

13: CULTIVATING IDEAS, VALUING THE CHAIN, LEVERAGING THE INVESTMENT



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Kellogg Leadership Programme – Course 35



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EXECUTIVE SUMMARY

The future of the New Zealand Primary industries will rely on its ability to remain agile in the face of ever increasing change. Equally for success to be realised there is a call for the industry to know; where its current position is (and launch from this); how it lifts the level of innovation; increases ambidexterity across the value network, and insures the right level of investment is happening to enable long term gains.

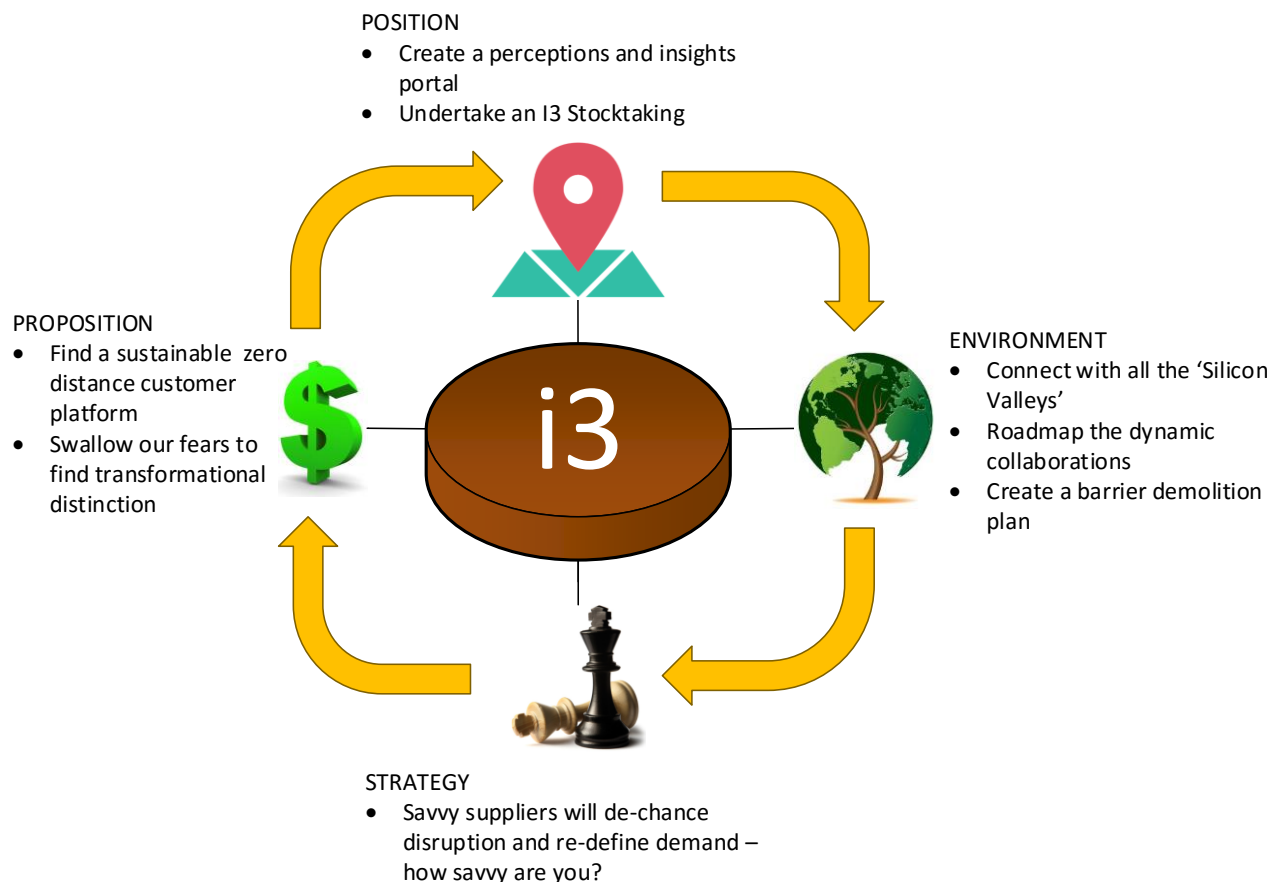
The question this proposal sets out to answer is:

How could the New Zealand Primary industries become more adaptive to disruptive change through Investing in Innovation (I³)?

Through a series of case studies (Sanford, Synlait, Mr. Apple and Comvita), and interviews with 'key players' that have connections to investment in innovation, it is clear to see that the traditional 'no.8 wire' approach will not be enough to leverage the sort of innovation needed.

Using technology to gain zero distance to our customers will enable the creation of more mindful products that will come as a result of having more compelled consumers. Our value network will have to foster integration across both axes (vertical and horizontal) to enable the experience and benefits impactful alignment will bring. Underpinning this will be some fundamental shifts in the way I³ is backed, be it private internally/externally or publically sourced finance.

Eight key recommendations across four key areas have been derived as a result of the findings of this proposal, with the aim trying to determine what an I³ life cycle could involve.



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Before you read on I would like you to pause and understand the deep gratitude I owe to the team of people who were instrumental to me putting this proposal together.

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And to my wife and family for their tireless support as I act like a hermit to get this proposal completed, thank you this chapter is nearly complete.

INTRODUCTION

“If you always do what you always did, you will always get what you always got.”

Albert Einstein

As we enter the fourth industrial revolution, where technology is merging the digital and physical world, the requirement for the Primary industries to remain smart about the choices and opportunities it makes increases every day.

Industry leaders and other observers are fast to point to the Primary industries as being historically innovative, whilst largely being locked in to the same production system it has operated in for at least the last 200 years. Many, if not all state to the need for more value to be added, less footprint to be taken and an awareness to remain ever conscious of the trends happening globally.

When the largest trend is change itself, how does an industry prepare itself to become more adaptive and agile so that it does not become another example of obsolescence like the professions of computers (the people), ice cutters or even leech collectors who quickly became victim to technology replacing their need to exist?

As the thinking for this proposal came together it soon became evident that the topic was vast, the issues were complicated and in some instances had been deeply explored, whilst in others the surface had merely been scratched. When trying to refine the dimension of the proposal many other questions emerged around the theme of innovation, investment and position of the New Zealand Primary Industries (NZPI). A few examples below were:

Are there other countries better positioned to respond to growing global demand (in terms of products, price and supply) with the potential to out-compete New Zealand products in our domestic and exports markets?

Will the New Zealand Primary industries' supply chains be able to scale up production and performance to meet this competitive challenge?

What is the role for innovation, at what level, and how should it be funded and structured?

If the capacity of the New Zealand food and agriculture sector is constrained by capital does it matter where overseas investment comes from, particularly if it brings with it market access advantages?

Will advances in science and technology within the agricultural sectors of Asian countries make them relatively more competitive than our own food and agricultural sector?

Does New Zealand agriculture primarily produce commodities that others countries add value to and, if so, why—and what can be done to increase New Zealand's role in value-adding?

Whilst initially frustrating as a distraction the consideration of these and other emerging questions did help frame better thinking on motivation, intent and ultimately the approach taken in shaping the proposal.

MOTIVATION

I was driven towards this proposal because increasingly the rate of change we are exposed to, or warned of can be confronting and sometimes confusing. This led to me wanting to try and understand how innovation can be used most effectively, either to counter, embrace or foster disruption, and what is constraining the Primary industries from becoming more innovative.

INTENT

I would like the proposal to offer an insight to the industry as to how investing in innovation can assist in becoming more disruptive or becoming more adaptive to disruption. It will look to take learnings from the industry on approaches that have led to higher value returns, greater diversity and great flexibility.



THE QUESTION

How could the New Zealand Primary industries become more adaptive to disruptive change through Investing in Innovation (I³)?

The project will consider how successful New Zealand businesses cultivate ideas, position themselves and their innovations to boost growth and become more adaptive to disruptive change. It will also consider how and why they finance this investment and what the barriers to investment are.

THE CONCEPTS

There are three main concepts the proposal is seeking to build knowledge, comprehension and application on before being used to help analyses and evaluation of question to foster discussion, conclusions and if appropriate recommendations for the author or others to act on. Investment in innovation is the combination of three main concepts, as depicted below in Figure 1 (where disruption can either be an enabler or an inhibitor).

1. Innovation
 2. Value chain
 3. Investment
- } = I³

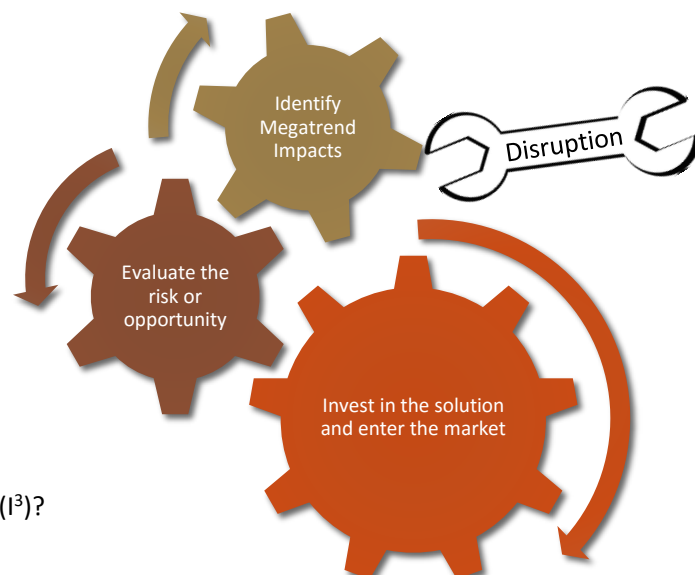
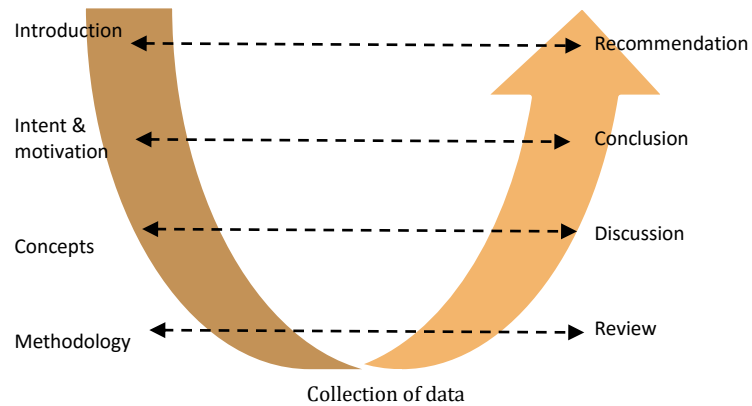


Figure 1. What is Investing in Innovation (I³)?

METHODOLOGY

Following the approach in Figure 2 the research method involved three main elements for data collection.

Initially a literature review was undertaken around the main concepts (innovation, value chain, investment) and other ancillary areas such as disruptive trends, barriers and strategy, both in New Zealand and overseas.



The second step was a series of semi-structured interviews with ‘key players’ in the Primary industries who had a background across innovation and investment. Most of the key players were identified through the level of influence they had in the area of I³ and offered a diversity of backgrounds and perspectives to the thinking. Time and availability was a large constraint with some of the key players being interviewed over the phone in another country and a different time zone.

