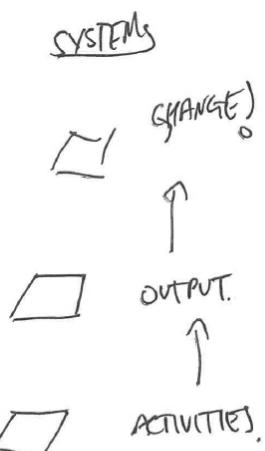
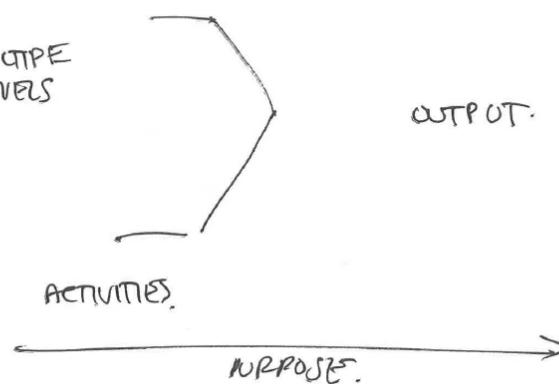
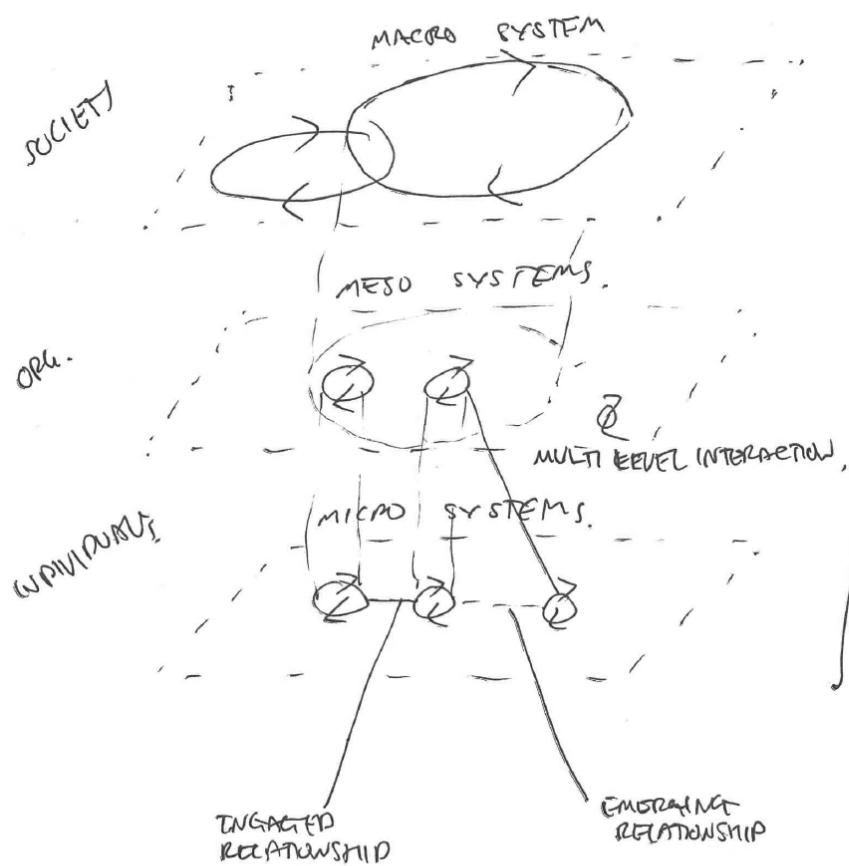
APPENDICES  
REFERENCES  
FIGURES

