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Lees, I., & Lees, N. J. (2016).

Competitive advantage through responsible innovation in the New Zealand's sheep dairy industry.

IFAMA 26TH Annual World Conference (pp. 18 pages). Aarhus, Denmark: IFAMA.
<http://www.ifama.org/2016-Aarhus>

Abstract:

This paper explores the opportunities for New Zealand to establish an internationally competitive sheep dairy industry. France is among the world leaders in sheep dairy production and therefore can offer valuable lessons to New Zealand in its early stages of development. Information was gathered through a literature search and several cases studies, where seven New Zealand and six French industry experts were interviewed. The strategic capabilities and structural forces of the sheep dairy industries in both France and New Zealand were compared. The study found that New Zealand sheep dairy (NZSD) industry should pursue a differentiation strategy that focuses on customer responsiveness, innovation and quality to achieve a competitive advantage. This study also identified that responsible Innovation is a critical factor for the NZSD industry to sustain a competitive advantage.

Objectives:

This report seeks to investigate how New Zealand can establish an internationally competitive sheep dairy industry. The purpose is to evaluate the strategic capabilities of the sheep dairy industries in both France and New Zealand.

The specific objectives are to assess the building blocks of competitive advantage that will be most relevant to the New Zealand sheep dairy industry.

The study will help provide direction to the industry and its members in the early start up phase. The results will help understand; the resources and competencies that are needed for industry compete on the world stage, the opportunities and challenges that the industry will encounter in its development and ultimately the specific areas to focus on to achieve and sustain a competitive advantage.

Introduction

The New Zealand sheep dairy industry is in its infancy, with approximately 30,000 sheep milked per annum by six main producers.^[1] As a pioneer of a major sheep industry and a global leader in bovine dairy, the possibility of building on existing farming expertise and establishing a competitive sheep dairy industry in New Zealand is immense.

The sheep dairy industry in France offers valuable lessons New Zealand can use as it begins developing its sheep dairy industry. France is amongst the world leaders in sheep dairy production; as the fourth-largest producer of sheep milk, with 1.6 million dairy ewes producing around 260 million litres per year.^[2]

New Zealand's sheep dairy industry is a seemingly stark contrast to the French sheep dairy industry. In fact New Zealand's sheep numbers have been steadily falling since the mid-1980s, as a result of depressed wool prices, lower returns on meat products and competition from other farming industries such as bovine dairy.^[3] Only recently has significant interest in sheep dairy been generated; due to the success of current operators, changes to the global 'palate', various economic and environmental drivers, as well as contributions from various institutions.

Evolution of the New Zealand Sheep Dairy Industry

The NZSD industry began in 1992 when eleven pregnant East Friesian ewes and four East Friesian rams were imported into New Zealand from Sweden and entered a private quarantine station located on the outskirts of Dunedin.^[4] These animals formed the breeding stock for the current sheep dairy flock in New Zealand. Embryo transfer techniques were used and only those animals derived from embryo transfers were released from quarantine.

¹ Griffiths, L. (2014). *Business Plan for the New Zealand Sheep Dairy Industry*. Christchurch: Nuffield New Zealand.

² Villaret, A. & Markey, L. (2013). *French genetic's for cattle, sheep and goat industries*. Paris: France Genetique Elevage.

³ Gray, J. (2014, December 17). *NZ's sheep population down as dairy cattle numbers grow*. Retrieved May 9, 2015, from New Zealand Herald: http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=11375248

⁴ New Zealand Sheep Breeders Association. (2015). *East Friesian*. Retrieved August 9, 2015, from New Zealand Sheep Breeders Association: <http://www.nzsheep.co.nz/index.php?page=east-friesian>

New Zealand's dairy sheep industry has since had a fluctuating history due to challenges directly related to the industry's small scale, instability of supply, limited flocks of milking sheep, lack of experience and minimal domestic consumption of sheep dairy products.^[1] Unfortunately only two producers today are survivors of this commercial venture that began in the 1990's.^[5]

New Zealand's current sheep dairy operations range in size from small flocks of 70 ewes to one of the largest in the world; Blue River Dairy with over 20,000 ewes.^[1] The smaller producers are producing cheese or supplying milk to artisan cheese makers in a relatively niche market. While Blue River Dairy's products were initially destined to service the domestic gourmet food market, more recently the company has recognised the opportunity in the milk powder market.^[1] Blue River Dairy has established a powder plant to export infant formula to Indonesia and China.^[6] This has become a lucrative move as Blue River Dairy has seen a 50% increase in the milk powder price over the last three years.^[6] The success of this current operation has highlighted huge export potential for the New Zealand economy and has sparked renewed interest and investment into this fledgling industry.

More recently, a government owned farming enterprise Landcorp Farming Ltd (Landcorp) converted its Wairakei Pastoral farms into sheep milking and has made public plans to convert two more of their farms into sheep dairy farms. Their aim is to be milking 10,000 sheep on the central plateau site by 2020.^[6] They have also entered into a joint venture with 'Spring Sheep Dairy', to make ice cream for the domestic markets as well as export whole milk powder for the Taiwan and Korean markets.^[6]

Recent projects have investigated various aspects of farm productivity, product options and marketing. The New Zealand Government's commercial-research-funding agency (Ministry of Business, Innovation and Employment) has awarded

¹ Peterson S.W. & Prichard, C. (2015). The sheep dairy industry in New Zealand: A review. *New Zealand Society of Animal Production*, 75, 119-126.

⁶ Cronshaw, T. (2015, June 11). *Landcorp to milk sheep for Asian markets*. Retrieved August 9, 2015, from Stuff.co.nz: <http://www.stuff.co.nz/business/farming/fieldays/69292522/landcorp-to-milk-sheep-for-asian-markets>

\$5.5 million in funding to Crown Research Institute (AgResearch) and three of the existing dairy operators.^[6] In February 2015 New Zealand also held its first Ewe Milk Products and Sheep Dairying conference at Massey University. This was the first forum for information sharing among those interested in supporting the industry and is a fundamental step towards creating a collective voice for the NZSD.

The Potential for a Sheep Dairy Industry in New Zealand

The Bovine Dairy boom

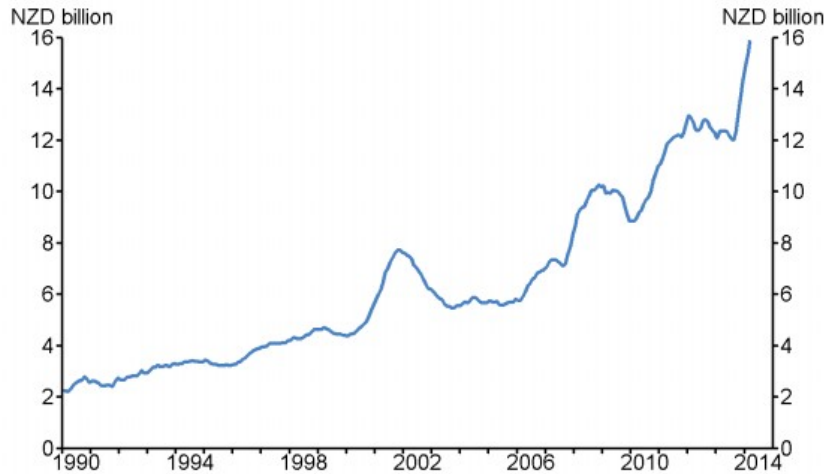
China's economic growth, over the past 35 years, is unparalleled in modern times. New Zealand has been quick to tap into this market to supply its rapidly growing demand. In 2008 New Zealand signed a trade agreement with China titled the New Zealand-China Free Trade Agreement, which has seen China grow to be one of New Zealand's largest trading partners.^[7] Total exports to China have tripled since 2008, rising from \$2.1 billion to reach \$6.1 billion in 2012.^[8]

The most exported commodities to China in 2012 were milk powder, butter, and cheese products, totaling \$2.2 billion NZD worth of export; up \$1.8 billion from 2008.^[8] Thus fueling what has been termed the 'China-driven milk boom' in New Zealand. As shown in figure 2.5, dairy export revenue has risen dramatically over the past two decades.

