A Scholarly Review of Supply Chain Integration within the New Zealand Blueberry Industry

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Editor: Carel N. Bezuidenhout, PhD

Co-authored by:

Mitchel R. Martin, Alexander H. Williams, Avinash Peiris, Katherine I.A. Wood, Tianxin Zhang, Gabriella T. Shea, T. David Lavelua, Megan J.N. Cosgrove, Jade S. Forman, Mrunal Paranjape, D.R. Thenuka Kodikara, Perry Dalglish, Lihong Weng, Isaac Cosson, Shakeela Raza, Jonathon E.D. Claydon, Harpreet Kour, Rahul Dilip Kathara

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Massey University, Manawatu Campus, Palmerston North

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Integration: the process of combining two or more things… into one.

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Preface

Supply Chain Integration is a vast field of study and a Google Scholar search will reveal more than 3.2 million publications in this space. This document captures some of the core concepts when the degree of integration of a primary industry supply chain, such as the blueberry industry, is evaluated. The book was developed after final year students in Massey University's Supply Chain Management Programme conducted an in-depth review as part of a formal assessment. The content of the book is of a scholarly nature and caution should be practiced before any guidelines are implemented in industry. The students studied the literature, reports, newspaper articles and accessed information on the internet. However, the most valuable source of information was a one-hour interactive question and answer session with Patrick Malley, director of Maungatapere Berries in Northland, New Zealand.

Ethics and credence attributes are the humanistic basis for establishing sustainable supply chain development. It determines brand reputation, ecology and customer experience. Furthermore, good ethics and credence Attributes promote the progress of industry leadership and increase the possibility of win-win strategies, especially in terms of negotiation. Negotiation is the basis of supply chain collaboration. The purpose of collaboration is to establish a synchronized supply chain to improve the ability of industry coordination. This is also the key to creating value, and the importance of risk management cannot be ignored. It is not only a guarantee for the smooth operation of the supply chain, but also an important measure to improve the flexibility of the supply chain. Finally, the results of supply chain integration need to rely on performance metrics and benchmarking to control and improve the overall performance of the supply chain. This publication evaluates modern theories in all these areas and contextualise them with regard to the New Zealand blueberry industry.

It is important that the reader appreciates the scholarly origin of this publication.

Carel N. Bezuidenhout, PhD (Editor)

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The views published in this scholarly document do not necessarily reflect the opinions of the individuals mentioned above.

Introduction to the Blueberry Industry

Blueberries is from the *Vacinnium* family that include Blueberries, Bilberries, Cranberries, and Lingonberries. These are native to North America and were a food stable for the native tribes for many centuries, collected from wild bushes. The first domestication of blueberries was by a New Jersey farmer Elizabeth White and USDA botanist Frederick Coville in the early 1900's. Now blueberries are grown in North and South America, Europe, Australia and New Zealand.

Agriculture is New Zealand's pillar industry, agri-food exports accounted for two-thirds of total exports and the percentage is quite high compared to other developed countries (LEES & Nuthall, 2015). Zespri kiwifruit, the largest horticultural exporter has provided a successful exemplar for other horticultural industries.

Although New Zealand's blueberry growing area only accounts for 0.003% of the country's land area, New Zealand's export of organic blueberries enjoys a high reputation in the international market. High quality, unique taste and environmental reputation are also recognized in the markets, especially in the domestic and Australian markets. This is due to New Zealand's world-leading plant science and food research capabilities. T&G and other well-known domestic companies cooperate with the New Zealand government to develop the blueberry strategies. The domestic blueberry industry has also invested in genetic research, soil and water quality improvement, and the development of new agricultural systems ("Opportunities,'' 2020).

The blueberry industry is represented by Blueberries New Zealand Inc. (BBNZ) and its goal is to further the interests of the blueberry industry in New Zealand. It currently has 60 grower members, 13 exporter members and 10 associated members. Its members represent approximately 400 hectares of planted blueberries. (Rotorua Land Use Directory – Tahuri Whenua, 2020).

The blueberry industry in New Zealand is still relatively young, but quickly growing and showing its promise as an emerging, soon to be key, export commodity. Cultivars of blueberries were first imported by New Zealand's Ministry of Primary Industries during the 1950s, however, it was not until the 1970s when breeding to improve harvest season, taste, texture, size and other post-harvest qualities took place. Plant and Food Research has developed varieties that are more suitable for New Zealand conditions. New Zealand bred cultivars, suited to the country's growing conditions and climate. These cultivars in themselves are valuable export products with royalties returned year on year. The cultivars took off in the 1980s during the initial boom of the industry. Since then the blueberry industry has seen continuous growth, with over 600 ha of planted cropland, annual domestics sales of over $25 million and annual export revenue of over $38 million in 2019 (Skerrett, 2019; Fresh Facts: New Zealand Horticulture, 2019).

Blueberries are classified into three different main varieties:

1. Rabbiteye, the tallest bush,
2. Highbush, intermediate size, and the most common
3. Lowbush, the smallest in size

Blueberry is a super fruit and contains phytochemicals that are beneficial to human health. This not only reduces the incidence of cardiovascular disease, diabetes, and cancer, but also has the potential to restore cognitive ability. Blueberries are considered low in calories, a good source of fibre, and possessing high levels of antioxidants (Robichaud, 2006).

Despite the growing demand for "natures instant snack food" (Mellentin & Crawford, 2008), the challenge of blueberries is their short shelf life - a maximum of 18 days in perfect storage conditions (Bachmann & Earles, 2000). Post-harvest the blueberries travel to consumers through many channels including fresh, frozen and further processed. Being perishable in nature and a fragile fruit there are many difficulties that come with the movement of the berry from farm to consumer along the supply chain. Due to the short time frame, fresh blueberry exports from New Zealand must be air freighted to reach global markets before spoilage. As a result, New Zealand blueberries target high-end consumers with a price to match in each global export market, where consumers are willing to pay the high premiums for high quality, air-freighted fresh produce (Fresh Fruit Portal, 2012).