## 9.1 List of Appendices

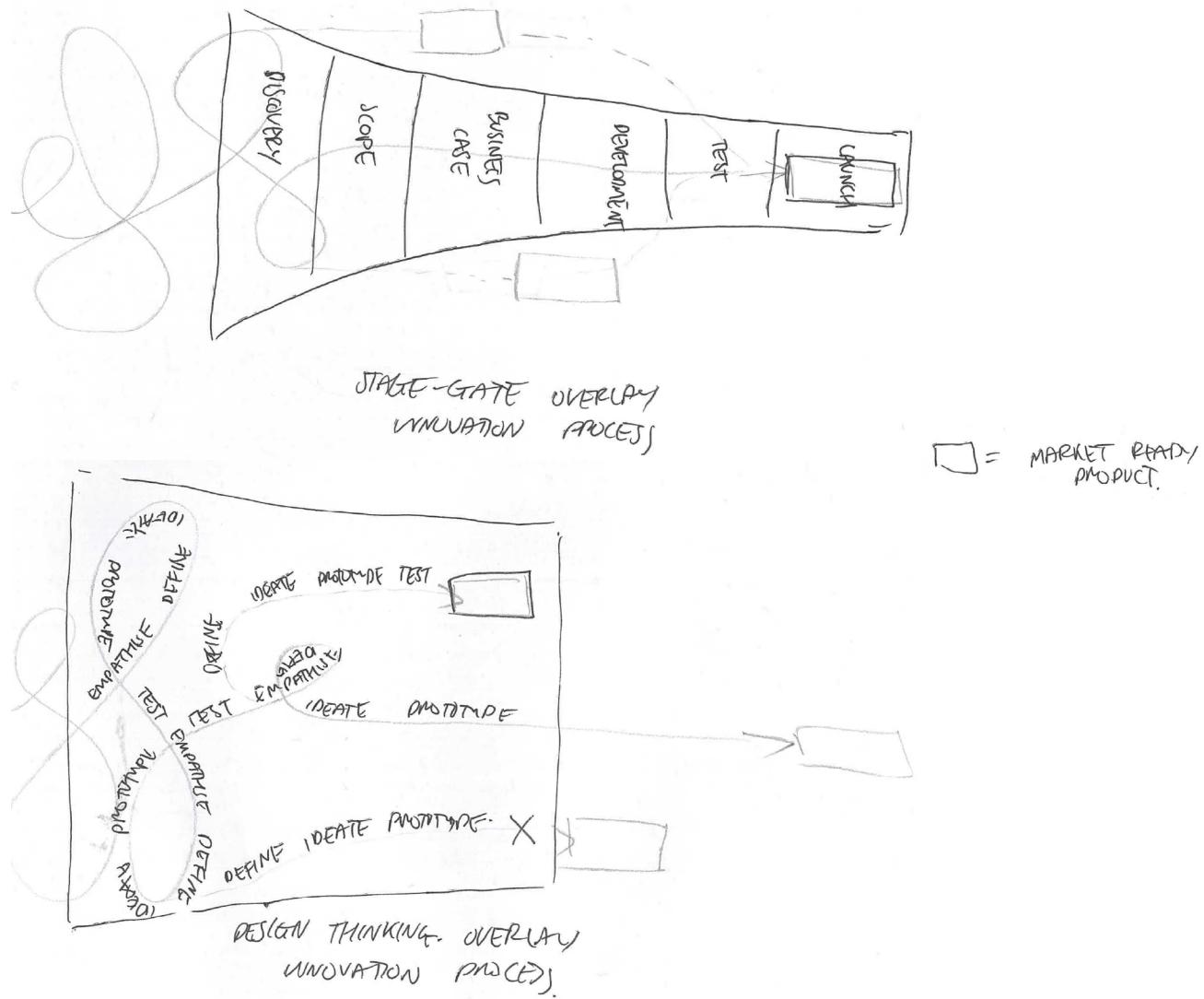


Appendix 1 – Conceptualising and hybridising the innovation process and activities.