Figure 2.5 NZ Dairy exports

⁶ Statistics New Zealand. (2014, Jan 11). *Trade in goods with China shows rapid growth*. Retrieved July 28, 2015, from Statistics New Zealand : http://www.stats.govt.nz/browse_for_stats/snapshots-of-nz/yearbook/economy/national/trade.aspx

⁷ Wheeler, G. (2014). *The significance of dairy to the New Zealand economy*. Hamilton: Reserve Bank of New Zealand.



Source: Wheeler, G. (2014).

There has been significant improvement in dairy farm profitability over recent years; in 2014 dairy prices in NZ had grown by 65 percent since the 1990's and dairy cattle numbers had increased by 30 percent.^[8]

The New Zealand bovine dairy industry has experienced prosperous times and long-term stability is predicted for the future despite the recent downturn. Conversely, the sheep meat industry has experienced much lower profitability by comparison, facing only a 2% return on assets.^[9] Increasing input costs such as higher land prices from dairy demand, recent nationwide droughts in 2013 and 2014, the strong NZ dollar and freight disappointment in New Zealand's wool industry has lead sheep farmers to look into other options to improve their returns.^[4] Sheep milking provides another avenue for farmers to explore and could be a lucrative alternative to bovine dairy farming.

Product Demand

Demand for dairy products including sheep dairy is growing by 2.5% annually, this is being driven by emerging countries and the growing demand for healthy, natural and traditional food.^[1] Despite sheep milk products only occupying a 1.4% share of

¹ McDermott, A. S. (2008). *The Key Elements of Success and Failure in the NZ Sheep Meat industry from 1980-2007*. Lincoln University. Christchurch: The Agribusiness and Economics Research Unit.

the global dairy market, it is estimated that the demand for sheep milk is growing by 10-20% every year.^[1]

The growing presence of the health conscious consumer is boosting demand for sheep dairy products that caters for their preference of healthy foods. Not only does sheep milk have properties that are favourable for cheese, yoghurt and butter manufacturing such as a 3 times higher whey content compared to cow milk, but it also has other notable health benefits.^[10] For example its higher content of whey aids digestion, higher calcium levels (162mg/100g compared to cow's milk 110mg/100g) and higher Vitamin D levels, which aid the regulation of phosphorous and calcium absorption essential for bone mineralisation (0.18g/100g compared to cow's milk at 0.04g/100g).^[10]

AgResearch has a food, nutrition and human health team studying the functional benefit of sheep milk on health. They have found that sheep milk contains different forms of proteins, unlike the beta-lactoglobulin and alpha S1 casein in cow milk that commonly causes milk allergy and intolerance.^[6] Thus sheep milk is preferable for consumers who are unable to consume cow milk due to allergies.

Sheep milk lacks the a1 beta-casein milk protein therefore is classified as a2 milk. In 1990's a New Zealand company, the A2 milk company, discovered and began to market A2 milk as a superior product based on the theory that a1 milk facilitates immunological processes that lead to type 1 diabetes and coronary heart disease.^[10] The A2 milk company's marketing campaign has been very successful and its product is now the leading premium milk brand in Australia.^[10] This example suggests there is huge market potential for New Zealand sheep milk dairy products that fall into the A2 category.

Return on Investment

Although there is more research to be done, preliminary studies suggest that the

[»] Downie-Melrose, K. (2014). *A Bio-economic Feasibility Study of Sheep Dairy Systems in Canterbury*. Christchurch: Lincoln University.

economics of sheep dairy might be a more profitable venture than conventional dry-land sheep farming. Landcorp have announced their plans to set up sheep milking as a way of earning a third income, along with meat and wool.^[6] Although the farming objectives change from lamb growth and development to ewe condition and lactation, there is still a strong market for male lambs, which can be finished or sold store as well as the wool generating an income from all classes of stock.

When comparing the return on assets of particular farming models, a dry land sheep farm model returned 2.8%, an irrigated sheep dairy returned 7.8% and an irrigated bovine dairy returned 7.2%.^[10] These results should be attractive to farmers wishing to improve the profitability of their sheep farming operation. The capital costs involved in setting up a sheep dairy operation were less than that required for milking cows, however the New Zealand bovine dairy industry currently has other positive qualities such as, structure and stability and a strong successful cooperative, qualities that are almost non-existent in New Zealand's sheep milking industry.

Environmental Sustainability

New Zealand has traditionally marketed its products using the image of a 'Clean and Green' producing nation, forming the basis of the New Zealand brand and creating a global reputation for using safe, sustainable and trusted methods of production. However New Zealand must uphold this image especially as public concern mounts against the impact on the environment from intensive farming practices. New Zealand's agricultural policies will have to shift focus from intensification and higher production towards social and environmental protection and enhancement. This will have significant implications on New Zealand farming practices.

In particular the dairy cow industry faces significant management challenges relating to its effect on the environment. Effluent and nitrate leaching is contributing to water contamination. Leaching occurs when there is excess nitrate in the soil profile, which is typically the result of waste effluent, nitrogen fertiliser or urine patches.^[10]

Studies have shown that leaching levels can be increased 5 fold for a pasture grazed system with cows than without.^[10]

By comparison, sheep do not have the same leaching effect because they have a lower volume of urine. One trial found that the nitrate leaching levels of sheep grazed on ryegrass and clover pasture did not increase compared to a similar pasture from which hay was cut and where there was no stock access.^[10] Therefore in terms of the 'clean green image' New Zealand promotes, milking sheep on lush green pastures is an accurate semblance that is far less detrimental to the environment. Not only do future environmental constraints make milking sheep a more sustainable option than milking cows in New Zealand, but as environmental preservation becomes key to market access, there is a great marketing opportunity for environmentally sustainable sheep dairy products.

Research Methodology

This qualitative study is based on a literature search and several case studies. Initial desktop research was conducted on both the New Zealand and French sheep dairy industries. The literature search provided information to assist more in depth case studies. The case studies were conducted through semi-structured interviews in order to obtain specific and practical information. Several actors were interviewed including researchers, producers and manufacturers, who provided information on the current resources and competences within New Zealand and France that could offer opportunities for New Zealand's sheep dairy industry. A list of the interviewed actors is included in Appendix A.

A study tour of the Roquefort Area in France examined the current state of the sheep dairy industry in France from the perspective of farmers and processors. This also provided an understanding of the opportunities for the NZSD industry to develop into an industry that is not only attuned to market needs, but also that ultimately returns profits to its farmers, distributors and processors.

Information from the literature, case studies and the study tour were applied to the theoretical framework and analysed to identify themes and build on ideas that helped determine what would help New Zealand's sheep diary industry develop and sustain a competitive advantage.

Theoretical Framework

Jay Barney defined the concept of competitiveness or competitive advantage as implementing a value creating strategy not simultaneously being implemented by any other current or potential competitor.^[11]

Therefore, for the NZSD industry to succeed it needs to identify and understand how it differs from its competitors in ways that allow for superior performance and a competitive advantage. These concepts underlie what is known as the resource-based view (RBV) i.e. the competitive advantage and superior performance of an industry is explained by the distinctiveness of its capabilities, both its resources and competences.^[12] The first stage of research determines the distinctive capabilities of the NZSD industry.

The next stage of research considers the generic strategies needed to create an appropriate differentiation or cost-leadership advantage. To achieve a competitive advantage, should the NZSD industry pursue strategies that involve superior efficiency, quality, innovation, or customer responsiveness.

Resource-Based View

Within the resource-based view (RBV) there are two components of strategic capabilities that contribute to a competitive advantage: resources and competencies.^[12]

11 Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17 (1), 99-120.
12 Johnson, G., Whittington, R. & Scholes, K. (2011). *Exploring Strategy*. England: Pearsons Education Limited.