Six key players were interviewed/surveyed to gain a wider understanding of some of the guiding principles identified in the literature review for I³. The intent was to use the first two stages to help shape the format for the third stage of case studies. The key players were asked 10 questions, all of which they had prior notice of. This was so that their responses were informed and also gave the opportunity to take the discussion further in certain areas where they had particular insight.

The initial idea was that all key player interviews would be complete before the case studies began, so that any new concepts or perspectives that came through could be further researched and incorporated into the design and adoption of the case studies. Time did not allow this to fully happen.

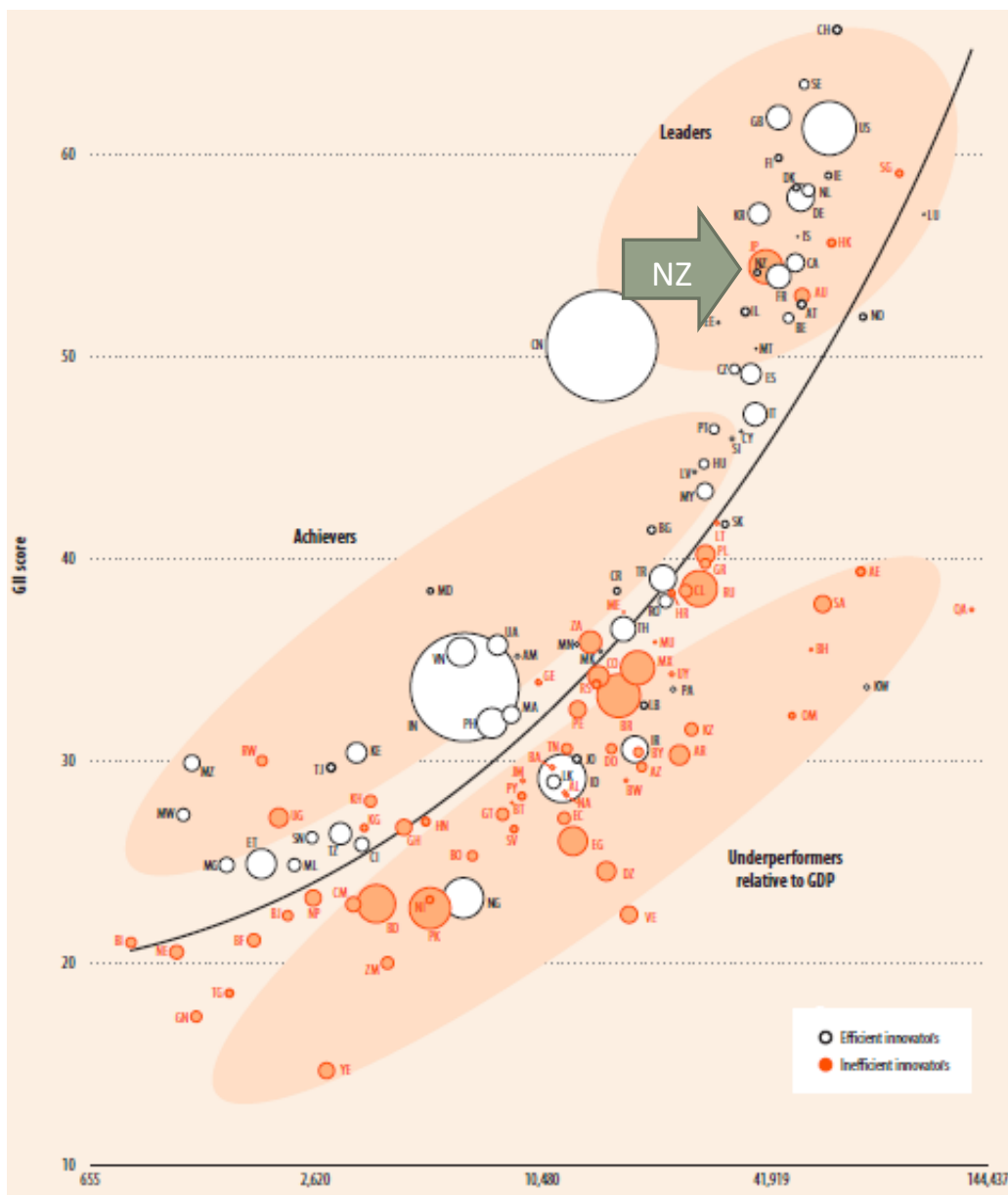
Final data collection was in the form of four case studies from across the Primary industries. These covered a range of sectors and approaches to I³ and were designed to test the thinking of the key player interviews at a deeper more applied level.

The interviews were evaluated to pick up on evolving ‘themes’, which were transcribed in the form of quotes or considerations in the results section. In some instances some themes that came through in the interviews required additional literature research to be able to understand the full validity of comments being made. The information obtained by the key player and case study methods was used to formulate trends, perspective and insights, which in turn helped set the structure and content of what has been captured in the reflections section.

INNOVATION

The latest (3rd) edition of the Oslo Manual defines innovation as the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations (OECD and Eurostat, 2005).

An innovation can consist of the implementation of a single significant change or of a series of smaller incremental changes that together constitute a significant change. By definition, all innovation must contain a degree of novelty. The Oslo Manual distinguishes three types of novelty: an innovation can be new to the firm, new to the market or new to the world. The first covers the diffusion of an existing innovation to a firm – the innovation may have already been implemented by other firms, but it is new to the firm. Innovations are new to the market when the firm is the first to introduce the innovation on its market. An innovation is new to the world when the firm is the first to introduce the innovation for all markets and industries.



(Source: OECD/Eurostat, 2005)

Driving growth in the Primary industries in NZ has and will always be the best marriage of trade, innovation and competition. However given its size retaining global competitiveness has always been the challenge for NZ, particular to innovation has been a series of reforms in the industry coupled with the uptake of new technologies and practises which has led to its relative ranking against other OECD countries for innovation (OECD, 2008).

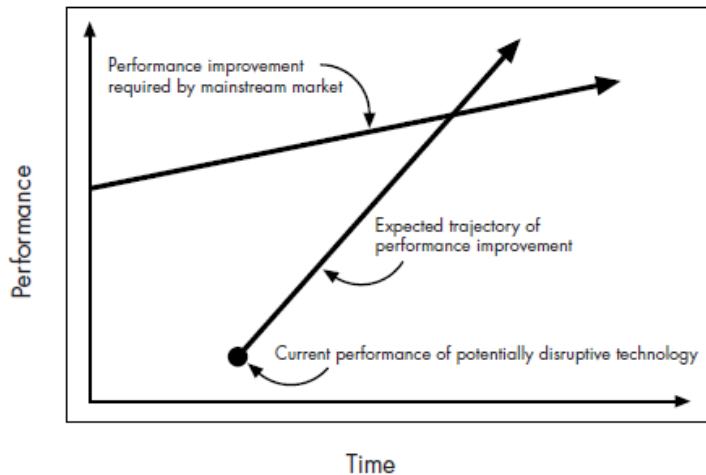
Figure 3 shows that NZ is well placed in terms of innovation efficiency, but this is no reason for complacency.

Historic drivers will not be the same for the future of innovation in the industry, true the demands to increase production will remain, and the challenges of climate change, soil quality, water depletion, yield plateaus etc. will continue to drive innovation in agriculture (The Economist, 2015). The real stretch will be innovating fast enough to keep up with disruptive market trends or technologies.

Figure 3 *The Global Innovation Index 2016* (Source: Cornell University, INSEAD, and WIPO, 2016)

DISRUPTIVE INNOVATION

In contrast to more ‘sustainable innovation’, which looks at constant incremental improvement, ‘disruptive innovation’ is built on the customers unperceived ideas, which is often at the initial loss of quality of the original product or service. A good example is when Sony became involved in transistor radios the quality was reduced because they were trying to reduce the size of them, as a result though they blossomed into the portable devices we know and use today (Bower and Christensen, 1995). Whilst it is easy to see these changes retrospectively it becomes far more difficult to predict their path or even create a means to replicate them (Kaplan, 2012). Many persist it is simply looking at the strategy that exists and taking a view on how futureproof it is, but increasingly it is as much about being self-aware when success is not enough (O’Reily and Tushman, 2016), or realising the opportunity over the risk from a reduced short term benefit to an increased long term benefit (Hendy and Callaghan, 2013). Some of these concepts are depicted in Figure 4 and 5 below.



LEAPS		Strategy
L	Listen	Start with Yourself, Not the Market
E	Explore	Go Outside to Stretch the Inside
A	Act	Take Small Simple Steps, Again and Again and Again
P	Persist	Take the Surprise Out of Failure
S	Seize	Make the Journey Part of the (Surprising) Destination

Figure 5. Five strategies to help disruptive change become less uncertain. (Source: Kaplan, 2012)

Figure 4 How to assess disruptive technologies. (Source: Bower and Christensen, 1995)

A review of literature shows that often when trying to assess for risk of disruption or seek opportunities to disrupt it seems worth considering ‘what would have to change for advantage to evaporate?’ (Wessel and Christensen, 2012). Wessel and Christensen (2012) also point to some key barrier assessments for understanding advantage and how to use it to pivot, which can be used either by the disruptee or the disruptor:

- 1) The momentum barrier (customers are used to the status quo);
- 2) The tech-implementation barrier (which could be overcome using existing technology);
- 3) The ecosystem barrier (which would require a change in the business environment to overcome);
- 4) The new-technologies barrier (the technology needed to change the competitive landscape does not yet exist), and
- 5) The business model barrier (the disrupter would have to adopt your cost structure).

Using these and other approaches to define the landscape can help to both identify the risks and opportunities but also draw together the framework or strategy for what needs to happen next, how it will be resourced and what structure needs to drive it. The concept of an innovation strategy is to help businesses build aspirations, target their approach and ultimately set the culture in which they operate under, they can be used when assessing innovations (Pisano 2015).

Pisano (2015) categorises ‘the innovation landscape map’ into four main innovation areas; *routine* – same technology and customer base; *disruptive* – can leapfrog existing technology using a different business model; *radical* – pure technology

where the existing business model drives high R&D investment to deliver a few high value products, and *architectural* – which attempts to be ambidextrous with both technology and the business model (Figure 6 below).