However, the blueberry industry is an emerging industry for New Zealand. The pressure facing the industry is internal management and external competition. With the expansion of blueberry demand, supply chain management is critical to improving industry performance, especially supply chain integration.

In 1981 E.M. Gray wrote about the concept of a blueberry growers cooperative in the Papers on Fruit and Nut Production. Gray proposed a cooperative of blueberry growers, working together to forge the developing industry, coming together to share problems and solutions, "right from the time of initial production through the whole of the production and marketing chains." What Gray was alluding to with his concept, was integration across the supply chain of New Zealand's young blueberry industry.

The supply chain begins with the production of fresh blueberries, then progresses via product grading, storage and handling; and proceeds to enter the transportation, services and customer industries. Supply of fresh horticultural products needs careful management from the fields to the user. This is crucial to New Zealand's fresh supplies for which time is typically measured in weeks and days rather than months between harvesting and entering the consumer market.

The global demand for blueberries has grown as it has been recognised as a 'superfruit' due to its health properties (Hancock, Mcdougall, & Stewart, May 2007). The export market is highly seasonal, February and March, with most produce going to Oceania and South East Asia. There are opportunities to grow the market in Australia, East Asia, and South East Asia. In Australia, New Zealand blueberries are able to meet Australian biosecurity requirements, but are in competition in the same season as other Australian states. The New Zealand export market tends to go into a "Boom and bust" cycle, with its main competitors being Chile and Peru. The global market was in the past dominated by North America, Europe and China, but there is substantial growth in Peru. Peru's output has increased alongside massive irrigation projects, large firms, investments in post-harvest, plant genetics and planting systems to

produce the highest yields. (Blueberries New Zealand, 2020). The local market for fresh Blueberries is small and static, but the frozen market, mainly from imported frozen berries, has been growing. There are opportunities to grow the fresh and frozen local markets, replacing the imported frozen products.

Supply Chain Integration

The supply chain is a critical component in enhancing the production, profitability, and sustainability of any organization. Thus, organizations in a contemporary competitive and unpredictable market should formulate a supply chain that incorporates all the players to ensure the production and distribution of the products is smooth. In addition, it should be able to cater for mitigation steps that should be taken when the supply chain is interrupted by unforeseen economic or political factors in and outside the organization's control.

One cannot delve far into supply chain integration without first discussing the broader ideology of supply chain management; this concept was first proposed in 1982 by Oliver and Weber. Originally, supply chain management concerned itself with the oversight of material flows from production through the supply chain to end consumer. Since then the walls of supply chain management have expanded. Definitions of supply chain management vary in academic literature. However, it is no coincidence that verbs such as integrate, collaborate and coordinate are key themes; as effective supply chain integration can only be accomplished through proper supply chain management.

Supply Chain Integration refers to how a company or business plans their strategy to properly create synergies with other members in their supply chain, and how they manage their own internal supply chains to maximise efficiency and value in the supply chain (Yi-nan & Zhao-fang, 2009).

There is a rich history of cost trade-offs in the world of supply chain and logistics, with popular topics promising more effective integration across supply chains rising to prominence every decade. The 1950s saw a rise in the popularity of the concept and analysis of total cost. This new knowledge caused ripples throughout supply chains, as it was a significant change in thinking from the historic drivers to keep costs down in every silo, thus making it difficult to integrate through supply chains (Bowersox et al., 1999). The answer to some of these struggles arrived in the mid-1960s with a push for outsourcing and the birth of third party logistics (3PL) providers who offered manufactures and producers the ability to hand off their logistics issues to an already integrated service in order to focus on their core business of manufacturing or producing. As thinking began to change and new strategies implemented, certain companies were also able to generate a competitive advantage, in addition to improving the bottom line. Once these business functions had been outsourced, the potential for internal integration made its way under the microscope and managers looked to streamline processes further. Concepts such as Just in Time (JIT) practices emerged in the 1970s and Total Quality Management (TQM) arrived in the 1980s. As globalisation started to expand it became increasingly apparent that collaboration was required to effectively gain control of the ever-expanding supply chains. The needs and capabilities of not only suppliers

but customers were increasingly incorporated into the strategic planning of businesses. Supply chain integration at its core is the notion that no man is an island, every link of the supply chain must be unified to act with continued efficiencies and meet customer demand.

Supply chain integration is an emerging and large topic within the broader supply chain management topic. Business is all about earning profits, creating value and becoming more competitive to stay alive in an ever-expanding global market. From a supply chain practitioner's point of view "Supply chains compete, not companies" (Christopher, 2000). With this point of view, organisations need to work on ensuring that their supply chains are as competitive and efficient as possible. While supply chain improvements may not be able to always increase revenue, they can typically affect the bottom line by reducing cost. Supply chain integration is a method that organizations can use to improve the quality and timeliness of information, decision making, products and other advantages for increasing customer value (Flynn, Huo, & Zhao, 2009; Schoenherr & Swink, 2011). It can be defined as practices and procedures to strategically collaborate with supply chain partners and manage processes, both within and between firms to obtain operational and strategic advantages, internally and externally (Narasimhan & Jayaram, 1998; Flynn, Huo, & Zhao, 2009; Mellat-Parast & Spillan, 2014).