Resources are assets that a company owns, controls and uses for the purpose of creating value. While competences are the ways those assets are used or deployed effectively.^[12] Resources can be divided into two types: tangible or intangible. Tangible resources are physical entities; such as land, buildings, manufacturing plants, equipment, inventory, and capital.^[13] Intangible resources are nonphysical entities such as brand names, reputation, knowledge and experience as well as the intellectual property of the company; including patents, copyrights, and trademarks.^[13]

Furthermore these strategic capabilities can be divided into threshold capabilities, i.e. required to be able to compete in a market, or distinctive capabilities that might help the organisation achieve competitive advantage and superior performance. Summarised in Figure 1.1.

Figure 1.1: Threshold and Distinctive Capabilities

	Resources ‘what we have’	Competences ‘what we do well’
Threshold capabilities Required to be able to compete in a market	Threshold resources	Threshold competences
Distinctive capabilities	Distinctive resources	Distinctive competences

¹³ Jones, G. & Hill, C. (2013). *The Theory of Strategic Management* (Tenth International Edition ed.) South-Western, Canada: Cengage Learning.

Required to achieve competitive advantage		
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Source: Johnson, G., Whittington, R. & Scholes, K. (2011).

While threshold capabilities are important in competing in a market, they do not in themselves create a competitive advantage. Competitive advantage is more dependent on having distinctive capabilities.

Generic Strategies for Competitive Advantage

For the NZSD industry to develop a competitive position globally it must achieve superior profitability through either creating a differentiation or cost-leadership advantage.

1. Cost Leadership

By pursuing a cost-leadership strategy, a cost leader can gain a competitive advantage by producing goods or services at a lower expense than their competitors, therefore allowing them to charge a lower price for their product.

2. Differentiation

By pursuing a differentiation strategy, a differentiator creates a unique product that customers perceive as different or distinct while still being able to satisfy their needs and therefore the product can then be sold at a premium price.

Building Blocks of Competitive Advantage

The NZSD industry needs to understand that its competitive advantage can be achieved by building on the distinctiveness of its capabilities by focusing on four main areas; efficiency, quality, innovation, or responsiveness to customers.

1. Innovation

Innovation refers to the act of creating new products or processes.^[13]

Product innovation creates value by creating new products, or enhanced versions of existing products that customers perceive as having more utility.

More recently the concept of responsible innovation has become a greater focus. That is a new approach towards innovation, in which social and ethical aspects are explicitly taken into account, and economic, socio-cultural and environmental aspects are balanced.^[14]

2. Quality

A product is said to have superior quality when customers perceive its attributes provide them with higher utility than the attributes of other competitors' products.^[13] The quality of a product is commonly evaluated against two kinds of attributes: those relating to 'quality as excellence' such as design, features and functions, and those relating to 'quality as reliability' such as consistently performing its designed function with little fault.^[13]

3. Customer Responsiveness

To achieve superior responsiveness to customers, a company must outperform its competitors in identifying and satisfying customers' needs. This can include improving the quality of products or developing new products to meet consumer demands.

4. Efficiency

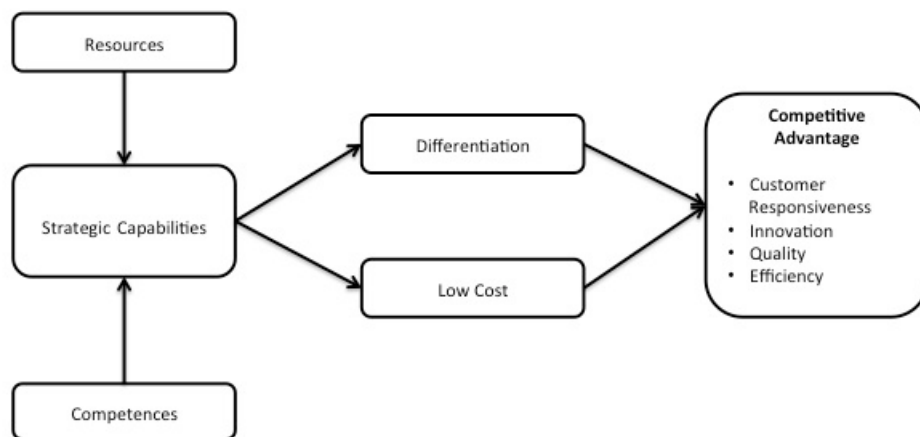
The simplest measure of efficiency is the quantity of input required to produce a given output. The more efficient a company is, the fewer inputs

¹³ Blok, V. & Lemmens, P.. (2015). Chapter 2 The Emerging Concept of Responsible Innovation. Three Reasons Why It Is Questionable and Calls for a Radical Transformation of the Concept of Innovation. In: B.J. Koops et al. *Responsible Innovation 2: Concepts, Approaches, and Applications*. Switzerland: Springer International Publishing Switzerland. 19-35.

required to produce a particular output. Superior efficiency enables an industry to lower its costs and improve its performance and profitability.

The relationship between distinctive competencies, strategies and competitive advantage is illustrated in the model Figure 1.3. This report centres on this model and each element is used to develop strategies for the New Zealand sheep dairy industry to establish a successful global industry.

Figure 1.3: The relationship between distinctive competencies, competitive forces, strategies and competitive advantage.



Source: Lees, I. (2015)

Results: Threshold and Distinctive Capabilities of New Zealand's Sheep Dairy Industry

This chapter explores the threshold and distinctive capabilities of both the French and New Zealand sheep dairy industries. The resource-based view (RBV) provided the framework for classifying resources and competences; those that the NZSD industry requires to compete in the global market and those that might be distinctive in helping achieve a competitive advantage.

	Resources	Competencies
Threshold capabilities	<ul style="list-style-type: none"> - Capital - Critical Mass - Dairy Genetics - Market Development - Government Assistance - Equipment and Technology 	<ul style="list-style-type: none"> - Experience and Expertise - Industry Structure
Distinctive capabilities	<ul style="list-style-type: none"> - Pasture Based 	<ul style="list-style-type: none"> - Market Leaders - Innovation

Threshold Capabilities

Threshold capabilities are important for competing in a market, they do not in themselves create a competitive advantage.

Capital

New Zealand's current sheep dairy industry is capital constrained both at the production level (investment in land, animals, milking sheds) and at the processing and marketing level predominantly due to the uncertainty of the long-term profitability and sustainability of the industry. Consequently banks are reluctant to lend and investors are reluctant to invest on a large scale because the industry is viewed as unproven with historical failures. In particular, investors are wary because New Zealand has had a history of boom and bust industries that developed rapidly only to find initial high product prices unsustainable which led to inevitable collapse.

This highlights the need for the NZSD industry to develop intangible resources and capabilities for a sustainable industry before the capital investment in tangible resources becomes more readily available. Historically the New Zealand production

culture focussed on investment in farms and production technology, however the NZSD industry needs to focus on downstream market development that secures long-term contracts for industry development, investment and ultimately prosperity.

Critical Mass

France has a national sheep dairy flock of 1.6million dairy ewes producing 260 million litres of milk per year.^[1] By comparison New Zealand's dairy flock is currently estimated to be approximately 30,000 ewes with an annual production very low by world standards.^[1]

This deficiency in critical mass is preventing New Zealand from turning its sheep dairy industry into a thriving industry, predominantly due to the lack of sheer volume to compete effectively in the world marketplace and an insufficient volume needed for effective marketing and distribution to satisfy market demand.

Growing the NZSD industry must rely on finding ways to help and encourage more people to enter the industry, as well as supporting those already involved to be more financially successful. This requires a multifaceted approach; investment in infrastructure such as stock, including growing national flock numbers and increasing productivity through effective genetic improvement schemes, as well as developing industry stability through market development and contracts, industry coordination and technical support for farmers. With the right approach it is estimated that in 10 years New Zealand could be milking as many as 900,000 ewes, and that sheep dairying could become a billion dollar industry for New Zealand. ^[1]

Dairy Genetics

Genetic selection programmes in France not only have substantial scale, but they are also highly coordinated and technically well supported, this framework has ensured effective selection programmes and has translated into substantial genetic progress. For example, almost 500,000 ewes are artificially inseminated every year in the

programme, and 845,000 ewes are registered in official milk recording schemes, making France's national flock Europe's largest performance data-controlled flock.^[2] All three major sheep breeding pools in France, under the genetic selection programmes, now achieve world-class milk yield performances: 289 L for Lacaune, 209L for Red-face Manech, 183 L for the Basco-Béarnais.^[2]

The difficulty for the NZSD industry is that its dairy gene pool is small, although time has been spent on developing East Friesian and Awassi breeds, New Zealand is still well behind the genetic progress of the northern hemisphere. The NZ industry also lacks wide flock improvement programs and instead farmers strive to improve the genetic merit of their dairy animals through their own selection programmes.