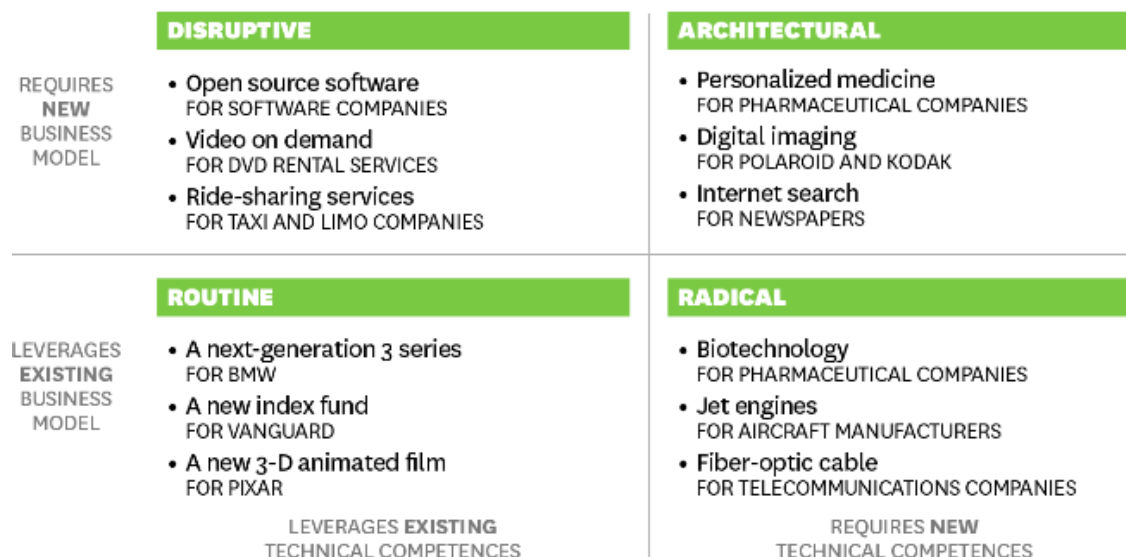


Figure 6. The innovation landscape map (Source: Pisano, 2015)

Before moving forward to the second concept of ‘the value chain’ it is worth considering some of the disruptions facing the Primary industries and the risks or opportunities that they offer.

Disruption Type	Brief description	Risk/ Opportunity
Alternative Protein	These companies look to replace traditional sources of protein such as meat and eggs. Companies fall into three categories: cellular agriculture; ingredient innovation; and the production and discovery of alternate protein sources, such as crickets or algae.	R – widespread undermining of traditional production O – distinctive position of naturally produced
Farm-2-Consumer	Companies that directly deliver food to consumers from farms, differing from food e-commerce, which involves e-grocers, meal kit delivery services, and specialist meal delivery.	R – choice overrules consistent buying O – significantly reduces the distance to customers
Food E-Commerce	E-grocers, meal kit delivery, and specialist meal services which are attempting to disrupt the agriculture value chain. Excludes restaurant delivery.	R – same as Farm-2-Consumer O – ability to increase the provenance brand
Indoor Agriculture	Includes all farming operations that occur indoors or in greenhouses, and the technologies that accompany them.	R – Self-sustaining megacities O – Ecosystem supporting food

Table 1. Key disruptive mega-trends (Source: adopted from Burwood-Taylor *et al.* 2016)

VALUE CHAIN

"The big temptation that gets between us and our customer is to think we know our customer very well. We don't and never will! The best we can hope to do is increase our knowledge of the customer all the time."

Feargal Quinn

The value chain is the set of actors (private, public, and including service providers) and the sequence of value-adding activities involved in bringing a product from production to the final consumer. In agriculture they can be thought of as a 'farm to fork' set of processes and flows (Miller and Jones, 2010).

First introduced by Michael Porter in 1985 the concept of a 'value chain' (VC) separates the business system into a series of value-generating activities. Understanding the cost advantage (by reducing VC individual activity costs or restructuring the VC) and the differentiation advantage (e.g. policies and decisions, timing, integration) of a firm can greatly assist in capturing more value and getting ahead of the competition (Porter, 1985).

The complexity of the agribusiness chain, or network as is increasingly referred to (NZIER, 2015), requires far more attention to understand the effects of VC positioning than is currently being undertaken. Figure 7 shows the array, from R&D-based input companies to universal ingredient producers, farmers to high tech agro enterprises, biotech start-ups and small and medium-sized enterprises (SMEs) to multinational corporations, developing this chain is influenced by a series of factors (Figure 8). A US example (Table 2) demonstrates the sort of integration across this chain and provides some useful benchmarks in terms of where I^3 is reflected across each link of the value chain, and also shows how value gain grows exponentially the closer you move to the consumer (10-30%) (Chartered Accountants Australia and New Zealand 2015). Streaming or integration across the (both supply and value) chain can lead to efficiencies in production and more systematic competitiveness which has greater customer focused value.

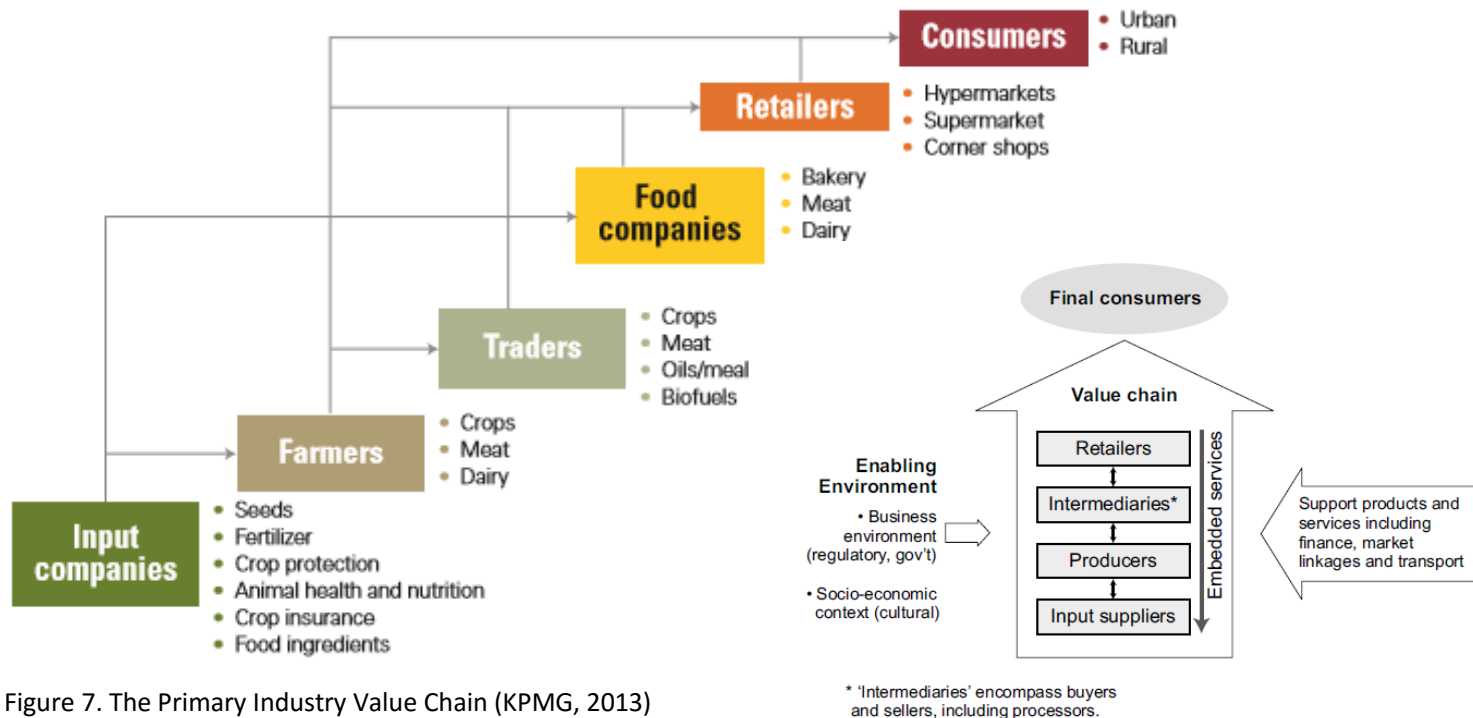


Figure 7. The Primary Industry Value Chain (KPMG, 2013)

Figure 8. A stylised value chain (Source: Miller & Jones, 2010)

Sector	Input	Farmers	Traders	Food companies	Retailers
Sales: US\$bn (approx.)	400	3,000	1,000	3,500	5,400
Number of players	100s	450 million	Tens	Thousands	Millions
EBIT %	15%	Variable	2–5%	10–20%	5%
R&D % sales	<1% (fertilizers) – 10% (seeds)	0%	<1%	1–2%	<1%
R&D spend: US\$bn	10	–	Low	8	Low
Composition/ Sub-sectors	<ul style="list-style-type: none"> • Seed • Fertilizer • Crop protection • Machinery • Animal health and nutrition • Crop insurance • Food ingredients 	<ul style="list-style-type: none"> • Grains • Fruit and vegetables • Meat • Dairy 	<ul style="list-style-type: none"> • Handling • Primary processing • Secondary processing 	<ul style="list-style-type: none"> • Bakery • Meat • Dairy • Snacks • Ready meals • Beverages 	<ul style="list-style-type: none"> • Multiples • Discounters • Wholesalers • Independents
Range	R&D-based majors to generic manufacturers	Smallholders to agroholdings	Global agribusinesses to local middlemen	SMEs to multinationals	Corner shops to hypermarkets

Table 2. Key profitability metrics for the agribusiness value chain (KPMG, 2013)

When considered in a global context value chains become even more important to determine the breadth of impact the NZ Primary industries can have. The New Zealand Institute of Economic Research undertook analysis of NZ's Global Value Chain (GVC) effectiveness and found it to be lagging behind other developed countries, providing an example of Australia having GVC participation of 44% (as a proportion of total gross exports) compared to NZ having 33%. What this indicates is that NZ's value-added exports are increasingly used as 'ingredients' for other economies to add further value to, and re-export. There are also comparisons drawn between foreign direct investment (FDI) and GVC participation, and identifying NZ with a 5% FDI versus Australia with 13% (NZIER, 2015). This might suggest low (or incorrectly targeted) FDI could be leading to NZ having less enduring GVCs, and also focusing on moving up the VC might not be purely enough to make a real impact.

To be able to achieve the benefits of international scale organisations success is often influenced by a factor of sufficient access to capital, strong customer relationships, value chain management and maintaining control through competitive advantage (MacDonald and Rowarth, 2013).

If I³ is to be enduring and enable the benefits/protect against the threats of disruption over the value network then the environment and landscape of investment will also need to offer a streamed and integrated approach.

INVESTMENT

The investment environment and landscape offers the Primary industries a wealth of opportunities, but too often the first opportunity to offer itself is not the most impactful. The diversity of the global economy has developed at a high pace in the last 10 years despite growth remaining moderately benign, which makes strategic decisions on investment types/options even more critical. Regardless of international economic policy being accommodating to growth the prospects for growth still remain modest at around 3.4% (NZ Super Fund, 2017), which given the long term cycles and volatility involved in the Primary industries mean raising the right capital to diversify the value network becomes even more important (Chartered Accountants Australia and New Zealand, 2015).

Technology is providing some smoothing to the volatility of the industry and its ability to have more stable performance reporting. Combining this with expectations on global population growth and the steady increase it will provide to asset values means that new middle income investment (domestic, but mainly offshore) is coming through to the agri-food sector. The flip side of technology is that it continues to drive ever increasing complexity into both the value network and the ability to seek more impactful I³. The e-commerce channels evolving will not only increase value network efficiencies (like waste and handler costs), but also drive more transparency and brand value, if the collaborations they are built from are positioned in a way that remain agile to the generational trends of the consumer.

Understanding and capitalising on the trends will be the most important area for the success of I³, particularly with the on-boarding of ‘Millennials’ (born 1982-2004). How will high levels of student debt and being the most tech-savvy generation help shape the investment decisions of Millennials? What social influences will impact on how they pursue the creation of wealth or support investment offerings? The investment marketplace is already seeing signs of this emergence with ‘Fintech’ startup firms offering platforms for anything from chump change (like Acorns, which invests rounded up spare change generated from electronic transactions) to venture capital and cloud based equity funding like AgFunder or Swell (Carlson 2015).