Research shows that when supply chain members can learn to work together closely the effectiveness and efficiency of the whole supply chain improves (Yi-nan & Zhaofang, 2009; Awad & Nassar, 2010). Supply chain integration is also defined as the limit that a firm can tactfully coordinate, collaborate and plan with its supply chain to manage all intra- and inter activities within the organisation through information sharing, resource allocation, and steady flow of goods with the task and goals of supplying significant quality to the end customer at a low spending; all through the combination of all firms in the supply chain working as one (Narasimhan & Jayaram, 1998; Bowersox et al., 1999; Barbara B., Baofeng, & Xiande, 2009; Yi-nan & Zhao-fang, 2009; Katunzi, 2011; Mellet-Parest & Spillan, 2014). An integrated supply chain brings a number of benefits to the chain including:

- Reduced costs
- Reduced waste
- Improved production times
- Improved response times
- Prevention of production delays
- Reduced storage costs

Directions of Integration

Munir, Jajja, Chatha, and Farooq (2020) note that Supply chain integration consists of three main directions, these are supplier, customer, and internal integration. Supplier and customer integration, also known as external integration, refers to the amount to which an organization collaborates with its upstream and downstream partners in the supply chain to structure strategies, practises and processes and create mutual value (Flynn et al., 2010). Customer integration involves the amount in which integration occurs with firms downstream of the focal firm; it involves information sharing, particularly in relation to the market, allowing the organization to respond better to customer needs (Wong, Boon-itt & Wong, 2011). Supplier integration refers to the extent of information sharing and coordination with firms upstream of the focal organization, particularly concerning the supplier's capabilities, processes and limitations. This allows more effective forecasting and operations management (Swink, Narasimhan & Wang, 2006). Internal integration refers to the amount of collaboration between functions within a firm,

for example, the sales and marketing departments of a firm (Williams, Roh, Tokar & Swink, 2013). It is important to note that supply chain integration is multidimensional, and the three directions of integration above might not represent all that it entails. The three directions of integration are noted frequently, but some also view integration from the behavioural and relational perspective of firms (Mackelprang, Robinson, Bernardes & Webb, 2014). These relationships will be built on common goals, trust, shared risk and reward. By creating collaboration and implementing a level of integration between different parties, they can achieve a higher level of business performance compared to operating individually (Sadler, 2007).

Supply chain integration can be achieved tightly or 'captive' (National Research Council, 2000) by buying and owning all the different parts of the chain and therefore controlling the whole supply chain. It can also be achieved more loosely by information sharing and working with trusted suppliers where the different parts of the chain are not owned by one person, but everyone is working closely to produce gains.

Definitions of Supply Chain Integration

"*Supply chain integration is defined as practices and procedures through which firms obtain operational and strategic efficiencies both internally and externally, through collaboration among internal functions and with other firms*" - Mellet-Parest & Spillan, 2014.

Bowersox, Closs & Stank (1999) define supply chain integration as the degree of integration of all activities within the organisation, as well as the activities of its suppliers, customers, and other supply chain members.

Supply chain integration has been defined as "*the extent to which all activities within an organisation and the activities of its suppliers, customers and other supply chain members are linked together*" (Hong et al., 2008).

Supply Chain Integration is defined as the degree to which the business can work efficiently with its supply chain members and coordinate the intra and inter-organizational processes cooperatively to achieve efficient and productive transfers of goods and resources, knowledge, capital, and actions with the goal of supplying the consumer with full market value at low price and high frequency (Yi-nan & Zhaofang, 2009).

Supply Chain Values, Culture and Value Attributes

The term supply chain ethics is difficult to define. Manning, Baines & Chadd (2006) published the following guideline; "*Legislation defines governmental policy but it does not define what is "good" or "right" and this is the role of ethics … Ethics is therefore, the application of moral theories to the analysis of practical problems.*"

Achieving supply chain coordination, and eventually integration, requires as a first step the development and application of key values (Awad & Nassar, 2010). The application of values and morals to human activities is known as ethics (Manning, Baines & Chadd, 2006). Ethical deliberation incorporates moral constraints, legal frameworks and the ramification of actions to determine principles and responsibility levels for both individuals and groups; – then reviewing member compliance in alignment with those principles and responsibilities (Manning et al., 2006). An ethical code is made up of legal frameworks, such as legislation and laws governing human rights and labour laws, as well as internal companies' policies that encompass corporate social responsibilities and codes of conduct. These policies aim to avoid costly and counterproductive ethical transgressions.

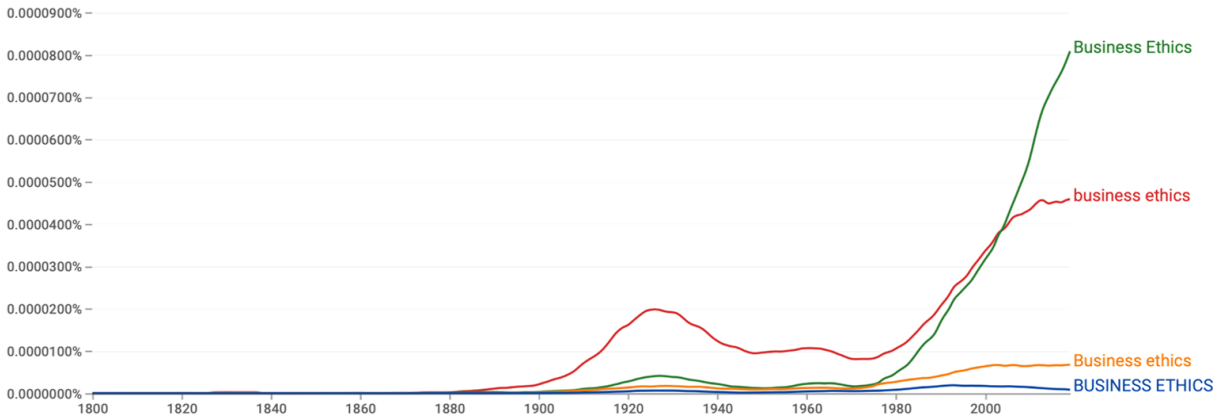
The terms ethics and morals have been used interchangeably in the literature (Downie, 1980; Lange and Fenwick, 2008). Ferrell et al. (2013) recently included the phrase '*social responsibility*' to this grouping. Ethical behaviour should focus on cultivating respect and care for others, which benefits not only individuals and specific groups, but also society in general, including concerns for animal welfare, protection of the environment, and the advancement of social good (Manning et al., 2006). Ethics involves evolving ideals of behaviour, defining right and wrong. The core principle of ethics is that these concepts are absolute. The ethics of business is equally old; Trevino and Weaver (2003) note that Aristotle along with others made "*observations on the evaluations of the ethical propriety of commercial practices, such as interest rates and the pricing of goods.*"