While there is a small gene pool of sheep dairy breeds adapted to the New Zealand environment, namely the Awassi and East Friesian the genetic improvement of these existing breeds will be slow. Imported East Friesian and Lacaune breeds could provide the basis for faster genetic progress in New Zealand. However these breeds have been selected in intensively farmed environments, a far cry from NZ's pastoral system. Therefore NZ requires an organised genetic improvement programme similar to the pyramidal structure within the Roquefort model. The imported bloodlines could form the nucleus flock to be crossed with New Zealand bloodlines, to produce a modified breed adapted to the local environment. The selection nucleus at the apex of the pyramid would then generate and disseminate the genetic progress down throughout the entire population.

The effectiveness of the Roquefort pyramidal structure is largely attributed to excellent recording systems, the widespread use of artificial insemination and a coordinated direction of the programme. New Zealand's sheep dairy industry certainly has the capabilities to implement a similar improvement programme; for example Sheep Improvement Limited (SIL) already offers performance recording & genetic evaluation for the current New Zealand sheep industry. It should be noted that the resources and associated costs with such a system would be significant to the sheep dairy industry in its infancy.

Market Development

Traditional sheep milk producing countries such as France have the advantage of historically high levels of domestic consumption of sheep milk products. By comparison sheep milk is not traditionally consumed in New Zealand. Although demand is growing, like other New Zealand agribusinesses the limited scale of the domestic market means New Zealand's sheep dairy industry will have to adopt an international strategy early on.

Reliance on overseas markets poses a number of challenges for the NZSD industry, specifically market access requirements, vulnerability to global economic conditions and the international trade environment. For example, Blue River Dairy experienced a combination of politics and red tape in order for its infant formula range to receive certification by Chinese Certification and Accreditation Administration (CNCA), it was forced to sell its processing plant and associated brands to Chinese investors (Blue River Nutrition HK).^[15] Another example of New Zealand's dairy industry vulnerability, attributed to its overreliance on foreign exports, was exposed this year when milk powder exports to China were negatively affected. New Zealand's primary dairy exports are predominantly in whole milk powder to China. This year, high inventory in China, due to oversupply from global production, resulted in Global milk prices falling by 50% and New Zealand dairy farmers receiving the lowest payout in six years, this has been estimated to amount to NZ\$6 billion off farmers' incomes.^[16]

While an international strategy would need to be adopted early by the NZSD industry, it is important that international market opportunities are researched

¹⁵ Gray, L. (2015, June). *Cutting through the red China tape*. Retrieved September 22, 2015, from Country Wide: <https://agrihq.co.nz/article/cutting-through-the-red-china-tape?p=95>

¹⁶ Howard, R. (2014, December 11). *Global Milk Glut Is Udder Misery for New Zealand Farmers*. Retrieved September 22, 2015, from The Wall Street Journal: <http://www.wsj.com/articles/global-milk-glut-is-udder-misery-for-new-zealand-farmers-1418317202>

thoroughly, ensuring that the right trading partners are obtained to establish secure supply and demand arrangements.

Asia offers great prospects for NZSD products, particularly in markets where NZ has free trade agreements; such as China and Taiwan. These markets are also not currently the key markets for other sheep dairy producing nations. Furthermore the Asian market is becoming increasingly familiar with New Zealand's sheep dairy products and their demand and interest is growing, reflecting New Zealand's reputation for producing safe, pure and healthy products.

The U.S.A also offers exciting possibilities for the NZSD Industry as the world's largest consumer of sheep dairy products, consuming over half of the world's production of sheep cheese. New Zealand and the U.S.A are part of the Trans Pacific Partnership; a trade agreement aimed at lowering trade barriers between the two countries. Unfortunately as it stands, an agreement over liberating border restrictions on dairy trade with more open access into the US market has not been reached. However if these trade restrictions are lifted NZ has could supply the USA with premium sheep dairy products.

Government assistance

In France, milk production, breeding selection programmes as well as marketing and processing, all receive major scientific and technical support from the government. For example, government backed official schemes exist for labeling outstanding product quality, and the coordination and leadership of genetic improvement programmes are supported by the Government's Génétique Elevage.

Furthermore, European agricultural producers receive subsidies for their production. It is estimated that subsidies make up 26% of the total income of sheep dairy farmers in France.^[17] Changes to the Common Agricultural Payment scheme may

¹⁷ Dockes, A. M., Mottet, A., Neumeister, D., Champion, F., Lagriffoul, G., Morin, E. & Perrot, C. (2012, October 5). *Bergers demain en brebis laitières*. Paris, France.

further benefit farmers of the French sheep dairy industry. By comparison, New Zealand's government eliminated agricultural subsidies in 1984. This was a major turning point in changing subsidy-driven volume-based production and led to industry restructuring with an emphasis on production efficiencies and product quality. Whilst a reintroduction of government subsidies is not recommended, the New Zealand government's assistance for niche industries, such as the sheep dairy industry, would be invaluable.

Financial assistance for research and development will be instrumental in establishing New Zealand's sheep dairy industry. The New Zealand government is backing an Agresearch-led, six year, \$6.6m project involving Antara Ag, Kingsmeade and Waituhi Kuratau Maori Trust (WKT).^[18] This Research will involve sheep milk composition, sheep milk function and ways of boosting milk production through feeding and environmental footprint analysis.^[18] Other areas of funding and development that also need to be considered by the Ministry of Business, Innovation and Employment include market and product development to lead the industry.

Equipment and Technology

The French electronic animal identification and information systems are exemplary; not only have they improved the quality and reliability of agricultural products, but also they allow food traceability and have become key components in the success of their genetic programmes.

Adopting a system similar to France could be highly beneficial for NZSD farmers; providing information such as an individual sheep numbers, days since last lambed, number of lactations, date of birth, number of 'empty days' between pregnancy, number of artificial inseminations, days of lactation, birthed lambs, live lambs and litres/lactation. Electronic milk monitoring systems also yield information of Total Solids and Somatic Cell Counts that are important indicators of product quality. This information will form the basis of selection and culling decisions, helping farmers

¹⁸ Buckley, D. (2015, June). *Problems Aired*. Sheep Milking-Country Wide, 22-34.

gain greater yields and revenue from their flock.

Advances in technology are also offering modern and reliable methods of individual identification, monitoring and tracking. For example, NZSD farmers could soon take advantage of microchip technology allowing for Radio-frequency identification with a microchip inserted in the tail of the ewe. This would provide each animal in the flock with its own individual identification number and form part of the National Livestock Identification System.

Efficient national 'animal identification and traceability' systems also provide the opportunity to easily register animal health-related interventions. Interventions including administered treatment and withholding periods are likely to become important market access requirements in the future. This system allows food traceability from 'farm to fork,' which is vital in meeting consumer demand for access to reliable information about their foods' origin and safety. This system is most certainly a key step in adding value to products and upholding food safety.

Experience and Expertise

The importance of experience and expertise in sheep dairy farming cannot be underestimated. The sheep dairy industry of France was established in the 8th century, therefore a wealth of knowledge has been amassed throughout the centuries; from the proficiency of farmers and the industry expertise of technical and scientific organizations.^[19]

It has been said that a sheep dairy industry could be a natural fit for New Zealand's current farming expertise as it is already a global leader in cow dairy production and a forerunner of a major sheep farming industry.^[1] However there is still insufficient information directly relevant to NZ sheep dairy production and extrapolating information from dairy cattle research or international information may not always be applicable to the NZ industry. In particular there is a general lack of targeted,

¹⁹ Laubrie, E., Doutreleau, V. & Del Porto, P. (2012). *Introduction: History and some specific facts of sheep farming in France*. France: Canepal.

specific research performed in in most areas of sheep dairy production. One notable area where there is insufficient research is animal health; many veterinary products may be registered for use in sheep but the effect on milk residues and the withholding period is unclear. Instead most veterinary products require 'off label' use.