On a larger scale there is also belief that disruption will filter through into the universe of investible assets. The \$270 trillion (US) representing the resources that can be used for investing (Figure 9) is spread across three main groups: money holders, money managers and intermediaries. The money holders carry the largest risk and stand to benefit from the largest share of any gains, they range from individual households through to corporations. Money managers and intermediaries are delegated by the money holders to manage the asset growth, these incumbents are now having to reposition themselves as robo-advisers (digital providers of financial advice based on algorithms) and other disrupters grow their share of the asset market. New entrants like China’s Alibaba Group Holding have grown to over \$100 billion (US) in assets over the past few years and have done so largely by efficient use of ‘blockchain’ technology, and unless regulation dramatically stifles this approach more of this type of disruption can be expected (Stefanova et al, 2016).

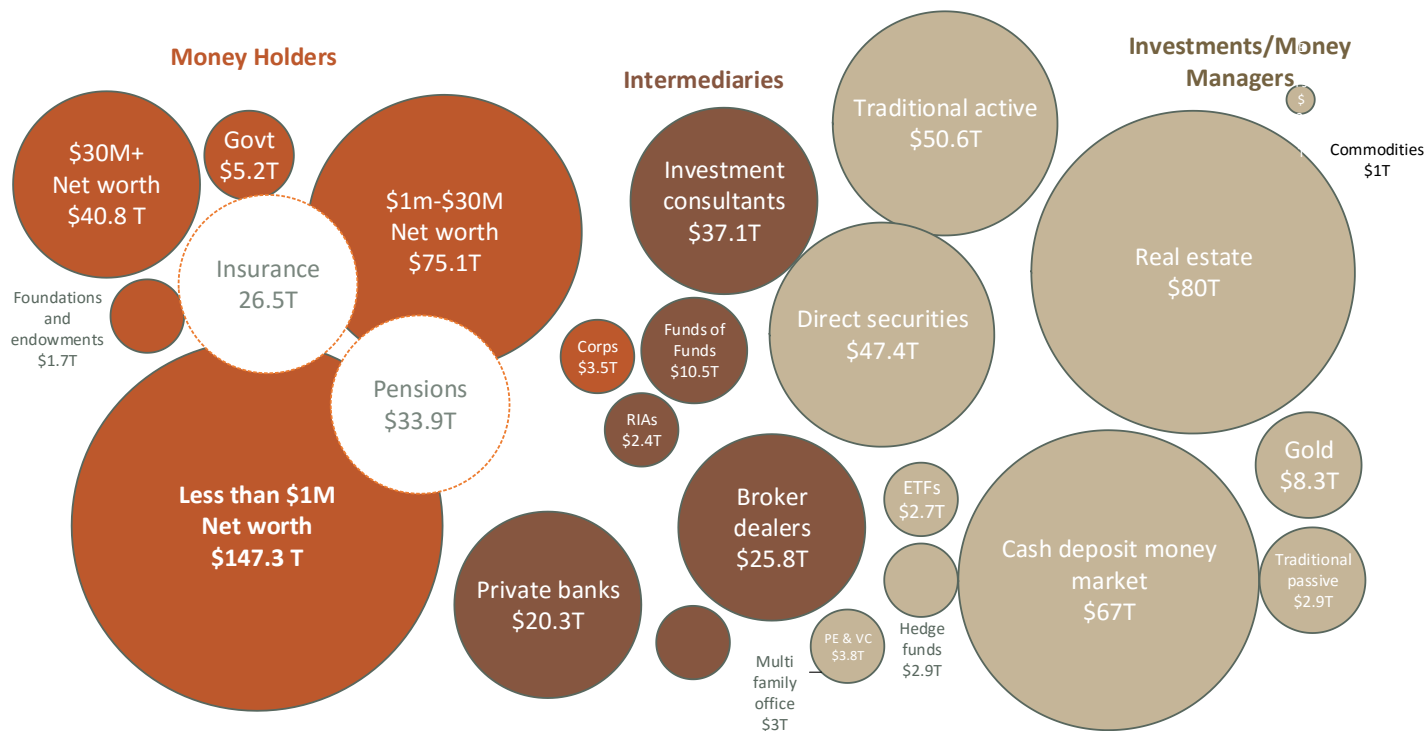


Figure 9. The \$270 trillion (US) investment asset universe (Source: adapted from Stefanova et al, 2016)

Blockchain technology (otherwise known as distributed/shared ledger technology) tracks all transactions across the supply network it has been built around. Every transaction is a ‘block’ that is chained from the previous and onto the subsequent

transactions, with every transaction being verified against pre-determined rules or logic, meaning once the fundamentals are set up there is no need for a third party intermediary to authenticate (e.g. bank) the transaction as it is verified by everyone in the blockchain. This type of technology has the potential to bring a new form of trusted transactional practice that could lead to significantly accelerated innovations across the Primary industries value network (McKinsey & Company, 2016).

The Primary industries have a number of areas that need developing and that blockchain could assist with like; product tracking; fair pricing and decreased transaction costs; reducing human error; more efficient financing; smart farm contracts and data monitoring, plus many more that result in a more transparent and efficient way to manage the value network. The adoption of this does require shifts in business models and for value proposition to be clear (De Meijer, 2016).

NZ support to research and development

Whilst it is more difficult to extract data on pure I³ in the NZ Primary industries, looking at New Zealand's Research and Development Survey 2016 shows \$542 million of research expenditure in 2016 was for the purpose of the Primary industries, of which \$266 million was carried out by business, \$214 million by government (including Crown research institutes) and \$62 million by higher education, principally universities (this includes an estimate for mining exploration covered by Primary industries definition). By comparison this is 17 per cent of total research and development expenditure in 2016 of \$3,216 million. Whilst this survey does not include the full value chain of the primary industry (for example, it does not include manufacturing of primary products), so there will be some underestimates, it does show an improvement from the previous survey, but there is still more that can be done (StatsNZ, 2016).

This investment still only represents around 1.3% of GDP, and setting this against the OECD average of 2.4% (please note this is overall R&D as it has been difficult to extract suitable information on primary industry global shows the gap. There is the view that the approach of grants/Crown research/other current forms of support are potential limiting the level of R&D/innovation expenditure being undertaken in NZ and that a more substantial tax credit for R&D would be more incentivising (Business Desk, 2017). There are pros and cons for taking this approach – pros include more certainty for business, lower admin costs and less picking of winners by government, but this is countered by having less control and the opportunity for abusing the system (businesses re-classing activities as R&D) (Sawyer, 2005), although the increasing transparency digital transactions offer could reduce this risk. It is too soon to understand whether the 'cash out' R&D tax credit (came into force Feb 2016) (New Zealand Parliament, 2016).

Whilst the concepts of innovation, value chain and investment have not been able to be fully explored, the work undertaken through the literature review has provided some useful insights to help build the structure of the primary data collection in the next section.

RESULTS

This section illustrates the key findings from the interviews and case studies undertaken as part of this research. These findings inform and guide the discussion and recommendations in the following chapter.

KEY PLAYER INTERVIEWS

Six interviews/surveys were undertaken with 'key players' across the spectrum of I³ (Table 3). This initial line of survey/interview was undertaken to gain an initial barometer as to how effective I³ in the NZ primary industry is, and also provide some insights as to the sorts of areas that could be explored at a deeper level with the case studies that carry on from them. In reality this proved difficult to organise in time provided. **Themes** not previously identified in the literature review were explored and have been built into the concepts piece of this report, but some of the themes introduced in the later interviews were not able to be pursued in the case studies. Each interview generally ran between 30 mins - 1hr long (two participants were only able to provide written responses to the questions).

Organisation representing	Interviewee	Role	Date interviewed
 SPROUT NZ Agri-tech accelerator	Stu Bradbury	Sprout Business Strategy Adviser	4/4/2017, surveyed
 Administers largest % Govt R&D	Max Kennedy	Manager Contestable Investments	11/4/2017
Supports innovation in agribusiness VCs 	Barry Brook	Trustee	21/4/2017
 Start-up/accelerator support company	Andy Hamilton	CEO	21/4/2017, surveyed
 Private equity/capital raising firm	Richard Allen	Co-founder/Director	3/5/2017
 NZ largest dairy company	Jeremy Hill	Chief Science & Technology Officer	19/5/2017

Table 3. List of Key Player interviews

1. What is innovation to you?

This question was really designed as an introduction to the topic and was generally answered in the same light by all respondents – “Something new or different that offers a benefit over whatever the alternatives are”, distinctions were made between non radical and radical/disruptive innovation “On another level, disruptive innovation could completely over-run and sideswipe other innovation that has taken place in the past by offering a vastly different and superior solution to what has become the norm”. There was also good distinction around what was domestic versus global innovation, but the responses brought no new perspectives or themes.

2. What’s your view on innovation in the Primary Industry in New Zealand?

“NZ’s primary industry has experienced a lot of innovation and drives innovation out to the world”, **spatial separation** means NZ has to **innovate to survive** “farmers have been incredibly innovative on farm and you only have to give them the right signals in terms of product and they will find the most efficient way of getting there beyond the farm gate the product innovation is less successful and less innovative and this is partly due to the **industry structures**”, “the **old number 8 wire** approach wont suffice”. There was widespread recognition of the accomplishments in the breeding/genetics/practices across the sectors and special note to the innovations emerging from the Maori Agribusiness space, but there was also the feeling that possibly “only 3-4% was game changing”. There was also the view that “there is **no common rate of innovation across the Primary industries**”, so “some aspects are moving fast and some are getting **ripe for disruptive innovation**”. Some of the interviewees offered the perspective that there had been incremental innovations that have led to disruption from a unit operations perspective but not widespread disruption. Observations were also made around whatever radical/disruptive innovations emerged they would still need “to obey the fundamental rule that we need a range of micro and macro nutrients in order to survive”. In hindsight the question could have been targeted at specific points of the value chain, but some of the interviewees might have struggled with specific examples.

3. Can you share a specific innovation strategy you've recently encountered which you find compelling?

Responses on this were really varied with some choosing to focus on specific businesses/approaches, some on the types of services that were being offered and others more on pan-sector collaborations. Ideally all of these strategies would have been followed up on to try and fuse some correlation as to what was making them compelling, but time constraints have not allowed for this. The following were key examples picked up on from the interviews:

- Specific businesses – [Robotics Plus](#) “strategy is to identify areas where **value can be added to their customer’s operation**, and then charge their machines out as a service (similar to a lease)”. ANZCO Foods, Merino NZ, Synlait, Sanford (particularly since a re-gear of leadership) “**all have some really good thinking..., but the difficulty they have is actually making things happen**”. Fonterra is supporting innovation across a broad spectrum of businesses and activities ‘Velocity in Innovation’ within Fonterra through to [Fonterra Ventures](#) a recently launched spin off that seeks to cultivate disruptive ideas from outside Fonterra (this is a trend that was noted whilst undertaking the literature review with examples like Kellogg/General Mills creating spin offs like [Eighteen94 Capital](#)). Some chose to look beyond the Primary industries stating examples like Xero and Tesler, or discussing other accelerators like Creative HQ (amongst other services they offer a workshop on exponential organisations and response strategies towards them).
- Services – **Technology scouting** “needs to be more opportunities for UNIs and CRI’s to work with SMEs”. Some pointed to the need for a step wise change for decision making using the **Internet of Things (IOT)**.
- **Pan-sector collaborations** – Te Hono, Team USA were discussed and these approaches are really encouraging for developing the ecosystem of I³, whilst also promoting the brand of NZ offerings, “I have got some really great hopes for what’s going there the momentum that is going there is a bit of a tipping point...they termed the [nine inflection points](#) for what they term as an innovation strategy”.