To stop unethical use of power that undermines supply chain integration, it is important that there is a consistent code of conduct and ethical framework that runs throughout the whole supply chain. An area of little study, but very effective in creating this unison and cohesion is the application of Māori values. Māori businesses often resist the typical western way of conducting business, which prioritises individual organisational profit and success. Spiller et al. (2011, p. 166) state that: "*they* (Māori businesses) *emphasise belonging through being in partnership with customers, suppliers and other stakeholders in a way that creates well-being.*" This idea of belonging as partnership is enacted through the core ethical values of "*seek*[ing] *to improve the human condition through serving others, including the environment, and assist*[ing] *others in experiencing well-being*" (Spiller et al., 2011, p. 166). To cultivate this sense of belonging between partners and with the

wider environment in which they operate, Māori businesses draw upon the values of: wairuatanga (spirituality), aroha (empathy, care, charity and respect), whakapapa (genealogy), manaaki (kindness and respect) and kotahitanga (unity) (Spiller et al., 2011). Māori industries wish to make a difference to a multiplicity of communities such as: with customers and suppliers, within their own organisations, and in a cultural, social, and environmental manner (Spiller et al., 2011; Kawharu, 2019). By viewing any form of business relationship as community, Māori business is motivated to ensure the flourishing of the greater whole and direct their skills and abilities to serve others in a manner that exceeds the limits of traditional capitalistic business relationships (Spiller et al., 2011). Further, the Māori value system poses a challenge to the often taken-for-granted idea that shareholder interests must come before the concerns of other stakeholder groups (e.g. local communities), as well as dismantling the opinion that organisational and individual well-being is directly correlated to having material wealth (Spiller et al., 2011). It is easy to see that operating from these Māori values sets up an atmosphere where organisations can integrate and work together toward the benefit of many not only themselves. In fact, the Māori value system is established on the concept of kotahitanga, or togetherness, of all things and by its very nature is founded on and completely supports integration (Spiller et al., 2011).

Manning, Baines & Chadd (2006) state that ethics in an organisational context is the use of morals and standards to business affairs and business decision making, as to conclude the outcome of direction that they should take. This is influenced by four over-arching elements which include:

- Legislation conformity,
- National standard of ethics,
- Culture of the organisation, and
- Multiple organisations with different cultures, cooperating and interacting within the supply chain.



Publications on 'business ethics' in the literature from 1800 to 2019 (Google books NGRAM viewer, 2020)

Culture

The values and perception of risks can be subjective to each region or culture and hence in complex and geographically diverse global supply chains, partners need to be aligned with values, ethics and compliances of the business and the customer whom they are catering to. It requires integration of supply chain partners and a strong code of conduct (Ferrell et al., 2013). These compliances are created by governing authorities of countries with alliance to other countries, in order to have uniformity of practices, which will facilitate international trade. The policies and compliances need to be followed within the organization and across the supply chain (Ferrell et al., 2013). "*The Ethical Trading Initiative*" was established by trade unions and non-governmental organisations to promote the application of corporate codes of practice, which monitor the working conditions for labour, fair remunerations, ethical sourcing and social accountability (Manning et al., 2006). Each country's social, political, economic and cultural forces influence its values and ethics and has its own view on social responsibility. In a complex network of supply lines, a central organization must lay the rules of its ethical code of conduct and make sure the supply chain partners are adhering by those rules without any compromises. These compliances may be legally binding and faltering the rules may cause losses to the business (Ferrell et al., 2013).

Organisational culture is an attitude, habit or traditional method of how a task or responsibility is completed as described by Deal and Kennedy (1982). Early (2002) states that the culture and ethics of the business is a mirror image and representation, of the values and morals of business owners and managers. Organisational culture and structure corelate and react with one another. Aspects of the organisational structure that affect culture include but are not limited to the organisation's vision and principles, standard operation procedures, tracking key performance indicators, methods of reporting and accountability (Handy, 1985; Johnson, 1988).

Trust

Ferrell et al. (2013, p. 281) point out that "*understanding the ethical culture of a specific member of a supply chain as well as the entire supply chain ethical culture would be a significant start*." Increasing understanding is one of the fundamentals for establishing trust. As organizations build trust with each other, they take larger risks, integrate business processes, reduce their reliance on additional sources of supplies, and can collaborate more effectively on the design of processes and products (Ferrell et at, 2013). Additionally, building trust within the supply chain means entities are more likely to keep the interests of their entire supply chain in mind without monitoring, checks and complicated contracts (Chopra & Meindl, 2007). A study by Porter & Kramer (2006) demonstrates that ethics allow a firm to attain a unique position and differentiate itself from competitors and charge premiums for products that have an ethical component to it. Further, Bowman and Haire (1975) also reveal that organisations with higher levels of social responsibility have greater returns. Varley (2014) suggests that ethically produced goods are a recession resilient product, as consumers who purchase products for positive ethical reasons are not willing to lower their ethical viewpoints for lower-priced substitutes without the same ethical guarantees.