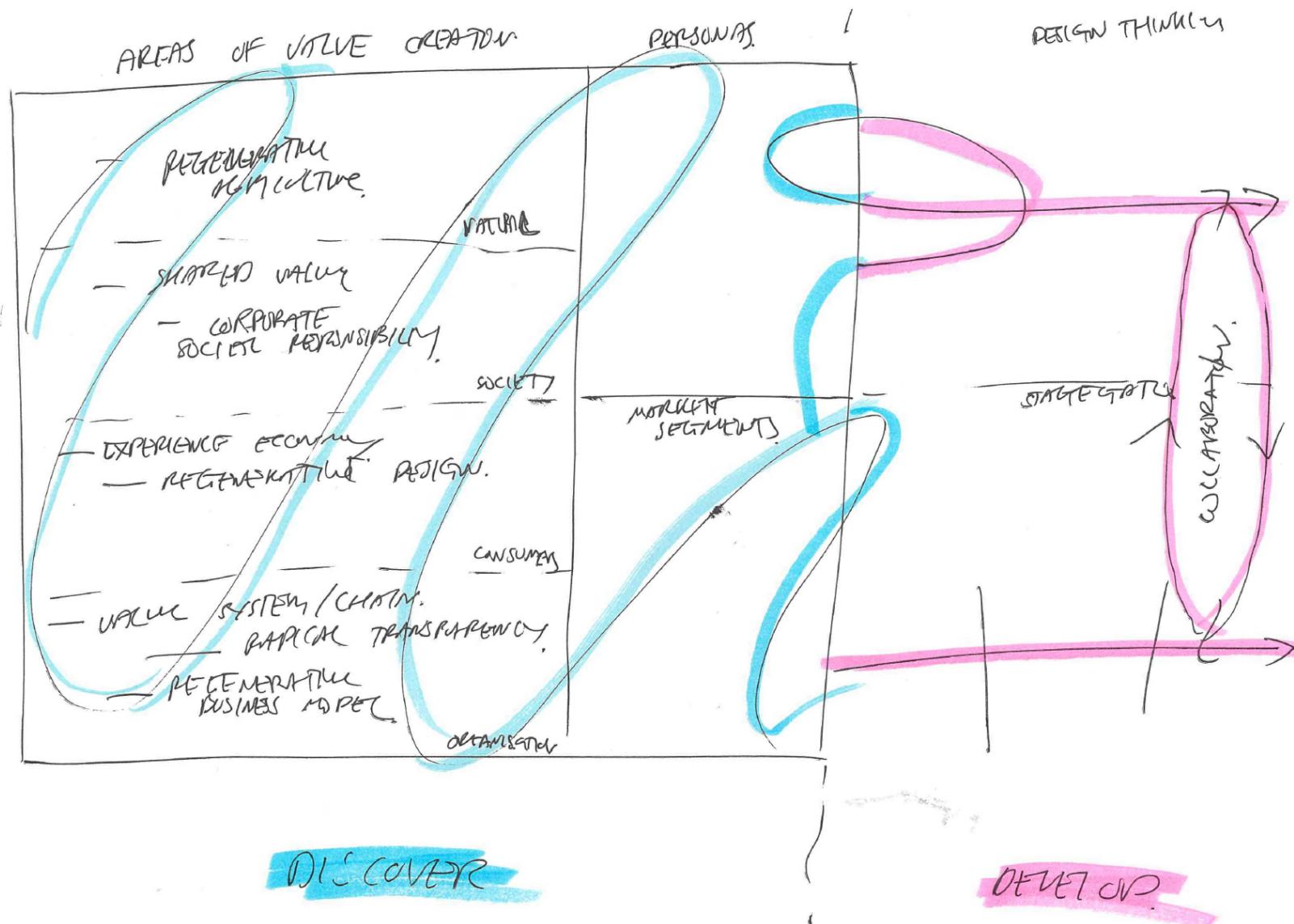
## SYSTEMS



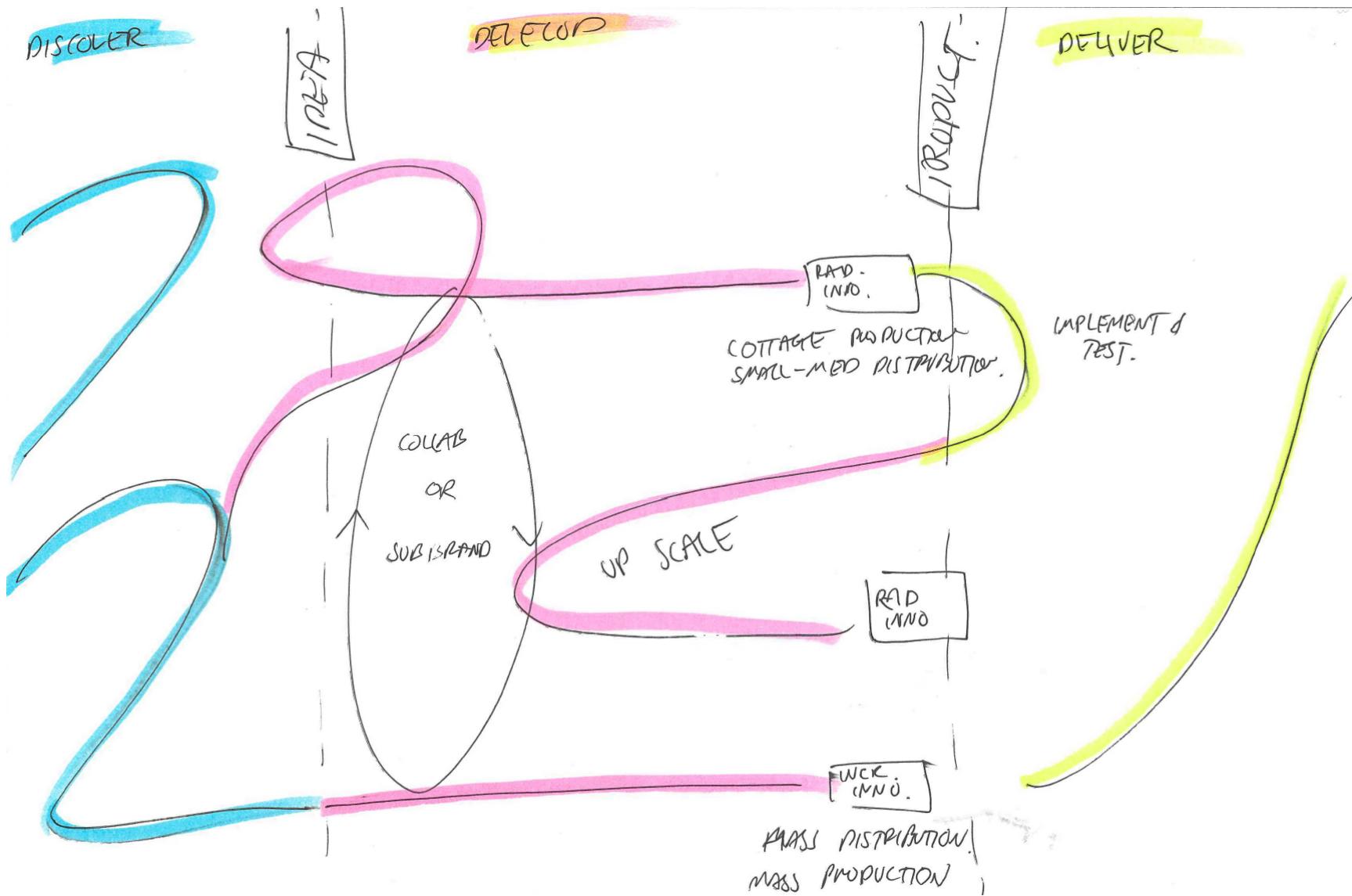
Appendix 2 - Sketching the components that make up a complex system.