The NZSD industry must continue to foster research and development into sheep dairy production and its applicability to New Zealand systems. Extension programmes for New Zealand sheep milk producers need to be created, so a dedicated group that collaborates with government and regulatory bodies, can monitor and disseminate new/current information. Such a group would also offer resources, training and events for producers within the sector. Valuable lessons could be learnt from New Zealand's dairy sector that has established an organisation called DairyNZ that represents and supports all New Zealand dairy farmers. The organisation is funded by the current levy (3.6 cents per kgMS) as well as receiving funding through other public and private institutions.^[20] DairyNZ invests in practical on-farm tools, science, resources and offers extension programmes and discussion group networks, allowing New Zealand Dairy farmers to hold forums, and share tools and expertise that help them farm successfully.^[20] DairyNZ also run focus and monitor farms, that act as information hubs and training facilities for the industry. This is another possible initiative that would benefit the NZSD industry.

Industry structure

The NZSD industry in its infancy has a blank canvas to design an effective industry structure. While there are many possible systems, valuable lessons can be learnt from other successful NZ agricultural co-operatives such as the Dairy Goat Co-operative (DGC) and Fonterra. Their effective use of a customer-focused co-operative business model has helped them overcome the challenges of capital constraints in their early startup phase, as well as the challenges relating to New

²⁰ DairyNZ Limited. (2011). *DairyNZ*. Retrieved September 22, 2015, from About Us- DairyNZ: <http://www.dairynz.co.nz/about-us/>

Zealand's small scale and geographic isolation. Both co-operatives have grown into large international firms that significantly contribute to New Zealand's economy.

Co-operative models present innovative ways of raising capital. For example, farmer owned Fonterra initially raised funds through a capital share structure, where farmers were required to own a minimum of one share for every kilogram of milk solids (kgMS) they supplied to the co-op. When the Co-operative underwent international expansion, substantial capital investment was needed to develop dairy farms and processing operations. Thus Fonterra developed a new capital share structure which currently allow farmers to hold up to 20% of shares above their level of annual milk production and to trade shares amongst themselves on a registered and regulated private stock exchange (Fonterra Shareholders' Market, FSM).^[21] Furthermore there is a second class of share capital traded on this stock market (known as the Fonterra Shareholders Fund, FSF), which allows farmers to hold up to 25% of the company's share capital. However holders of these FSF shares have no voting rights within the co-op and only receive dividends.^[21] Fonterra also has Retail Bonds and Capital Notes issued and listed on the New Zealand Stock Exchange Debt Market (NZDX).^[21] Fonterra's strategy has not only enabled the company to invest more strategically into products with high margins and growth, but has also enabled members to benefit directly from brand activity through share price increases.

Within France the sheep dairy industry's success can be attributed to its coordinated value chain, including selection programmes, milk production, processing, product marketing and cheese merchandising. Similarly the New Zealand DGC also maintains control over its supply chain, ensuring efficiency as well as optimising the economic value of its products. For example the DGC has taken over subsidiary companies within the supply chain such as Dairy Blenders Ltd, New Zealand Can Manufacturers Ltd and Pacific Orient Limited.^[22] It also maintains control over suppliers through supplier quotas and quality control of on-farm production; this ensures a premium product is sent to the co-operative. DGC should be acknowledged for generating

²¹ Fonterra Co-operative Group Limited. (2014). *Capital Structure*. Auckland: Fonterra.

higher margins and direct profits for its producers and shareholders; farmers of the DGC now receive the highest milk price, \$17 per kilogramme of goat milk solids.^[22]

Distinctive Capabilities

Distinctive capabilities help achieve competitive advantage and superior performance.

Pasture Based

For most of the last century New Zealand's competitive advantage has come from being a low cost producer of agricultural products. This is by virtue of adopting a seasonal, pasture-based system, and avoiding a reliance on high grain or supplementary feed costs associated with confinement systems used overseas. New Zealand also used this 'clean and green' image to its marketing advantage by developing a New Zealand brand with a global reputation for safe, environmentally friendly and sustainable products. As a result New Zealand branded kiwifruit, wine and some dairy products are capturing significant consumer premiums.^[23]

Unfortunately New Zealand is rapidly losing this competitive advantage and its clean green reputation is fading. The focus in NZ is changing towards attaining increased productivity through higher stocking rates, improved nutrition and other technologies. Furthermore, intensification has led to negative environmental impacts. A report from the Ministry for the Environment in 2013 showed that over 25% of sites monitoring New Zealand's rivers have rising nitrate concentrations and there was a clear link between the expanding dairy farming and the deteriorating water quality.^[24] Not only does this jeopardise New Zealand's 'clean green' image but, secondary to intensification, New Zealand is also losing its competitive advantage as a low cost producer.

²² MacDonald, T. & Rowarth, J. (2013) *Critical success factors when going global: Agribusiness co-operative growth*. Proceedings of the New Zealand Grassland Association 75: 55-60

²³ Lees, N. & (Saunders, 2010), C. (2015). *Maximising Export Returns (MER): Communicating New Zealand's Credence Attributes to International Consumers*. Agribusiness and Economics Research Unit. Christchurch: Lincoln University.

²⁴ Lees, N. (2014). *What is New Zealand's Competitive Advantage?* Christchurch: Lincoln University.

The NZSD industry could benefit from NZ's environmentally friendly brand and reflects consumers' demands for more sustainable food products. Milking sheep is far less intensive on the land and there are fewer negative environmental implications, so in terms of the clean green image New Zealand promotes, milking sheep on lush pastures is an accurate picture of the industry.

A New Zealand Milk powder manufacturer, Synlait, has already begun testing this more environmentally friendly model. Instead of continually chasing higher production, it has focused on consumers' needs for sustainable 'green' products. Whilst also proving they can generate a premium for their products that make up for the lower productivity. Synlait is embracing the traditional New Zealand dairy farming system; cows are farmed without being housed, grazing pasture and crops without any supplementary feed.^[25] Synlait has begun supplying its milk formula to the U.S. baby product company, Munchkin. There is growing interest into the perceived health benefits of formula derived from New Zealand cows that are raised on pastures, unlike grain-fed cows in the US. Farmers who can meet 'grass only' production criteria, which includes no barn-housing, no grain supplements or blended concentrates, could earn 25c per kilogram of milk solids more for their milk sold to Munchkin.^[26]

Therefore the NZSD industry should build on this positive perception of low intensive and truly pasture based production systems. By emphasising these attributes in marketing, NZ products could obtain market advantage and gain higher product premiums.

Market Leaders

New Zealand has been at the forefront of the agricultural sector particularly in

²⁵ Tjitsu, N. (2015, June 17). *NZ's Synlait inks U.S. deal to supply grass-fed milk formula*. Retrieved September 22, 2015, from Reuters: <http://www.reuters.com/article/2015/06/18/us-synlait-milk-usa-idUSKBN0OY08920150618>

²⁶ Fulton, T. (2015, June 18). *Synlait's grass farmers offered 25 cents a kilogram pay premium*. Retrieved September 22, 2015, from Stuff: <http://www.stuff.co.nz/business/farming/dairy/69505815/Synlaits-grass-farmers-offered-25-cents-a-kilogram-pay-premium>

developing and commercialising sustainable and healthier farming practices. Consumers are increasingly looking for foods that align with their own personal values; such as environmental sustainability, animal welfare, fair trade and organic production. The NZSD industry has to see this as an opportunity. No longer should these demands be seen as compliance issues but instead as a way to provide a valuable competitive advantage. This will require New Zealand's sheep dairy industry to keep up-to-date with the latest developments and consumer demands as well as finding ways to lead the market in sustainability, animal welfare and food safety.