However, there is often a dichotomy between trust and power that makes organisations weary of collaborating with some supply chain partners (Drake & Schlachter, 2008). This is particularly evident in a dictatorial collaborative relationship, where one dominant party exercises enough power to

force its supply chain partners to undertake operational tasks or deliver value-added services without sharing the benefits (Drake & Schlachter, 2008). The process of brushing potentially unethical decisions aside by referring to them as ''*just business*'' also serves to undermine the very aim of collaboration in the supply chain (Drake & Schlachter, 2008).

For more on trust, refer to the section on Supply Chain Collaboration and Leadership.

Value Attributes

Value attributes comprise search attributes, experience attributes, and credence attributes (Ford, Smith, & Swasy, 1988).

Search attributes refer to product attributes that can be easily judged by viewing and touching before purchasing, such as the size, shape, colour and firmness of blueberries. Search attributes determine the customer's desire to purchase the product.

Experience attributes refer to product attributes that customers can only perceive and evaluate after purchasing the product, such as the taste, sweetness, freshness and flavour of blueberries. Experience attributes are closely related to follow-up or second consumption, i.e. customers would buy the same brand of blueberries again if they had a satisfying experience.

Credence attributes refer to product attributes that cannot be evaluated and verified, even after purchasing and consumption (Ford, Smith &, Swasy, 1998; Baron, 2011; Dalziel, Saunders, Tait, & Saunders, 2019). The concept of credence goods was first introduced by Darby & Karni in 1973, who defined credence goods as services of which the buyer can never be certain (Darby & Karni, 1973). Ethics related attributes are part of credence attributes.

Baron (2011) states that the appearance and performance of products can be verified by customers' search and experience, but credence attributes, consist of the production environment of the product, the treatment condition of employees, sustainable development of the product, and other external conditions related to production, which are hard to be observed. Credence attributes of products might come in the form of informational indicators like labels and may include ethics, trust, nutritional value, organic production, fair trade and food safety. These qualities when attached to the product, adds value and importance, giving the buyer credibility, reliability and trustworthiness (Grunert, 1997; Fernqvist & Ekelund, 2014; Dalziel, Saunders, Tait, & Saunders, 2019). Doane & New Economics Foundation (2001) state that ethical consumption is a personal choice to consumers who are willing to purchase products with a sense of morality and responsibility, for instance, in human rights, animal welfare, environmental sustainability and labour conditions.

Impacts on Markets

Supply chains can be enriched by adding market value through novel products, processes, and product functions, such as societal prosperity and welfare, animal welfare, and organisational culture. By identifying markets which value these additions enough to pay a premium price, and by implementing vertical and horizontal organizational structures, ensures that a fair share of the market price is shared throughout the entire supply chain. Implementing all three of the above-mentioned enhancement activities (societal prosperity and welfare, animal welfare, and organisational culture) in accordance with the standards developed by Fairtrade Labelling Organizations

International, results in fair trade labelled products being sold to conscientious consumers in the industrialized world.

An ethical supply chain now needs to focus on both corporate and social responsibility, plus its product's environmental impacts as sustainability has become one of the biggest impacts on brand reputation in the current market (Gonzalez-Padron, 2016). As customers are becoming more aware of environmental issues around them, they are also becoming aware of the environmental impacts of the products that they are purchasing. Products in today's market need to have a brand reputation of being sustainable to gain a long-term loyalty and provide a better customer experience. Studies show that three quarters of millennials are more likely to pay more for a sustainable product (Mullen, 2018). According to Kottke (2018) 65% of modern consumers want to make a positive difference to the world through their purchases. To meet the customers' demand for an environmentally sound and socially responsible brands, the importance of supply chain ethics has increased.

According to Miller, Driver, Velasquez, and Saunders (2014, p. 15), "*there is significant evidence to suggest that China has a substantial number of wealthy consumers interested in purchasing premium goods.*" If New Zealand can put weight on the correct credence attributes, they will gain market share and target a different consumer, giving the country a point of difference to its competitors. A study by Dimara and Managanri (2015) confirms that customers have a higher willingness to pay for products that have an ethical component associated with it. New Zealand uses credence attributes in its marketing campaigns of New Zealand products, in particular its environmental standings and food health safety ratings to promote itself as 'clean and green' and therefore the products it produces.

Environmental management, production methods, public health, country of origin, creation of employment, supporting local communities, employee rights, raw material procurement and reputation commitments are all potentially considered by consumers as standards for brand reputation and reliability. More and more customers are concerned about the social responsibility of the supply chain, production methods and specifications, and material usage rates (Eckel, 2019). Supply chain ethics has changed from a background role to the competitiveness of the industry. The Association of Supply Chain Management (ASCM) announced their performance evaluation standard of enterprise supply chains in 2019. The purpose of setting standards is to establish a competitive advantage and sustainable development management platform for companies in supply chains. This standard clearly includes ecological, economic and ethical attributes to certify the transparency and superiority of supply chain performance. Furthermore, the increase in profits also proves the importance of supply chain ethics and credibility. Agyabeng-Mensah et al. (2020) explained that reduction of greenhouse gas emissions and effective waste management measures can not only improve the environment and the production safety of employees, but also enhance the reputation and image of the brand. Because the performance of a business comes from the reduction of overall operating costs, but also from customers' recognition of the industry and corporate ethics. Therefore, supply chain ethics is not only an invisible industry characteristic, but can also be transformed into benefits (Lucci, 2019).