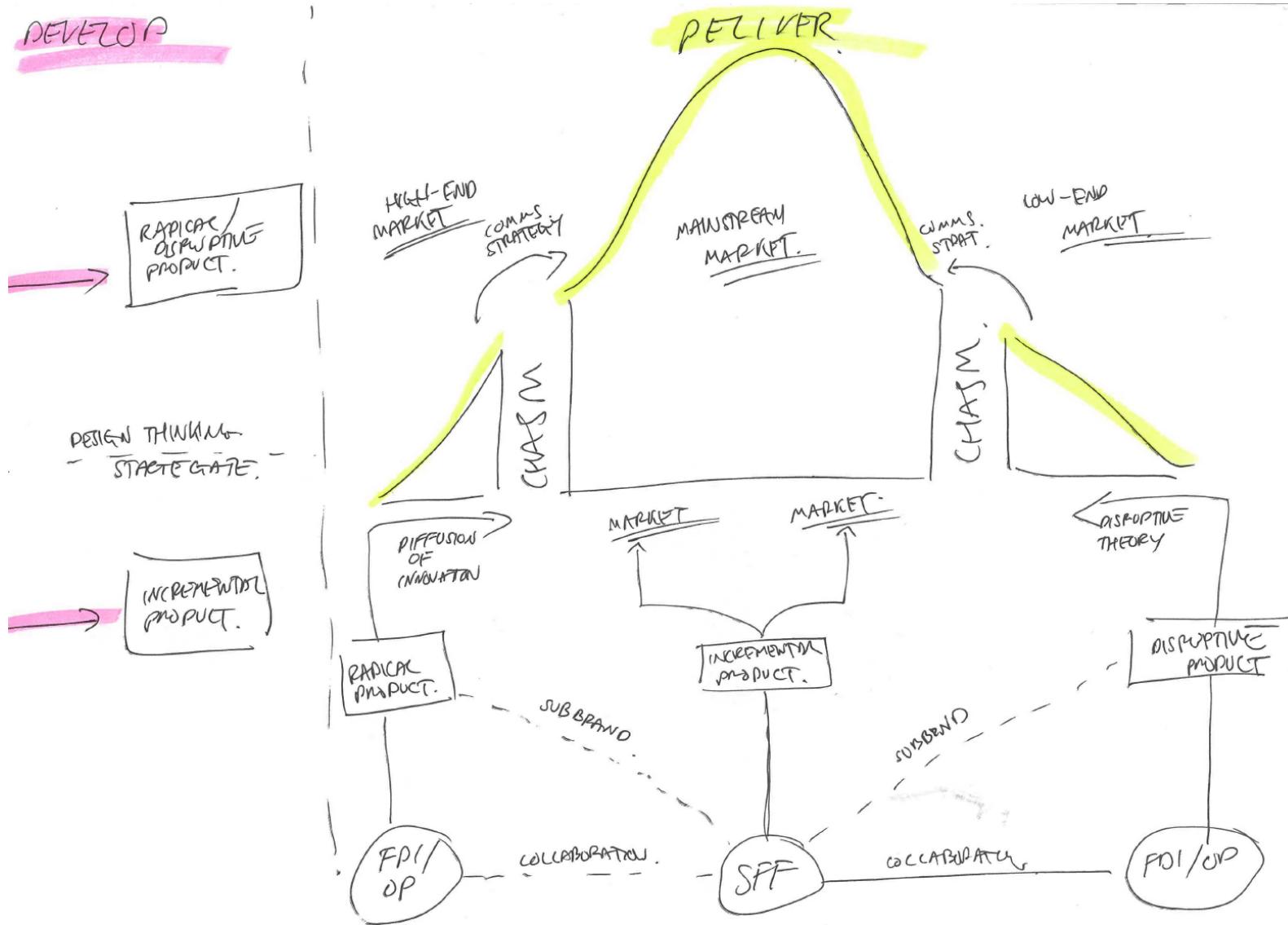
*Appendix 3 – Conceptualising the differences between stage-gate and design thinking in the innovation process.*