Innovation

The French sheep dairy industry has largely been based around protecting traditional products and processes, perhaps at the expense of innovation. By comparison New Zealand has led the way in many agricultural innovations, with a dedicated agricultural research community supported by the government, commercial entities and researchers. Many of New Zealand's agricultural advantages have come from commercialising scientific innovation into market applications.

New Zealand based company Fonterra, is one of the leading dairy companies in the world due to its innovative success. Fonterra recognised that the development of innovative technology in improving products and processes was crucial to the success of New Zealand's dairy industry. The company established the world's largest dedicated dairy research facility that developed products such as spreadable butter and functional milk protein concentrates. Fonterra is currently researching dairy ingredients targeting specific health concerns such as allergies, eczema, neural tube defect, and osteoporosis. So far this research has led to the development of Anlene; a specially formulated milk for adults to help maintain optimal bone health and strength. This was specifically aimed to supply the Asian market where dairy consumption is low. ^[27]

²⁷ Fonterra. (2015, September 22). *Research and Innovation*. Retrieved September 22, 2015, from About Fonterra: <https://www.fonterra.com/global/en/About/Research+and+Innovation>

Increasingly consumers look to products that are not only free of harmful effects but that also have added health benefits. Product development of sheep milk should focus on nutritional benefits that make it superior to other milk. This has been key to the success of the New Zealand Dairy Goat Co-operative. DGC research and development focused on the health benefits of goat milk that led to the development of the world's first commercial goat milk formula.^[22] The co-operative's promotional strategy emphasised the safety and efficacy of goat milk infant formula, from predominately pasture fed goats in New Zealand.^[22] The product is marketed as a NZ premium item for infant and toddler nutrition, specifically promoting health benefits and quality assurances.

The NZSD industry needs to invest in developing innovative new products that are validated by scientific research. Key areas of development include:

- Superior sheep milk products for niche sectors like health, infant care and gourmet food.
- Production systems that deliver a consistent supply of high quality safe food that also meet consumers' expectations of animal welfare and environmental stewardship.
- Market innovation and knowledge to communicate with customers.

Discussion – Strategies for the New Zealand's Sheep Dairy Industry

This chapter discusses strategies that the NZSD industry should pursue to achieve a competitive advantage. These strategies build on the distinctive capabilities and market opportunities for the NZSD industry to develop a competitive position. Important excerpts from the interviews of industry experts have been included to offer support and perspective on the recommended strategies.

The results suggest that the New Zealand sheep dairy industry should pursue a

differentiation strategy rather than a low cost strategy. This means avoiding the commodity market where products have little differentiation in the marketplace and where value rapidly fluctuates with forces of supply and demand. As a differentiator, the NZSD industry would gain a competitive advantage from a product that better satisfies customer needs than its rivals.^[13]

‘We must make sure we don’t give away our advantages by supplying commodity products that dilute the unique New Zealand story’

Guy Trafford

The NZSD industry must focus on the building blocks of competitive advantage that can differentiate the industry; customer responsiveness and product innovation and quality. Furthermore the results suggest creating strong brands and close relationships throughout the supply chain to gain premium prices and develop industry stability.

Customer Responsiveness

For the NZSD industry to be market orientated it must focus on delivering products according to customer needs, wants and demands. Consumers are increasingly making food choices not only based upon taste, texture, and appearance, but also on credence attributes.^[22] In particular high-end consumer preferences have shifted towards wholefoods, natural or organic foods that are produced in sustainable ways and there is greater demand for seasonal and locally produced food. Consumers are now demanding a greater number and variety of these product attributes before they are willing pay a premium price. Despite the recent global recession, evidence has also shown that demand for credence attributes has not decreased and consumers are still prepared to pay premium prices.^[28]

This presents a number of opportunities for the NZSD industry to obtain market

²⁸ Saunders, C., Guenther, M. & Driver, T. (2010). *Sustainability Trends in Key Overseas Markets: Market Drivers and Implications to Increase Value for New Zealand Exports*. Christchurch: Lincoln University.

advantage. New Zealand-produced food products have a positive standing in markets as a result of its natural environment, wealth of unique resources and a reputation for delivering high quality and safe foods. The NZSD industry is in a position to build on this positive foundation, through sustainable farming operations that include a seasonal pasture based production system and by producing innovative products to the highest standard.

“New Zealand needs to keep focus on the high value add proposition; naturally-based, fresh, and nutritious products, with trusted and reliable production. We then must maintain this through control over supply and have strong protocols”.

Guy Trafford

One way the NZSD industry could achieve trusted and reliable production is through market assurance schemes. GAP is an acronym for Good Agriculture Practices and is now the world's most widely implemented farm certification scheme. GAP addresses consumer concerns for product safety, environment, labour and animal welfare standards, with the aim of regulating different retailers' supplier standards.^[28] However more and more retailers, whilst using schemes such as GlobalGAP, also belong to other certification schemes or have created their own more stringent schemes. Tesco for example, has developed a scheme called Nature Choice; an integrated farm management scheme in which all of its suppliers must comply with a set of environmental and quality standards.^[29]

The NZSD industry needs to collaborate with Veterinarians, Environmentalists and the gatekeepers of target markets to develop market assurance schemes. Schemes that address all components of its supply chain from product safety, environmental, labour and animal welfare. The aim should be to not see these schemes as merely compliance issues, but instead as an opportunity to forge stronger market relationships and cement premium prices. These schemes should not only meet but also build on global ethical agricultural standards such as GAP. For example France has taken the lead in lowering antibiotic use in agricultural systems, vowing to reduce antibiotic use by 25% between 2013-2017.

“Very hard for farmers to remain customer focussed when production orientated minds tend to continually undermine the good work that is done”.

Jim Inglis

Product Innovation

“The New Zealand sheep dairy industry needs to maintain high end products as the volumes coming out of New Zealand for some time will not be huge.”

Ian MacDonald

The Roquefort industry is an example of a hugely successful and iconic brand. Roquefort cheese is well known for its uniqueness, traditional production methods and history. The uniqueness of the product is largely related to its production within 17th century cellars located in caves under the village of Roquefort-sur-Soulzon.^[29] The superiority of the product is maintained through strict criteria, restricting mass production as well as protection from regulatory framework and labeling. Roquefort’s history and unique reputation differentiates it from other blue cheeses enabling it to fetch premium prices.^[29] Establishing New Zealand’s own premium cheese brand and competing with the likes of Roquefort will be difficult. This suggests the New Zealand’s sheep dairy industry should direct its focus towards innovating high quality niche products; including health, nutraceutical, pharmaceutical, infant care, elderly care and gourmet food products.^[1]

“The lack of a traditional sheep product industry can mean that there can be experimentation with new production and there are few traditions that will hold back the industry. Like New Zealand’s wine industry New Zealand needs to create new products and styles rather than copying traditional Feta and Roquefort type products”.

Nic Lees

^{*} Frayssignes, J. (2011). System IV: Roquefort Cheese (France). In Barham, E. & Sylvander, B. *Labels of Origin for Food: Local Development, Global Recognition* (pp. 177-183). Oxfordshire, United Kingdom: CAB International

Growing markets in whole food products present a considerable opportunity to the NZSD industry. Whole foods are foods that have been processed or refined as little as possible and are free from additives or other artificial substances. For example, Roquefort cheese is successfully marketed as a truly natural wholefood product, made of just three ingredients; raw sheep milk, salt and *Penicillium Roqueforti* spores. Interestingly, against the advice of health professionals there is growing consumer demand for raw, unpasteurized milk; based on a belief that heat-treating milk destroys beneficial bacteria, proteins and enzymes that aid in digestion and strengthen the immune system. While this is not a report to suggest that the NZSD industry should start supplying raw sheep's milk, it does point out different emerging trends for whole foods. The NZSD industry needs to successfully develop wholefood products that are produced with just a few natural ingredients and as little artificial substances as possible.

There is also growing demand for products that provide health benefits aside from basic nutrition, generally known as functional or fortified foods. Functional foods are of great demand in Asian and ageing markets, both of which are growing.