The way in which an organisation chooses to tackle ethical issues can influence their supply chain performance. Gonzalez-Padron (2016)

state that suppliers are a key stakeholder within a supply chain because they can offer secure, reliable, lasting, and sustainable access to safe, high-quality raw materials and products. Organisations often evaluate and choose suppliers based on their ethical performance and would prefer vendors with good social and environmental policies and standards.

Although supply chain activities may uphold good ethic practices and credence attributes, this is not always recognised by the consumer. Business tends to respond to this by publishing reports on their relevant ethics and credence attributes related activities to communicate with the consumer. In doing so, it becomes the role of marketing to ensure that credence attributes are communicated and promoted effectively to the consumer without superseding existing brand image (Manning, Baines, & Chadd, 2006; Ferrell, Rogers, Ferrell, & Sawayda, 2013; Gold, Kunz, & Reiner, 2017). While these credence attributes are advertised, consumers are also looking for authenticity and integrity and instances exist where consumer backlashes occurred when the product story on the pack conflicted with other data sources, such as claims in news articles or secret video footage (Cooke, 2016).

Applying Values and Credence Attributes to the Blueberry Supply Chains

Fearne and Hughes (2000) argue that Fresh produce is recognized as one of the key categories that will induce shoppers to switch stores (Fearne and Hughes, 2000). A wide range of fruit is often the first item that customers will encounter when entering a supermarket and supermarkets want the very best produce that it can source, either domestically or imported.

In New Zealand, the blueberry industry has one of the strictest standards in the world in its ethics in the way products are grown, picked and shipped, most not visible to the customer. The industry maintains a highly regulated system where the owners and growers must meet high standards on growing blueberries and the chemicals that can be used, higher than other parts of the world. For example, in other parts of the world to be classed as an organic product requires no chemicals to be used on the crop, but in New Zealand this requires soil tests, including from neighbouring fields to prove that no chemicals have come in contact with the crop. New Zealand is recognised for having a high social responsibility with its safety and labour laws, which means higher pay and better working

conditions, but also higher costs. In the blueberry industry each grower is audited every 2 years to ensure it is meeting the standard. But now continuous audits and random compliance checks are being carried out, which has resulted in growers maintaining ethical practices all year round. To ensure the blueberry product meets regulations on food safety, fruit to be exported is tested for chemical residue before and after shipment, verifying that the berries are of a certain standard to sell into export market.

The blueberry industry has gasped the importance of protecting the brand and ensuring that it is an ethical producer, both environmentally and as a socially responsible industry. By doing this several credence attributes are attributed to the New Zealand product that can be used for marketing a premium product. Examples of credence attributes that relate to the New Zealand blueberry industry include food safety, environmental stewardship, social responsibility, cultural authenticity, fair trade, functional foods, organic production, GM-free, water footprint, biodiversity and local foods (Saunders et al., 2016b, p. 18). The Chartered Institute of Purchasing & Supply (CIPS) suggests linking the organization's corporate social responsibility policy with the supply chain side to maximize benefits. Analysis and action should be prioritized in the high-risk areas and check the likely impact throughout the supply chain.

New Zealand blueberries adhere to the highest standards of biosecurity and receive certification from recognised organisations such as Bio Grow New Zealand (Berry Co, 2020). The fact that New Zealand is the only blueberry supplier to effectively penetrate the Australian standards for biosecurity attests to this fact (MBIE, 2020). Certain authorities have the specialist abilities to certify these claims, for example, in New Zealand, AsureQuality provides assurance marks for organic certification, animal welfare and transparency and authenticity.

One New Zealand blueberry collective, Miro®, is already trail blazing a Māori business approach to supply chain ethics by combining ancient Māori traditions and values with modern supply chain practises to create kotahitanga from orchard to plate. At Miro's very core is an assumption that working together and integrating is the key to success. For instance, the collective is made up from collaborating Māori businesses, trusts, whānau, hapū and iwi (Miroberries, 2020). This is supported by their core value of whanaungatanga (close connection between people; kinship) which places emphases on nurturing positive relationships and treating partners like family. Kaitiakitanga (guardianship and protection) in the form of best practices that supports sustainability, respecting the land, keeping people safe, and growing communities. Finally, manaakitanga (loosely translated as hospitality) which is about caring for others and treating all people with hospitality, humility, respect, and reciprocity of kindness (Miroberries, 2020). Miro strives to find supply chain partners who share their values and ethical code. One of their major partners, BerryCo is a company that specialises in global marketing, distribution, growing and packing techniques. BerryCo operates by the slogan "*With your basket and my basket our people will prosper.*" This partnership between BerryCo and Miro has flourished as both companies strongly believe in the principles of unity and community. Due to the kotahitanga between the two companies' vision and value systems, this partnership has managed to secure the intellectual property rights to produce Mountain Blue Orchard blueberry varieties in New Zealand (BerryCo, 2020). This is no mean feat and requires a tremendous amount of trust and integration between the two

businesses as any mistake in growing or distribution could affect the license agreement for this berry variety, a consequence which would devastate both companies.

A survey of online grocery retailers in October 2020 shows that those blueberries with organic certification have a higher recommended retail price (RRP) than those without (see Table below). Interestingly, of the products that are grown in New Zealand, only one has a Product of New Zealand branding. The others rely on the country of origin specification on the package, rather than a credence brand. Less than 25% of frozen blueberries currently on the market are grown in New Zealand; products that are grown in New Zealand command slightly higher premiums than those imported. There were no organic blueberries grown in New Zealand available for purchase. Further research shows there are two organic blueberry growers in New Zealand, however, their fresh organic fruit is only available during summer months (Oob Organic, 2020; Monavale Organic Blueberries, 2020).