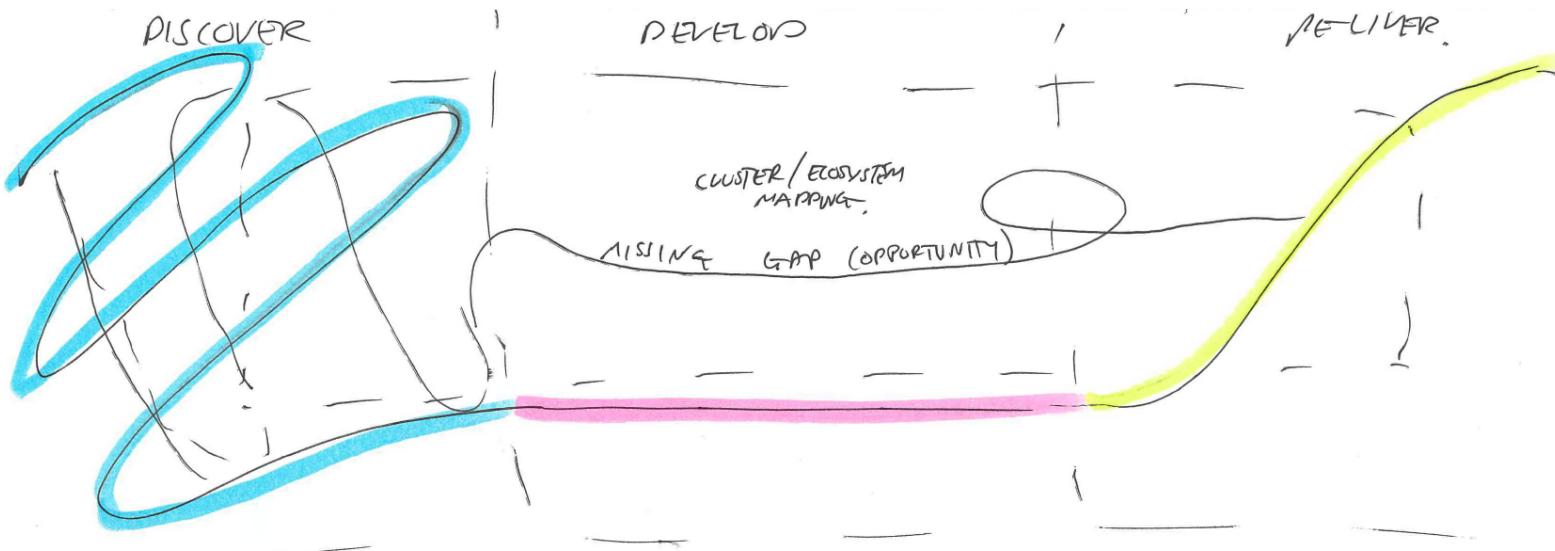
Appendix 4 – Visualising and mapping the Discover chapter.



Appendix 5 – Visualising and mapping the Develop chapter.



Appendix 6 – Visualising and mapping the Deliver chapter.

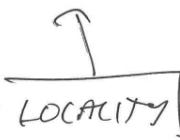


- ENCOURAGES / FACILITATES COLLABORATION.
- SHARE / EXCHANGE KNOWLEDGE
- VALUE CO-CREATION

CROSS-SECTORAL PROJECTS.

- ALTERNATIVE PRODUCTION MODELS & PESTIM.
- RADICAL "OUTSOURCING"

- NETWORK CENTRIS.
- FIRMING VS. REPURSANT.



## INNOVATION SYSTEMS

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Figure 52 – Silver Fern Farms' research project ecosystem. (Modelled with Kumu, 2021)

Figure 53 – Summary of the three types of knowledge networks. (Adapted from Pöyhönen & Smedlund, 2004)