4. What do you see as the most challenging barriers to increasing value chain gains, now and in the future?

The barriers touched on included; Education; Communication; free flow of information; terminology of agriculture needs re-branding; Complacency; lack of scale/motivation/interest; connection with the market place; “partnering towards more final market product”; “start-ups are good but it takes time for them to grow and their value capture still needs improvement”; lack of connectivity infrastructure, and lack of support to incubate Agservice industries. Whilst challenges were a plenty some responses highlighted the potential opportunities as; start-ups in the Primary industries being relatively untapped, possibly because less trendy or often more expensive to validate business concept. Or that the tyranny of distance could be an opportunity for biosecurity/provenance perspective. It was interesting to note one comment passed on and coined by one of the ‘Te Hono Stamford Bootcamp’ professors “*it is not just the way NZ is positioned, it’s not just positioned to be the best country in the world, but **the best country for the world***”

5. Where do you think innovation will have the biggest impact in NZ’s Primary industries?

Connecting consumer demands/desires to societal needs “Yes we know we have to move from volume to value but it is more about moving volume to value than the from”, largely the response was that innovation would allow NZ to differentiate and to extract more value from a limited resource that is being used to chase the status quo in terms of global growth (e.g. export growth 3%, but world growing at 3% means dwindling supply). The answer to this, as was noted by several ‘key players’, is to set high standards for discerning populations who are looking for quality distinction. One saw the need for what could be termed ‘**impactful alignment**’, that is for NZ to be ‘the best country for the world’ three areas would have to be aligned; 1) we have to connect to the consumer, 2) connect all of what they want to societal values and simultaneously connect that to 3) farmers.

6. What do you see as the next generation of investment in the Primary Industry? Has it become easier to source funding for innovation and what are the pitfalls?

Hybrid investment was something a few of the interviewees mentioned “a hybrid but likely not to be a hybrid of the types of investment we currently have”, “a hybrid of the seed source crowd funding to the fully branded commercialized support needed to lift the value retention of primary industry production” “You will see with the demand for more food and the demand for food produced in certain ways the emergence of new opportunities, new business models possibly a larger share of venture capital investment in Agri-food than we have seen before, that trend is already happening, certainly overseas”. There was also a lot of mention of **more passive open source investment** citing investors looking for new/exciting opportunities whilst also wanting to secure the future food bag. There was also discussion around the opinion that availability to finance I³ had never been better than currently, but some argued that a lot of public/core I³ was piecemeal, “a lot are not over \$1m and in global relativity is that going to be enough, e.g. Nestle has an R&D budget of \$2bn pa then there is the European framework funding, but many of these are not as effective as the PGP, but they are as effective if not more than some of the other investments in the NZ R&D space”. The most useful conversations were around not necessarily the next generation of investment, but the **next generation of investors** this redirected thinking back to the literature review to explore what was happening in this space (see page 10), “I would love it if it was in the ‘market end’ around owning the value chain” and “interesting to see what millennials do with their savings does it end up in Kiwisaver funds, or in consumables or does it end up in them taking an interest in more active entities either listed or unlisted and this has not been answered yet. But there is a massive asset class on its way that has potential to really game change in terms of investment into companies and therefore available companies in NZ”. Finally some of the thinking was that there needs to be caution around how protective NZ is around its **capital origin policies**, i.e. what are the right types of foreign direct investment and companies needed by NZ to build scale in all the right ways.

7. What in your opinion is an effective innovation strategy? And how do you measure innovation effectiveness?

In answering this question many of the interviews opened up into other remotely connected areas across I³ like confidentiality and strategic business placement. The key themes raised were; **passing the market test** (failure can be poor innovation or poor innovation strategy to market); passing the speed to market to test (more than 6 months is often too slow in the pace of today’s market) “It is about invention and exploitation, but for success there needs to be three things achieved relative to the competition 1) Fast 2) Differentiated, but for real disruption 3) to their business, but with respect to that purchase of your product”. Other observations made were; consider the balance of payments and **is the risk threshold significant**, look at the baseline vs enough for incremental change vs high risk high potential, get the pipeline working for the most successful portfolio (**the innovation ecosystem**). Considering how I³ is interwoven into the overall business/sector strategy and how it includes disrupting or sustaining change was also seen as important. Effective I³ was often not seen as a science and technology department working in silo until it needed to bring the offering back to the main corporate entity (so no [Skunk Works](#)), “but intentionally looking for different **vectors for your innovation**”

8. What more do you think NZ has to do to reach a higher point of innovation optimisation?

The two lead themes brought forward were, **Governance** “Taking a company from \$1m to \$50m in revenue will not happen without really good governance in place. So how do we support governance in small businesses that supports innovation in the right place” **and support from bigger business to grease the wheels for NZ Inc.** Building on from the **complacency** theme that arose in question 4, **urgency and leadership** was raised as being significant to impactful momentum happening before the Primary industries were really on the receiving end of disruption. The **risk threshold** element was discussed again (different interviewee) and others talked about how we built capability for an I³ approach through our education system.

9. How would you rate New Zealand's Primary industries approach to targeting value, positioning itself in key points along the value chain?

A good summary of the key themes that came through from this question would be **have presence**, "trying to encourage putting staff into the marketplace rather than rely on the odd overseas visit to brokers or agents...., but interest for this has been really low" **and insight**, "So where NZ suffers is that a large part of the research done is not connected to market so often they might have thought of differentiation but has it really been connected to what the consumer wants. It is a sophisticated view of where you are actually at versus the needs of your target and that doesn't matter on the channel". Another good take home was the perspectives placed on **value chain efficiencies** (this will be covered further through the case studies). This was a difficult question to get reaction to, possibly because often it takes scale to get a value increase worthy of being recognised.

10. What barriers do you see to NZ Primary industry lifting the value of exports and are there other countries NZ could learn from?

Looking back now there was some overlapping starting to happen with some of these latter questions, which was evident in some of the respondents starting to recover some of the themes that had been explored earlier in the interview. Nonetheless when pressed for some thinking elements like **being in an advantageously agile position** needs to be acted upon "The removal of ag subs in the 80s has set NZ up for a successful innovation platform.... NZ has already been through the pain barrier that other countries will still have to endure". There was also mention of how other countries made bounds because of the clarity of who they want/don't want to work with and the current danger of wanting to do what everyone else is doing. This was backed up by another interviewee referring to tapping into what was happening in areas that had much larger resources like Europe and the dangers of trying to maintain the no.8 wire approach. The most concerning subject raised was around the **public perception of the value of innovation** and how a lack of unity for what the Primary industries was trying to achieve would ultimately undermine gains being made. This stretches to wider issues around corporate responsibility and globalisation and this proposal is possibly stretched enough without trying to consider these issues, but **propaganda around the social pillar of innovation** is something to definitely take heed of. Those who provided examples of other countries doing well listed *Canada, Ireland, Israel and Netherlands* as good benchmarks.

11. Considering the proportion of SMEs in NZ is there anything that needs to change to enable more impact from innovation?

This question was included to try and gauge if this was an area that required significant investigation, either within the realms of this proposal or for future consideration, i.e. bearing in mind over 97% of NZ business is classed as a Small/Medium Enterprise was it something that impactful I³ hinged on or not? Only one person thought it was imperative that the type of dynamism that a high proportion of SMEs offered potentially outweighed the issues it presented in respect to scale, but their point was really valid and captured very well how **the seed of innovation can grow**, so I³ has to be part of our culture from an early age – "It's quite a few years since I was a kid and went to school, but I think it would be great if today's youth were encouraged in much the same way I was so that when they get to an age where they are able to apply themselves to building a business (EG, Patrick Roskam, invented the Gudgeon Pro at 11 years old), they've got the initial skills and support to just get into it". A number of people talked about what could be best termed as **consolidation through collaboration** – "You see a lot of good start ups but often limited to NZ and the scale it can provide so how do we give them access to global markets inc. more quickly, how do we leverage together for like-minded things. The success for NZ companies is how quickly they can they go off shore", "The only thing that will drive mergers and acquisitions is pleasure or pain, i.e. there has to be a really attractive upside or a really nasty downside otherwise you won't see the emergence of companies the size of Fonterra any time soon". Another interesting perspective was that if ambition and confidence could be amplified the rest would be looked after, which boils back to how can the **ecosystem** foster the type of joined up innovations that will lead to scale?

12. Other than ROI what other key considerations do you see investors in innovation making?

The final questions in the 'key players' section was designed to test decision making approaches for I³. The responses ranged from the production of new/novel offerings right through to what societal impact the innovation could offer, with some focusing purely from an external/consumer perspective whilst others looked at the enduring value of having an internal culture that enabled innovation to happen just as a way of life. The triple bottom line (profit, people, planet) was mentioned a couple of times and also interchanged "You need to look at innovation from a triple P perspective, that is **People, Planet and Prosperity**". The main learning from this was that I³ can be as complex or as simple as you choose to make it, but to gain momentum there has to be an easy connection, with the concept, the product, the people or even the place that is being offered. Emotive decision making rules product flow globally more and more (or at least until we suffer another GFC).

Theme discovery coming in from the 'key players' was used where possible to shape and test the design of the case studies, but as noted previously the case studies were in themselves insightful around the approaches to I³.

CASE STUDIES

Because the notion of I³, and particularly disruptive innovation, is relatively unconventional it was important to ground test some of the theoretical concepts covered in a real commercial setting. This was not designed to simply gain a barometer on disruptive potential but to explore what strategy to I³ would shape up like if it was possible to take components from some of NZs leading primary industry innovators.

Four case studies were chosen from across the primary industry sectors and a series of twenty questions across four areas (position, environment, strategy, and proposition) were designed to gain both quantitative and qualitative information. The reasoning for choosing the four case studies is set out in Table 4. Interview data is also backed up by the author using published annual report information (or associated analysis) from each of the four organisations.