“Product personality is really important, we need to appeal to our customer desire to look after themselves and their families”

Jim Inglis

Sheep milk possesses a number of health benefits that consumers are directly interested in, such as a high protein level and low cholesterol. There is also additional opportunity to look at the composition of New Zealand's sheep milk to determine nutritional value and beneficial components that differ from overseas competitors where systems are based on concentrate feeds.

“Research into sheep milk has shown that it possesses numerous health benefits such being easily digestible, high in proteins and lower in ‘bad’ cholesterol (low-density lipoprotein), higher in energy great for people with milk intolerance, asthma or eczema.”

Furthermore health-conscious consumers are demanding products derived from natural foods that can be added to other foods to impart specific health benefits. These supplements are often called nutraceuticals. New Zealand has a long track record of identifying and exploiting the medicinal and nutritional uses of natural products such as Manuka honey. Manuka honey, derived from the Manuka tree (*Leptospermum scoparium*), has attracted the attention of researchers for its biological properties, especially its antimicrobial and antioxidant capacities. Comvita has already harnessed some of its potential by developing 'ManukaUp'; a drink made from New Zealand cows' milk with added nutrients particularly Manuka Honey.^[1] The NZSD industry could follow a similar lead in using functional food products that target infant and sport markets.

There is huge potential for innovation in sheep dairy products. The industry could team up with other unique New Zealand products such as Manuka Honey to develop natural food products that impart specific health benefits. For example a Manuka honey infused infant formula holds exciting potential. Another area of research could be a New Zealand sheep milk sports drink, officially backed by the All Blacks that offers higher energy and protein, as well as faster digestibility to improve hydration and speed up muscle recovery. This sports drink could team up with New Zealand green-lip mussel extract that has anti-inflammatory properties thought to help conditions such as asthma and arthritis. For these innovative products to be well received they also have to have the certification and scientific validation that back up these claims.

Quality

Unfortunately the NZSD industry cannot rely on the historical promotional success of New Zealand's clean green image. The clean green credence attributes are no longer unique to New Zealand and although New Zealand is seen as a safe country to source produce from, these attributes are also shared by other countries with strong

food safety standards and effective government regulatory regimes.^[22]

Instead the NZSD industry needs to create, communicate, and deliver value that is embodied by its products. To deliver products that consumer's value requires market research into consumer needs, wants and demands as well as up-to-date information about macro trends and micro effects particular to the target markets.

"Nothing can be taken for granted in this space and the real difference will be hard work and dedication of our marketers and the support they get in terms of finance, regulatory and of course on farm."

Jim Inglis

The value proposition of New Zealand's sheep dairy products is likely to come from natural production systems, unique resources, high standards and product innovation. The New Zealand company Zespri® has been very successful in promoting the nutritional and health benefits of its kiwifruit. Their main message promotes health and vitality; this was identified in market research as the key reasons people purchased kiwifruit. The attributes they felt were associated with the New Zealand origin were more about food safety and coming from a 'safe and clean' environment and Zespri® did not communicate these in a major way to the consumer.^[22]

The NZSD industry has to consider utilising the latest technology and marketing to communicate New Zealand's unique story, high quality standards, product safety and nutritional value. This type of linked communication may involve in-store point of sale material or displays, links to websites and social media, videos and printed media. Another way the NZSD industry could market its safety and quality is through adopting a system similar to the French sheep dairy industry. In France food quality labels that protect the designations of products and their geographical origin offers consumers assurances about food safety, production methods and quality. Product specifications need to include both experience quality attributes (taste, appearance and texture) as well as credence attributes (food safety, traceability, environmental

sustainability and ethical standards). This requires collaboration with the farmers, manufacturers, marketers and even the New Zealand government.

As already stated the NZSD industry will face challenges associated with the cost of marketing and research. The initial objective should be to minimally maintain costs but aim to increase the marketing budget with growth. The ever-changing marketing environment will constantly present new opportunities and threats and thus it is important for the NZSD industry to continuously monitor, forecast, and adapt to the environment.

Establishing A Brand

A brand represents the opposite to a commodity. A brand is a product whose dimensions differentiate it in some way from other products designed to satisfy the same customer needs. Well-established brands present an overall 'proxy' for quality, so consumers can trust that the brand represents important credence attributes as well as quality attributes they value.^[22] Ultimately strong brands can experience a number of benefits, such as strong returns, awareness among consumers, consumer loyalty to the product, a willingness to pay premium prices, as well as offering something which is difficult to imitate.

Therefore the NZSD industry needs to implement successful branding strategies that convince consumers there are meaningful differences related to its product. This could be through product innovation or by creating relevant and appealing images and messages around the products and production methods that reflect consumer demands. The branding strategy of Lewis Road Creamery is an interesting example. Lewis Road creamery is a boutique New Zealand dairy company that partnered with Whittaker's, a local confectioner, to create a luxury chocolate milk drink. Within three weeks of opening, the demand for this product was unprecedented, leading to masses of people across the country lining up in supermarkets to experience the new product and resulting eventually in a chocolate milk shortage. Lewis Road's strategies were based on positioning the product to match consumer trends for craft

and authenticity, as well as giving consumers confidence in locally produced New Zealand high-end luxury food and drink products. What is more impressive is that this hype was created from a marketing spend only \$20,000 NZD based on social media, without a single TV commercial or in-store promotion.^[30]

It will be necessary for the NZSD industry to carefully manage brand contacts ensuring any customer experience with the brand is a positive experience. This can be achieved through upholding standards to meet consumer demand for credence and quality attributes. That is not only making and refining a superior product, but also upholding credence and quality standards throughout the supply chain. Lewis Road Creamery offers another useful example of ensuring positive customer experience; by its deliberate nature of handling social media as every social media posts gets answered within 2-3 hours.^[31]

The NZSD industry should also positively build on its associations with other entities. Secondary brand associations can link the product to sources, such as country of origin, company, spokespeople, events, or awards or reviews. For example where the New Zealand origin or company branding is consistently communicated, as with wine, apples, kiwifruit and branded dairy products, some New Zealand exporters achieve a wholesale premium of up to 60 per cent above similar commodity products.^[22] The NZSD industry shouldn't underestimate the potential of celebrity endorsements to gain brand equity either. For example the introduction of a premium sports product endorsed by New Zealand sporting stars, such as the All Blacks or Valerie Adams, would have enormous reach, or healthy food products endorsed by New Zealand singer Lorde in the USA.

There is no doubt that establishing a successful brand will be hard work that requires careful positioning of brands, the maintenance of quality and credence attributes, long-term relationships and brand loyalty. This will require significant initial and

³⁰ Mandow, N. (2015, March 12). *Life and death over chocolate milk: the madness of Lewis Road*. Retrieved October 11, 2015, from Idealog: <http://idealog.co.nz/venture/2015/03/life-and-death-over-chocolate-milk-madness-lewis-road>

³¹ Morin, E. Astruc, J. & Lagriffoul, G. (2011). SIEOL, information system for genetic, technical and economic support for French dairy sheep breeders. In: Bouche, R., Derkimba, A. & Casabianca, F. *New trends for in Mediterranean animal production*. Wageningen: Wageningen Academic Publisher. 179-186.

ongoing investment in marketing within the NZSD industry. The industry would then benefit greatly from a concerted marketing effort, involving careful planning and execution using state-of-the-art tools and techniques. Hiring external experts to run marketing efforts will be invaluable. Niche-marketing specialists could help deliver superior value and develop luxury brands, for example consultation with the marketing expertise of luxury food and retail brands such as Lindt chocolate or Louis Vuitton.

Increasingly social media, YouTube videos, websites and online sales platforms are being used to successfully communicate a brand as well as associated information direct to the consumer. In general New Zealand companies are well behind other countries in the use of these platforms. Help from external social media specialists will enable the NZSD industry to really command the social media platform by driving traffic to websites, promoting content, developing relationships and engaging with customers.

“New Zealand needs “informational” resources on the size and scope of these markets, customer requirements as well as developing the relational resources to develop the channel partnerships to access distribution into these markets.”