A survey of blueberry offerings from 3 online retailers in October 2020*

Product Available	Fresh / Frozen	Imported/ Grown in New Zealand	Amount	Credence Attributes	Cost
Windermere Farms Blueberries	Frozen	Grown in New Zealand	500g		$8.49
Oob organic blueberries	Frozen	Imported	450g	Certified Organic (Asure Quality)	$9.99
Sujon Blueberries	Frozen	Grown in New Zealand	500g	4 Star Health Rating	$7.75
Pams Frozen Blueberries	Frozen	Grown in New Zealand	500g	4.5 Star Health Rating	$5.49
Fruzio Blueberries	Frozen	Imported	1kg	4.5 Star Health Rating	$12.49
Countdown Frozen Blueberries	Frozen	Imported	500g/1kg	4.5 Star Health Rating	$5.00 / $9.50
Orchard Gold Blueberries	Frozen		500g		$6.00
Trader Toms Organic	Frozen	Imported	500g	Certified Organic (ECOCERT SA)	$8.00
Macro Organic Blueberries	Frozen	Imported	450g	Certified Organic (ACO), 4.5 Star Health Rating	$7.50
18 Degrees South Frozen Blueberries	Frozen	Country of origin printed on bag	1kg		$11.50
Fresh Produce Blueberries (Unbranded)	Fresh	Grown in New Zealand	125g		$9.99
Fresh Produce Blueberries (Gourmet Blueberries)	Fresh	Grown in New Zealand	125g	Product of New Zealand	$7.50
Fresh Produce Blueberries (Eureka)	Fresh		125g		$7.50

*Countdown, New World and Farro Fresh, information retrieved on 13th October 2020

The New Zealand blueberry industry needs to differentiate itself from its growing season competitors to ensure they can remain competitive in the export market. While New Zealand has a reliable route to market into Australia, given that their biosecurity regulations are too tight for other producers, this is not the case in the growing lucrative markets of Asia. Chile and Peru can both produce higher quantities of berries cheaper than New Zealand, so New Zealand should potentially leverage their credence attributes.

Quality & Food Safety

There can be confusion in the market between quality and food safety. From a regulatory perspective, food safety is well defined. However, in the market "*safe food*" may include credence attributes that lean more towards a food quality perspective. Asian culture tends to view superfoods as preventative medicine. This is proven by the demand for NZ Manuka Honey (Nadkarni, 2017). Given that NZ blueberries are looking to expand their market share within the Asian

market, the NZ blueberry industry should look to piggy-back off New Zealand's Manuka honey reputation and market NZ blueberries in the Asian markets accordingly.

Most blueberries grown in New Zealand are certified by the supplier excellence programme which ensures food safety and high quality. Further, almost all frozen blueberries are USDA Grade A certified fruit products (Berry Country, 2020).

The blueberry industry values the same as other food industries, food safety is always the most important link. Zespri, as a leader in the New Zealand agri-food industry, concentrates on helping people, communities, and the environment, which includes health & food safety, recyclable packaging, carbon positive, water resources protection, growers valued, thriving workforce building, and community contribution (adapt from Zespri website). In the U.S blueberry industry, Qu, Lamm, & Rumble (2017) examined 18 attributes and they also found that in order to create an ideal blueberry image, growers and marketers should focus on price, pesticide-free (food safety category) and all-natural. Currently, the most globally recognized system to ensure food safety is Hazard Analysis and Critical Control Points (HACCP), among them, is the very widely used standard ISO 22000:2018. Regarding the traceability, New Zealand Made and New Zealand Grown is currently widespread used (see figure below).

Labels of Food Safety and Traceability Attributes.

While many aspects are being efficiently managed in terms of credence attributes one major limitation that currently exists is the difficulty in obtaining the organic certification within New Zealand. Even though growers who carry out growing under protected substrates follow all organic growing procedures, they are not classified as organic in New Zealand since the berries are not grown in the soil. As health-conscious customers demand organic certification, it is suggested that growers develop ways around this limitation in accordance with the organic certification criteria of New Zealand.

It might be worth attempting to lobby the New Zealand government to alter rules about organic production since New Zealand growers are at a disadvantage compared to other countries. It may be a good opportunity currently as the Prime Minister of New Zealand is trying to trade on the country's brand (RNZ News, 2020). The blueberry industry in New Zealand could try and push for a global agreement of organics sooner if possible,

especially with the government's weight behind it. With the blueberry being moved to an unofficial superfood status, it is a good time to move into potential markets where demand is growing, but the blueberry industry needs to differentiate New Zealand's berries and the overall New Zealand brand to ensure it gains a foothold and brand recognition. To do this, there is potential in working with and improving initiatives like the New Zealand Story (Dalziel et al., 2018).

Lincoln University investigated the top three export markets (UK, China and India) and potential markets (Singapore and Indonesia) for New Zealand. They found that food safety related attributes to be the most significant, including country of origin, traceability, organic and GM-free. This was prevalent especially in China and India, the two most populous countries in the world (Miller, Driver, Velasquez, Saunders, & Lincoln University; Agribusiness and Economics Research Unit Staff, 2014). Other attributes of importance were environmental quality and fair trade among China and Indian consumers.