What?	Who?	Why?
 <p>NZ's largest diversified seafood fishing, aquaculture and marketing company</p>	<p>Andrew Stanley General Manager Innovation 28th April 2017</p>	<p>Recent performance, spread across wild harvest and farmed products combined with increased focus adding value in high value markets</p>
 <p>Innovative dairy manufacturer of value added dairy for health and nutrition companies</p>	<p>Dr Simon Causer Research Manager 5th May 2017</p>	<p>Relative speed of growth, novel product offerings and ownership structure</p>
 <p>NZs largest, fully integrated grower, packer and marketer of apples</p>	<p>Andy Borland Managing Director (Scales Corporation Ltd) 16th May 2017</p>	<p>Whilst Mr Apple is NZ's largest vertically integrated grower, packer and exporter of apples it was as much about its place in the umbrella organisation of Scales Corporation Ltd. that was important</p>
 <p>Manufacturer of honey-based products for: food, nutraceuticals, personal care and medicine</p>	<p>Sharon Hollenstein Chief Innovation Officer 17th May 2017</p>	<p>Relatively recent listing, novel range of diversified products and use of e-commerce</p>

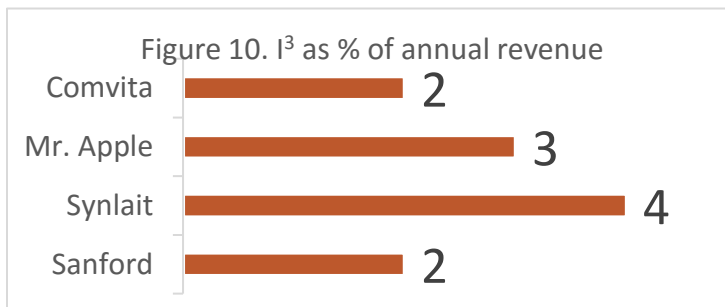
Table 4 (compiled with information from Coriolis, 2015)

POSITION

Which areas of the value chain is the organisation currently targeting and why and what is the strategy for expanding or developing this?

Sanford	Focussed on the finite resource, lifting the efficiency of the harvest and processing to reduce wastage and lift the utilisation/value of lower grade fish, but this is driven by consumer focused brands and increasing the reputation of their supply chain. This has been a recent change of Sanford as FMCG experience has been brought into the organisation on top of pure primary industry experience.
Synlait	The drive to add value pushed the organisation to seek out differentiated products , namely infant formula. Synlait grew from dairy farmers wanting to increase their returns in a volatile market and did this from moving from a range of milk powders to infant formulas and increasingly nutritional based products with a far higher proportionate value.
Mr. Apple	Vertical integration is important to Mr. Apple “we are always working on each part of the business to keep improving. From the orchard to the pack houses, cool stores and the distribution and marketing”. They have re-planted 37% of their orchards to cater for Asian demands of sweeter, bright red apples and have also invested heavily in digital traceability/management tools as well as acquiring more processing and storage capacity, which reflects the commitment to the market they are in. New varieties can take 10-15 yrs to be ready for market so there are long timeframes for new product development.
Comvita	Manufactures and markets manuka honey-based products and fresh olive leaf extract products. The company sells honey and olive leaf extract products for health, skin care and medical uses, with approximately 80% of its products exported to Asia, North America, Australia and the UK. (Edison, 2016) the focus priorities are consumer, distribution, farm, input

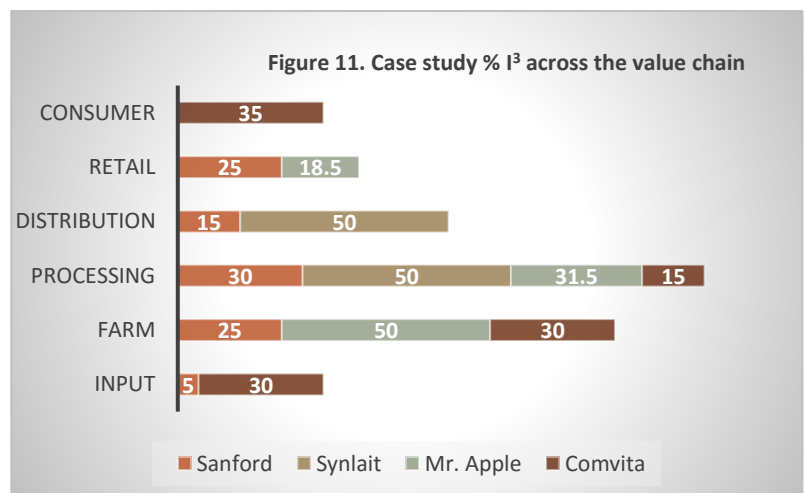
What percentage of annual revenue is committed to innovation/ research and development?



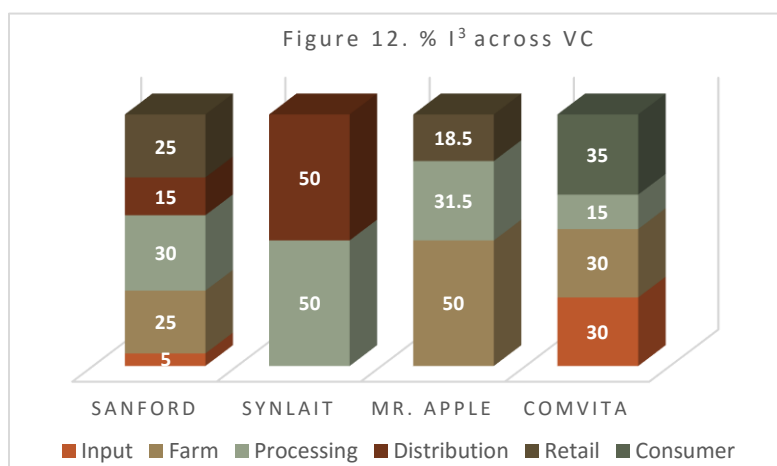
The idea of this question was to gain an understanding as to how much emphasis was put on I³, whilst there are no industry wide (freely available) benchmarks to set these results by it does demonstrate the relatively low levels of investment. Anyone interested in learning how to benchmark their organisation for innovation should contact [Callaghan Innovation](#).

Could you please provide an indication of the spread of expenditure for your organisation and the proportion of spend across the value chain on innovation/ R&D

This information was relatively crude in the fact that it was an assessment by the interviewees at the time. Nonetheless it shows a clear pattern that the weight of I³ is focused further away from the market end of the value chain than ideal to show potential to be a disrupter. A change in the mix of case studies could have re-gearred this slightly, but generally this shows the long cycles for new products and the requirement to work with mainly static inputs means what spare revenue used for I³ is retained for areas



of the VC that are controlled versus areas that could accelerate further growth.



The main point to note with Figure 12 is that: **Sanford** realise their infancy as a value adder and if this was 5-10yrs ago the weighting would probably look more like 50:25:25 (Input, Farm and Process)

Synlait partner with retailers to produce a lot of their new products so low representation of I³, ownership of farms is also now reflected in the spread

Mr. Apple shows weighting towards the first half of the VC. Scales Corporation Ltd. (parent company) provides much of the final stage VC connections (distribution and food ingredients)

Comvita has a strong retail presence, but is supply constrained so the effects of its e-commerce channels are diluted by the ability to maintain high levels of supply.

ENVIRONMENT

What is the culture/drive for innovation within the organisation and how is it measured?

Sanford spoke of the need to use innovation as a tool for problem solving, if used right it will solve a series of problems (incremental) across the organisation, but also mentioned **varied perceptions of what innovation is** and therefore prioritisation of (e.g. public perception of marine farming vs. factory production). Measures: no of initiatives, no. of successful projects, but engagement is difficult. **Synlait** framed this as **“how do you innovate against a background of growth”**. When the company was young there was the potential for nimble testing of new products and customers, but when the business is of a certain scale the focus is **“minimise disruption and engineer out risk”**. **Mr. Apple** explained where the industry had come from and the ‘save your way to prosperity’ approach versus much more of ‘grow your way to prosperity’ now. Much of the work around new cultivars/varieties is done by Prevar, which Mr. Apple has a stake in through PipfruitNZ, the company does not incentivise I³, but instead creates a passionate culture, and acquires innovation through purchases of other capability like Longview. **Comvita** presented the culture as being well positioned at senior level but needing to spread throughout the organisation, and mentioned how outside the Manuka honey industry it was not necessarily seen as innovative. Measures: time-to-market, time-to-profit, success rate of incremental innovation, success rate of radical innovation etc.

How does ideation come about in?

Sanford	Depends on nature, could be open source or special teams used. Mentioned opportunities around increased market insight data and more open collaboration on industry innovation. Challenge is 100 different species and 20 different factories across the country
Synlait	Driven by matching customer needs. New in-house product development team, but zero patents held
Mr. Apple	Driven by customer needs and looking for ways to increase efficiencies
Comvita	Needs developing but based on insights and customer led or supplier supported

On the matrix below where would you place the emphasis on how the organisation approaches innovation?

	Disruptive	Archietectural
Requires new business model	Comvita (new)	Sanford (nutraceutical)
Leverages existing business model	Comvita (core) Sanford (core) Mr. Apple (core)	Comvita (new) Synlait (adult nutrition) Mr. Apple (pests, packing)
	Routine	Radical
	Leverages existing technical competencies	Requires new technical competencies

All case studies recognized transitions they were undertaking via reassessing their competencies or models, with Comvita the only one that proclaimed to strive towards at least a couple of transformations.

What are some of the biggest impediments to innovation in your organization and industry sector?

Three of the case studies identified **organisation structure and buy-in** as the biggest impediments and the balance of keeping above the corporate churn vs being isolated from the main drive of the business. Some also mentioned the right sought of **leveraged capital to enable larger riskier I³** to take place, and that **lack of shared insights or research findings** was also leading to duplication of work.

What technologies, business models, and trends will drive the biggest changes in your industry over the next ten years?

The greatest weighting of response to this question was around the changing consumer trends that will continue to drive the need for transparency and societal integrity of the products and services being offered. Some went into the types of technology they believed would be the most influential and why (there were no new observations to the key disrupters identified in DISRUPTIVE INNOVATION on page 8). Only two mentioned anything around business model, with one alluding to changes around the co-operative model and the other reflecting on their own organisation “Our strategy is **diversification to protect the core business**”. This was not surprising and reflects some of the motivational reasons for wanting to explore I³, it is easy to be persuaded by what is trendy, equally technology inspires how we define the way we operate, but unless the business model can really drive differentiation or disruption the fear is that the ability for the Primary industries to be a trend setter and not a trend follower could be lost.

What partnerships are being pursued to enable closer integration of the value chain your organisation operates within?

There was a good spectrum of response to this question with some focussing on their efforts to build enduring relationships/partnerships from the supply side (Comvita), whilst others talking about investment from their retailers and distributors to foster strength in the market place (Mr. Apple & Synlait). Sanford pointed to service solution partnerships with government, 3rd party intermediaries like ['The Foodbowl'](#) and NGOs to make sure beneficial outcomes along the chain come from **dynamic collaborations**.

Considering the proportion of SMEs in NZ is there anything that needs to change to enable more impact from innovation?

Governance and leadership were further themes that emerged on top of the themes identified by the ‘key player’ interviews (the seed of innovation can grow, consolidation through collaboration and ecosystem). Other thinking was “there's a lot of New Zealand small to medium enterprises that really just struggle because they don't have that **right mix of ideas**,

commercial excellence, business contacts and networks". Further mention was placed against the greatest competition being overseas and partnerships with competitors in NZ was worth not discounting to achieve scale.

What do you see as the most challenging barriers to your organisation becoming more adaptive to disruptive change?