Nic Lees

Supply Chain Management

The way the industry is currently structured in New Zealand and the management of supply chain relationships poses challenges to the industry. Vertical integration of the NZSD supply chain would offer a number of advantages similar to the French interprofessional body (the Confederation of Roquefort). A vertically integrated NZSD supply chain could aid in the coordination of the industry in a number of ways:

- Resources and competencies; particularly in early stages of development, cooperation and selection programmes will maximise the genetic gain of New Zealand’s national sheep milking flock and build critical mass.
- Market assurance schemes; to provide consumers with guarantees that New

Zealand's sheep dairy products have been produced to particular standards.

- Supply; to avoid spot market relationships giving certainty of supply for processors and offering greater stability to the industry as a whole.
- Supply chain relationships; ensuring the right partners are at all levels of the supply chain is critical to success in the market.
- Marketing; to improve communications and add value to the products through greater use of strategic relationships, better market positioning, cooperation in research and development for innovation, and establishment of the brand.

This highlights the number of advantages to setting up a farmer owned Cooperative like the New Zealand Dairy Goat Co-op or Fonterra that not only offers the ability to raise capital for the industry in its early stages but also offers the advantage of having a single coordinating organization that can generate industry stability and ultimately profitability.

"Already with Blue River and Land Corp the horse may have bolted"

Guy Trafford

There are some indications that vertical integration of the NZSD industry may not be possible. LandCorp are set to embark on its own independent supply chain. They have partnered with the agribusiness investment company SLC Group and intend to utilise an independent Hamilton processor to make ice cream for the domestic and export markets, as well as whole milk powder initially for Taiwan and Korea.^[6] Blue River Dairy, until recently, held New Zealand's largest vertically integrated sheep milk supply chain. However it was sold to a Chinese company who has taken over the processing plant, demonstrating the difficulty of maintaining and regulating the supply chain.

"Its healthy to have different players targeting different markets"

Lucy Griffiths

At the very least the NZSD industry must develop horizontal co-ordination with other New Zealand companies to develop and sustain marketing internationally.

“Vertical coordination means that the supply chain needs to be coordinated from producers to consumers with market information flowing back and the supply chain responding to market signals, this can occur through partnerships, and relationships not necessarily vertical ownership.”

Nic Lees

Following the first sheep dairy conference held in Palmerston North in February 2015 an interim industry steering group was established. This networking undoubtedly facilitates the sharing of ideas, innovations and enthusiasm; building connections and opportunities that cannot be underestimated. Nonetheless a more permanent arrangement is needed to set recommendations that will instill trust and integrity in New Zealand's systems and differentiate the industry from its competitors.

“ We may need supply chain captains or Co-operatives that act under the umbrella of producer organisations like Beef & Lamb New Zealand or the New Zealand Dairy Board.”

Ken Geenty

Conclusion

The aim of this research was to investigate how New Zealand could establish an internationally competitive sheep dairy industry. This research focused on the lessons learnt from France, a world leader in sheep dairy. Information was gathered through a literature search and case studies.

The results indicate that there is vast potential for New Zealand to establish a globally competitive sheep dairy industry and become a billion dollar contributor to its economy. There is opportunity from a growing global demand for sheep dairy

products. A growth estimated to be between 10-20% per year.^[1] This can be attributed to consumer trends focusing on quality and health attributes of premium sheep dairy products. There is further opportunity for the NZSD industry to develop first-class credence attributes, such as animal welfare, fair trade, provenance and environmental stewardship.

The NZSD industry could achieve a competitive advantage by building on its distinctive capabilities such as; pasture based production systems, leading innovations from the dedicated research community and market leading standards for sustainability, animal welfare and food safety. The case study on France's sheep dairy industry also revealed a number of threshold capabilities required to compete effectively within the global market. The threshold capabilities paramount to the NZSD industry include; overcoming current capital constraints, growing the national flock, genetic improvements for productivity, developing experience and expertise, securing market relationships and achieving industry cooperation and collaboration.

These results recommends that the NZSD industry pursues a differentiation strategy, where it creates and sells a product that better satisfies customer needs over its rivals.^[13] This can be achieved by competitive strategies that focus on customer responsiveness as well as the development of innovative and quality products. Emphasis on creating strong brands and industry coordination, should allow the NZSD industry to gain premium prices and develop stability.

While innovation is the source of considerable competitive advantage the NZSD industry must make a collaborative effort to focus on Responsible Innovation. Responsible Innovation is a critical factor for the NZSD industry to achieve and sustain a competitive advantage. This requires assessing and effectively prioritising social, ethical and environmental impacts, both now and in the future. This should not be seen as a barrier but rather a stimulus for success.

Responsible Innovation includes considering a balance approached towards three aspects;

1. Socio-cultural
2. Ethical
3. Environmental

The NZSD industry offers socio-cultural responsible innovation. Sheep farming has played a huge part in development of New Zealand's economy, culture and traditions. But this traditional agricultural practice has fallen by the wayside with the decline of sheep numbers and the rise of industries such as bovine dairy. The development of a NZSD industry could help retain some of New Zealand's agricultural traditions by stopping the decline in sheep numbers while supporting the income of sheep farmers and rural communities. Furthermore the NZSD sheep dairy industry has even greater potential for a socio-cultural innovation based on how it structures its industry. A farmer owned co-operative is one way of helping encourage social benefits, by ensuring key stakeholders are involved in order to incorporate relevant ethical and societal aspects into innovation practices and to achieve desirable goals such as profitability for the producers themselves.

Ethically responsible innovation by the NZSD industry must ensure that the profit motive and focus on value is not pursued at the expense of society. There are immense opportunities for the NZSD dairy industry to develop a product with specific health benefits to consumers. However these claims must be validated with science and there must be openness and transparency throughout the supply chain, all the way from research and development to the final product and customer feedback.

While some customer demands don't always fit the most efficient methods of production, the NZSD industry must see this as an opportunity to forge long term market relationships, develop some of New Zealand's newest quality assurance schemes and become market leaders in standards. Consumer demands will cause companies to be scrutinised more closely. Therefore the NZSD must carefully follow ethically responsible innovation, particularly in regards to animal welfare and human rights issues such as labour standards, worker safety and product safety. Increasingly this will expand to consider not just preserving these ethical standards but ensuring continued benefit.

The NZSD is an example of environmentally responsible innovation, as future environmental constraints make milking sheep a more sustainable option than milking cows in New Zealand. Increasingly environmental preservation will become key to market access. The NZSD has the opportunity to forge some of New Zealand's newest agri-environmental policies, such as carbon and water foot printing.

Responsible innovation within the New Zealand sheep dairy industry is a area that holds significant potential for further research. Responsible innovation must continuously assess and anticipate the need for change. Further research must consider wider social, ethical, environmental or commercial implications or circumstances so that the NZSD industry can be adaptive to change.

In conclusion New Zealand can create an internationally competitive sheep dairy industry. Pursuing diversification strategies by building on responsiveness to its customers, innovation and quality will be essential. In particular responsible innovation is likely to become a key aspect of sustaining the New Zealand Sheep dairy industry's competitive advantage.

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Appendix A: People Interviewed

New Zealand

1. Nic Lees - Senior Lecturer, Agribusiness Management at Lincoln University, Christchurch
2. Guy Trafford – Head of Department of Land Management and Systems at Lincoln University, Christchurch
3. Ian McDonald – Xcell Breeding Services Ltd, Kaiapoi
4. Ken Geenty – Phd, MAgSci, Dip Wool
5. Lucy Cruickshank – Nuffield Scholar
6. Craig Prichard – Convener of Sheep Dairy New Zealand Steering Group
7. Jim Inglis – Landcorp Business Manager

France

1. Jean Vincent Gauzentes – Lial MC
2. Valerie Loisy – Responsable Veterinaire Regional Sud Ouest Pfizer
3. Denis Bouyssieres - Responsable Grands Comptes at Zoetis Inc.
4. Farmers – GAEC de BALRAS (Camels et Le Viala) and EARL du Viernault (Roussennac)
5. Beatrice Giral – Ovitest
6. Dominique Bergonier – Département Elevage, Ecole Nationale Vétérinaire de Toulouse