The momentum barrier (customers are used to the status quo)	2
The tech-implementation barrier (which could be overcome using existing technology)	
The ecosystem barrier (which would require a change in the business environment to overcome)	3
The new-technologies barrier (the technology needed to change the competitive landscape does not yet exist)	
The business model barrier (the disrupter would have to adopt your cost structure)	1
Other	

The intent of this question was to try and assess from the case studies where they believed the barriers would be both from them becoming more disruptive and also barriers a potential disrupter would face. The result that the business model barrier was ranked highest is important, unfortunately in many historic disruption examples (e.g. Kodak, Blockbuster) the failure to see the weaknesses of their business model led to their demise. The nature of change is quite different in a physical setting versus a digital setting, but still disruption adaption has to start with the business model.

What would have to change for current advantages the organisation has to evaporate?

The immediate reaction to this questions was to discuss the PEST (political, economic, social and technical) problems like market access, reputational issues, consumer perceptions shifting faster than they could re-position for, regulation, capabilities, but after these material considerations had been canvassed some of the interviewees reflected that whilst they were aware of synthesized products (or other disruptors) in their areas they were confident that their approach would be around for decades to come.

STRATEGY

What steps is the organisation taking to become more adaptive to disruptive change?

Reducing risk as a general principle was keenly picked up by all case studies, how you reduce risk and stay agile is the challenge. Some took the view that staying 100% compliant, clean and transparent would give the best footing. Some talked about Te Hono and the window of exposure it offered to what disruptive channels were establishing, and what the network could do to support. This was reflected by some saying it was just as valuable to spend time in the marketplace seeing the pace of change first hand. There were also views that could be summarised as **diversity dilutes disruption** spreading the risk by tailoring channels to those that would naturally assist I³ (either new customers or products) and some alluding to the **skill of corporate ambidexterity**.

Does your business have an Innovation Strategy? What sort of assistance would help (helped you if you have one) you to develop an Innovation Strategy?

Innovation strategy was discussed in differing ways - Comvita and Synlait had steps towards an innovation strategy, both working with Callaghan to benchmark how they rated, but currently only Comvita was taking this further by building it into their communications across the company. Sanford pointed to the challenges of keeping the importance of I³ constant and Mr. Apple described it was not needed as they "ask their people to act like owners... and take leadership in innovating for their customers". The advice was to make sure there was leadership commitment to give fast yes or fast no to I³ and ensure any strategy has enough stretch to be considered as being enough over business as usual to warrant I³. Above all know your capability, know your consumers desires and identify the gap.

Can you share a specific innovation strategy you've recently encountered which you find compelling?

This question was another of those brought forward from the 'key players' section, with the intent of a bit more data mining. Some examples mentioned were ['TheLand'](#) and what is being captured in Asia, 'My Food Bag' and 'Lego' and its open source approach to ideation and new product development. The main subsequent learning from previous themes (where value can be added to their customer's operation, all have some really good thinking..., but the difficulty they have is actually making things happen, technology scouting, IOT, pan-sector collaborations) was that the rewards of I³ when **consumers are compelled**. This is not just a play on this question, but highly successful innovation is the result of the fact that users taking ownership in the concept and the product they are buying into has more connection than them simply consuming it.

PROPOSITION

How is innovation/ research and development financed? (private internal, private external, public)

The intent of this question was to try and see if there were any emerging themes or novel approaches, in hindsight it might have been more useful to have looked at a spectrum of companies (i.e. some listed, some not or maybe even some startups) to gain a bit more diversity across this area. Primarily I³ across the case studies is dealt with internally through either capex or opex, or if more significant investment is required further shareholding offers are used. Synlait and Mr. Apple mentioned investment by customers and this has been particularly useful for growth for Synlait. When they do use public funding models it is either because it is offered with great flexibility or there is a great potential to leverage the investment, by increasing their social licence or facilitating better access etc. Only one considered the possibility of a crowdfunding type approach, but suggested it would be used in a very targeted way if at all.

What are the considerations when choosing innovation finance?

Freedom to operate, flexibility, aligned with strategy, customer needs, **leverage but not being leveraged (i.e. level of control)** were the main responses, again a different nature of response might have come from start-ups or businesses in more fluid (where the inputs are not tied to high asset values) industries.

What do you see as the next generation of investment in the Primary Industry? (Repeat question from 'key players')

Here the focus was mainly around data and information and how both old and new investment approaches would have greater attention on more analytics and digital insights than ever before. There was repeated mention of investment coming from the front end of the chain and some good observations that the Primary industries have generally not favoured from being on the stock exchange. Providing the best case around return on capital employed was seen as a successful way to raise capital.

Has it become easier to source funding for innovation? What are the challenges of accessing funding for innovation? (Repeat question from 'key players')

Possibly due to the framing of the question, but only Mr. Apple interpreted this as accessing funding internally and the need to get the pitch right for the board to be fully supportive of it. Sanford and Synlait described that external/public funding was still difficult to obtain and creates delays. Sanford went on to point out that the industry (all industries) would benefit from having **more joined up precompetitive innovation** and development being undertaken using a combined vehicle (the example provided was of [Seafood Innovations](#) as a vehicle currently being underutilised).

Other than ROI what other key considerations do you see investors in innovation making? (Repeat question from ‘key players’)

Many saw ROI as high on the list but also added the following:

strategic fit, total market opportunity (channel, margins, growth, competitors), whether we will be competitive and meet consumer needs, will it leverage our competencies, whether likely to success technically, business risk, will it increase sustainability, will it make the business more robust, what are the payback times, what is the people impact (e.g. health & safety) and how will it lift or change public perception.

THEME TREE

With many themes (around 50) emerging from the findings filtering these before concluding the discussion was important to help refine the value against the original question of **‘How could the New Zealand Primary industries become more adaptive to disruptive change through Investing in Innovation (I3)?’** Rather than list out all themes, and their fit, the approach to how this has been arrived out is set out here. A few examples include the ‘Internet of Things’, industry structure and ‘the best country for the world’, which were more about aspirations or generic concepts.

DISCUSSION

REFLECTING ON INNOVATION

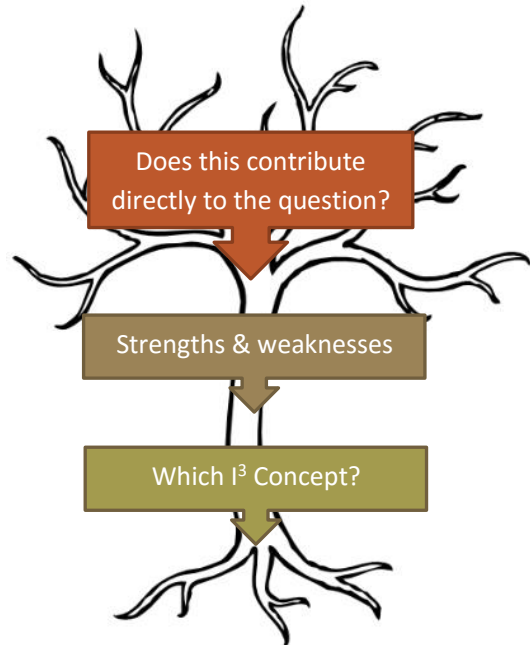
Exploring the subject of investing in innovation (I³) has meant drawing on many different variables, the constant across this has been the undisputed need that innovation has to continue to increase in order for the NZPI to not only grow, but survive. Traditional ‘no.8 wire’ approaches to innovation won’t be enough to pass the market test and get the sort of scale of value that is needed to keep the Primary industries sustainable.

The biggest issue to overcome, both internal and external to the industry, remains perception. Internally the industry still needs to lift its line of sight from complacency that the systems that have operated for decades will remain steadfast for decades to come and that increased urgency and leadership will be needed to drive the type of adaptive change needed. Indeed for the innovation ecosystem to be highly functional there needs to be some in-depth work adopted on what innovation is to the industry and how increased corporate ambidexterity can open up I³, what vehicle can be designed for more impactful insight and research sharing, how both the population and implementation of lean ideation can happen more and most importantly how the culture for I³ is enhanced by shifting from trying to minimise disruption to testing out disruption to build diversity.

Externally the challenges are just as hard, but considerably more rewarding. Shifting perception around the value of food production through being able to demonstrate the social pillar that innovation can offer will ultimately lead to a public that is not only compelled to consume, but to take ownership of our future food production. This chain of events will lead the industry to creating more mindful products that may themselves protect against radical disruption because they are disruptive themselves.

REFLECTING ON THE VALUE CHAIN

It is interesting to see the use of ‘chain’ coming through into new transactional technologies (e.g. blockchain). Whilst the chain approach is valid, classifying the system as a value network is much more fitting to the way channels from inputs to consumers



will evolve in the future. Disintermediation (cutting out stages between the producer and the consumer) is still a relatively unknown quantity in terms of how fast technology will enable it, or what long-term effect it will have on the marketplace, but it will provide the opportunity to markedly reduce the spatial separation NZPI is constrained by.

New Zealand agribusiness is often tasked with adding value and in some areas it does, but producing a code for success towards this relies on so many elements lining up. Most of all NZ needs to constantly test what the value proposition it is offering, true value comes from the uniqueness of the offering. The NZ Primary industries have to be able to find a way to get above the barrier of only having a small domestic market to road test, and learn to foster integration of ownership that allows scale to prevail without being to the detriment of distinction.

Vertical integration and network efficiencies are only going to be possible with collaboration that provides impactful alignment throughout the network, but this level of integration is now becoming a baseline standard by consumers. The next generation of primary industry products is increasingly about the experience as it is the nutrition, sustenance or other material givens, and in order to create this the industry will need to pivot on horizontal integration (not necessarily mergers and acquisitions, but joint venture and other licensing agreements) with as much emphasis as has been demonstrated with vertical integration. This starts by having sustained presence and insight to the consumer's desires (this is over and above their needs) and equally how all the players in the network can champion the type of integrity that will connect the products and services coming through at much deeper level than has previously taken place.

It is also clear that whilst start-ups and smaller organisations demonstrate agility it takes time for them to grow to the sort of scale that can make a real difference. Equally the larger organisations have engineered out risk and often this comes at the loss of agility. A number of the larger organisations are trying to address this with the types of partnerships they are fostering with customers, but there is as much potential with partnering I³ through the network of suppliers and intermediaries.

REFLECTING ON INVESTMENT

The Primary industries are continually challenged to increase investment in research and development (especially compared to other sectors like health or technology) and to become more innovative in how they operate and position the products and services they offer. Recently larger organisations have become victim to the effects of I³ coming through from start-ups backed by venture capital, but the enduring effect of this is still uncertain because traditionally the venture capital approach is to have a moderately fast exit plan, whereas larger organisations will take a longer term view. Nonetheless the fact remains that traditional new product development approaches are being trimmed because of increased diversity in the finance options available.

Maintaining and enhancing attractiveness is the most important consideration, which sounds obvious enough, but opportunities come to the companies that can demonstrate their readiness to go global, and in the background to this attractiveness lies compelling business models, partnerships and well-constructed channels.

The evolution of the investment landscape is shaping up to be as transformational as the consumer landscape catering to the desires of the next generation of investors is just as important as the desires of the consumer. This will require dynamic collaborations and a great deal more technology scouting and pre-seed/accelerator programmes (with support from more established companies) than is currently available (Fonterra and Gallagher are current examples). The government backed New Zealand Venture Investment Fund is currently being reviewed, but meanwhile some universities and other venture capital organisations are offering platforms to assist I³. Fundamentally though there is much more required in raising the right type of leveraged capital to encourage more impactful I³, and this will only come about from organisations continually refining their approach to I³, which includes how they structure their organisation, what level risk they take and how much connectivity is placed around the partners (acquired or ventured with) they choose.

CONCLUSION & RECOMMENDATIONS

The pathway to growth is littered with uncertainty, but standing still is not an option for the Primary industries and New Zealand has a great deal to offer the discerning customer.

Through the development of this research proposal it has become clear that as an incumbent to disruption in the production of food NZPI has more questions to ask of itself, and with themes like complacency, a misunderstood value of innovation, and passing the market test being offered by key players in the industry these need to be at the forefront of approaches moving forward.

In order for NZPI to become more adaptive to disruption there first has to be the realisation that some form of disruption is inevitable and renew the strategy on this basis. Equally 'the best defence is often the best offense', meaning that channelling I³ in the right way with the right insights, collaborations and appetite for risk will lead to NZPI having more opportunity to be disruptive itself.

In line with the areas drawn together through the case studies the following **recommendations** should help frame what some of the next best steps could be.

POSITION

- Government and Industry to setup a perceptions and insights portal – the [NZ Story](#) is a good start to this but it needs to have a greater level of complexity and depth to be of real value.
- I³ incentives stocktake – are the balance of tax (recently introduced) and non-tax incentives geared right to optimise innovation? My opinion is that we are still missing the optimal solution, '[Food Agility](#)' is a recent example of the sort of escalator NZPI might need to harness.

ENVIRONMENT

- Initiatives like [Project Leapfrog](#) need acceleration – this will happen with the passage of time and a larger cohort network, but Silicon Valley is not the only hot bed of activity globally where compelling connections need to be made.
- An NZPI roadmap of opportunities needs to be drawn together based on the value network and key operatives within it (with the aim of identifying dynamic collaborations)
- A barrier demolition plan also needs to be drawn together. The top 3 barriers identified through the case studies were:
 1. The business model barrier – fundamental thinking is required around how at each level of the industry technology can be used to re-route the business model barrier (e.g. 'blockchain' co-innovation standard)
 2. The momentum barrier (customers are used to the status quo) – linked to *POSITION* the 'status futururus' needs to be identified, even if it might require sacrificing some of our current success
 3. The ecosystem barrier (which would require a change in the business environment to overcome) – linked to 1&2 there is a need for a model/fund/initiative that can act as an incubator for testing new product development in global markets so they can fail or fly fast in the chosen destination. [The Food Innovation Network](#) needs to expand its sphere of influence.

STRATEGY

- *Savvy suppliers will de-chance disruption and re-define demand* – it is imperative that strategy becomes dialogue rather than just a planning tool. As well as acting on the results of the *POSITION & ENVIRONMENT* recommendations organisations would benefit from routinely asking themselves these questions:

1. Using new technologies, can we put together pilots, pressure test and launch quickly?
2. Are we in an investment ready state? Can we acquire a disruptor?
3. What is our high-level roadmap for transformation? How quickly can we implement it based on changing market conditions?
4. How are we actively seeking out partnerships with/investing in start-ups at various points in the value network?
5. How easy is it for our customers/ partners to influence our product development process?

PROPOSITION

- There has to be an increased drive to find a platform that will result in zero distance to our customers, whilst connecting society to what NZPI is trying to achieve and keep it sustainable for all beneficiaries, or put another way how do we open source our future? I believe technology is just a couple of door knocks away to enable this.
- Self-belief that NZPI can conquer its fears of disruption and displace itself only to find a better to produce the food, fibre, fuel and pharmaceuticals of the future

LIMITATIONS

Considering the methodology set to undertake this proposal it would have been more helpful to have the questions for the primary data collection set a lot earlier, or alternatively a more robust refinement of the literature review to enable a tighter set of concepts.

Whilst there has been some significant learnings around some of the interdependencies of the I³ concepts (innovation, value chain and investment), there are significant gaps in terms of the depth the proposal has been able to cover, not just across the I³ concepts but some of the themes that were raised during the course of the literature review and interviews. A sample of these are listed below:

- industry structures
- no common rate of innovation across the primary industries
- Internet of Things (IOT)
- the best country for the world
- capital origin policies
- Governance, leadership and FMCG experience
- being in an advantageously agile position
- seek out differentiated products and diversification to protect the core business
- leverage but not being leveraged (i.e. level of control)

Whilst some elements have been touched on, it is accepted that areas such as the capability pipeline, experience and governance to get I³ to gel has not been covered, these areas were seen as important supplementary/ follow up areas as the I³ ecosystem moves forward from conceptual to being implemented.

It would have also been ideal to have been able to do more in-depth analysis on the case studies and possibly foot print some of the likely impacts of some of the radical innovation coming over the horizon.

For those of you looking for tips for your own proposal, mine are – start early, schedule the tasks you need to do from submission back (and allow slippage time to secure interviewees), keep an electronic scrapbook as you go, use a spreadsheet for theme tree (it really helps frame the themes) and above all ask lots of questions. Have fun and thank you for taking the time to read this. [George Strachan](#)

REFERENCES

- Adrian J. Sawyer. (2005). *Potential implications of providing tax incentives for research and development in NZ* Royal Society of New Zealand.
- Bosworth, R. Pure advantage (2016). 'In lament of the NZ farm'.
- Bower, C. (1995). Disruptive technologies: Catching the wave Joseph L. Bower Clayton M. Christensen from the January–February 1995 issue. *Harvard Business Review*, (January-February), 13/5/2017.
- Business Desk, N. H. (6th April 2017). *Tax incentives for R&D could shape up to be an election issue*. Retrieved 6/5, 2017, from http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=11833301
- Carlson, M. (2015). *The disruption of millennial investing*. Retrieved 5/27, 2017, from <https://techcrunch.com/2015/11/21/the-disruption-of-millennial-investing/>
- Charles Campbell, Urs Daellenbach, Stephen Cummings, Sally Davenport. Problemsourcing: Local open innovation for R&D organizations. *Technology Innovation Management Review*. 2013 (March 2013: Local Open Innovation):14-20, Retrieved from http://timreview.ca/sites/default/files/article_PDF/Davenport_et_al_TIMReview_March2013.pdf
- Chartered Accountants Australia and New Zealand. (2015). *Food, farming and our future*
- Cornell University, INSEAD, and WIPO (2016): *The Global Innovation Index 2016: Winning with Global Innovation*, Ithaca, Fontainebleau, and Geneva. Retrieved 4/3, 2017, from <https://www.globalinnovationindex.org/gii-2016-report>
- De Meijer, C. R. W. (2016). *Blockchain: Can it be of help for the agricultural industry?* Retrieved 5/27, 2017, from <https://www.finextra.com/blogposting/13286/blockchain-can-it-be-of-help-for-the-agricultural-industry>
- Deloitte. (2013). *The food value chain: A challenge for the next century*
- Eastwood, C., Klerkx, L., & Nettle, R. (2017). Dynamics and distribution of public and private research and extension roles for technological innovation and diffusion: Case studies of the implementation and adaptation of precision farming technologies. *Journal of Rural Studies*, 49, 1-12. Retrieved from https://www.researchgate.net/profile/Laurens_Klerkx/publication/310797134_Dynamics_and_distribution_of_public_and_private_research_and_extension_roles_for_technological_innovation_and_diffusion_Case_studies_of_the_implementation_and_adaptation_of_precision_farming_technolog/links/583769e508aed5c614863d55.pdf
- Edison Investment Research Limited. (2016). *Comvita - from hive to the shelf* (<http://www.comvita.co.nz/assets/Investors/Financial-News/Year-ended-31-June-2017/Edison%20May%202016.pdf> accessed 3/6/2017) Edison Investment Research Limited.
- Hendy, C. (2013). *Get off the grass: Kick-starting New Zealand's innovation economy*. . Wellington: Auckland University Press.
- Kandybin, A., & Kihn, M. (2004). Raising your return on innovation investment. *Strategy and Business*, 38-49.
- Kaplan, S. (2012). Leading disruptive innovation. *Ivey Business Journal*, (July/August)
- KPMG International. (2013). *The agricultural and food value chain: Entering a new era of cooperation* KPMG International.
- Burwood-Taylor, L. Tilney, M, Chauhan, R. (2016). Agtech Funding Report 2016: Mid-Year Review. AgFunder retrieved 6/10, 2017, from <https://research.agfunder.com/2016/AgFunder-Agtech-Investing-Report-Midyear-2016.pdf>

- MACDONALD, T., & ROWARTH, J. (2013). Critical success factors when going global: Agribusiness co-operative growth. *Tauranga*, 75. pp. 55.
- McKinsey & Company. (May 2016). How blockchains could change the world. *McKinsey & Company High Tech, our Insights*, 27/5/2017.
- Miller, C., & Jones L (Eds.). (2010). *Agricultural value chain finance tools and lessons*. United Kingdom: Food and Agriculture Organization of the United Nations and Practical Action Publishing.
- New Zealand Parliament. (2016). *Taxation (annual rates for 2015-16, research and development, and remedial matters) bill*. Retrieved 6/10, 2017, from https://www.parliament.nz/en/pb/bills-and-laws/bills-proposed-laws/document/00DBHOH_BILL62315_1/taxation-annual-rates-for-2015-16-research-and-development
- NZ Super Fund. (2017). *Investment environment report - February 2017*. Retrieved 05/25, 2017, from <https://www.nzsuperfund.co.nz/news-media/investment-environment-report-february-2017>
- NZIER. (2015). *Global value networks how to succeed in business without worrying about scale, distance or thin networks* New Zealand Institute of Economic Research.
- OECD. Gross domestic spending on R&D Total, % of GDP, 2000 – 2016.
- OECD/Eurostat (2005), *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data, 3rd Edition*, OECD Publishing, Paris. DOI: <http://dx.doi.org/10.1787/9789264013100-en>
- OECD. Value added by activity Agriculture, forestry, fishing, % of value added, 2005 – 2016.
- Pisano, G. (2015). You need an innovation strategy. *Harvard Business Review*, (June)
- Porter, M. E. (1985). *Competitive advantage: Creating and sustaining superior performance* Simon and Schuster.
- Quinn, F. (2001). *Crowning the customer* Raphael Marketing, Incorporated.
- StatsNZ. (2017). *Research and development survey: 2016* StatsNZ.
- Stefanova, K., Teten, D. & Beardsley, B. *Asset managers prepare to have your business disrupted*. Retrieved May 21, 2017, from <http://www.institutionalinvestor.com/article/3544388/asset-management-equities/asset-managers-prepare-to-have-your-business-disrupted.html#.WSEKi49OJhh>
- The Economist. (2015) The role of innovation in meeting food security challenges *Global Food Security Index*, The Economist Intelligence Unit Limited. Innovation in investing. 2016, , 20/5/2017.
- The Organisation for Economic Co-operation and Development (OECD). (1997). How important SMEs are. *Small Businesses, Job Creation and Growth: Facts, Obstacles and Best Practices*, Retrieved from <http://www.oecd.org/cfe/smes/2090740.pdf>
- Wessel, M., & Christensen, C. (2012). *Harvard Business Review, Competitive Strategy* (December)