There is a strong desire for organic produce in the Chinese market. Due to China's poor record when it comes to food safety it is not a surprise that the consumer is pulled towards products claiming certain credence attributes such as organic, as they perceive organic to support safe food production. New Zealand has rigorous standards to obtain organic classification but not all blueberry companies within New Zealand can obtain it, which makes it difficult to use this attribute to their advantage in foreign markets. Although, in practise, organic production covers a cluster of attributes. When consumers think of organic produce it is associated with food safety, nutrition, ethics, environmental concerns and health. Studies have shown that interest in organic foods is driven mostly by health concerns more so than any other factor and is the primary reason for consumers to buy organic foods. Along with health attributes they place a high value on pesticide-free production and are willing to pay more than double for produce that is pesticide free (Miller, Driver, Velasquez, & Saunders, 2014; Saunders, Tait, Guenther, & Dalziel, 2015). New Zealand already has the advantage of having a clean green reputation and this is a strong foundation to build on to align with the credence attributes such as organic, superfood, pesticide free and nutritionally dense. As mentioned previously, customers are relying on and trusting credence attributes as they cannot be ascertained by direct experience (Wirth, Stanton, & Wiley, 2011). To target different markets in Asia the New Zealand blueberry industry need to build the picture in the consumers mind that New Zealand has a premium product to offer with many beneficial attributes, creating a co-ordinated story about "why the New Zealand blueberry?" across the industry.

An award-winning organic berry and ice cream company from northland OOB is currently supplying to over 1600 supermarkets in Australia and expecting to ship another 500 tonnes of fruit. At present OOB started in engaging with the world market including countries such as, Singapore and the company started to focus on organic ice cream which will boost their sales and help to capture the markets (Stuff, 2014).

Monovale Blueberries provides fully BioGro New Zealand organic status products for 25 years until present. Monovale Blueberries has a commitment towards environmental sustainability and also use a chemical free way to grow their berries, which provides several health benefits. This led them to obtain the credence attribute of the BioGro certified credence attribute.

Another significant credence attribute associated with New Zealand blueberries is the

Non-GMO (Non-Genetically Modified Organism) certification as no blueberries produced in New Zealand are genetically modified.

Social Practice Ethics

In terms of having good social practice and being a good employer, New Zealand and Australian blueberry growers comparatively have some of the highest barriers to market with most other producers achieving the standards of their country more easily. As such, in terms of social practice and fair employment, the NZ blueberry industry are ahead of the game and managing their social welfare compliance well.

A recurrent ethics issue within the horticulture industry is the ethical and fair treatment of seasonal workers. A recent case emerged in the Swedish berry industry where attention was drawn to how labourers were treated. This has raised an awareness within the Swedish community towards the berries that they buy (Faber & Nielsen, 2016; Eriksson & Tollefsen, 2018; Eriksson, Tollefsen, & Lundgren, 2019). Audits on two South Auckland farms in Pukekohe, coupled with another audit on an orchard in Hastings, revealed unethical behaviour in relation to exploiting its workers (Employment New Zealand, 2020). The audit revealed that growers were failing in compliance and accountability. A 2017 New Zealand report focusing on kiwifruit farms found that over half of audited farms in the Bay of Plenty region were non-compliant in providing seasonal worker contracts or paying minimum wage (McSweeny, 2017), this pertains to the blueberry industry also, as many kiwifruit growers cultivate other berries as well.

New Zealand has a comparably high cost of labour when compared to some other fruit producing countries and this has seen some examples come up of slavery and migrant abuse/exploitation. A notable example of this was the case of Joseph Auga Matamata who in 2020 was the first person in New Zealand to be convicted of slavery and human trafficking. He was a Samoan chief who lured workers to New Zealand from Samoa to work in the horticulture industry whilst not paying them, beating them and not allowing them to leave (Bradley & Farao, 2020). It also appears that this is likely not the only occurrence of this practise happening in the fruit industry (Barratt, 2017; Kennedy, 2020). Related to this, reports exist on poor working conditions, no employment contracts and workers being paid well below minimum wage (Collins & Stringer, 2019; Employment New Zealand, 2020). It is important for the blueberry industry to be mindful that this type of behaviour is reasonably likely to be occurring in or near their business somewhere in New Zealand.

The Australian horticulture industry has proposed ethical labour certification, which farmers can use to verify their fair and ethical treatment of employed staff members, both full time and seasonal. This credence would allow end consumers to purchase fruit products knowing that the farm of origin abided by labour laws (McCarthy, 2017). In the New Zealand market, there is currently no comparable certification available for growers. New Zealand blueberries are soon to be GRASP certified for ethical labour practices (Fresh Berry Company, 2020). However, Woolworths New Zealand, the owners of Countdown supermarkets has an ethical sourcing policy that dictates "*comprehensive criteria on business integrity, labour rights, fair and safe working conditions and environmental compliance*" (Woolworths New Zealand, 2018). The introduction of certification like this would afford a competitive advantage for blueberry growers who comply, as every credence attribute applied to a product is an opportunity to add value.

Environmental and Sustainability Values

Covered cropping is a new way to produce blueberries which refers to moving the traditionally outdoor grown blue berries to indoors. This provides the solution to several other uncontrollable factors such as, able to continue work regardless of weather and spraying is much easier since there is little or no spray drift. Pest attacks also could be better controlled and can lower the amount of chemicals needed. This practice might be considered as a credence attribute in the future.

The Fresh Berry Company mainly focuses on a sustainable future, ensuring their farming practices are not negatively impacting on the natural environment. They are also committed in making continuous progression towards waste reduction and caring and ensuring sustainability for the natural resources which they depend on. The Fresh Berry Company works closely with their growing partners by driving towards a sustainable change in water usage and by minimizing waste as much as possible. They also pack their products (berries) in an environmentally friendly packaging which is made from recycled and recyclable materials (The Fresh Berry Company, n.d.).

BerryCo acknowledges its Environmental and Social Responsibility through ensuring values are embedded in their trade with direct suppliers and also, BerryCo believes that, as an organization the goods sourced need to be produced in a sustainable way without causing negative impacts on the environment and the society. BerryCo implemented environmental and ethical trading policies in-order to make a commitment towards managing the environmental and social impacts. BerryCo also ensures that all stakeholders of their supply chain are treated with respect and dignity and can live in a safe environment (BerryCo, 2016).

Supply Chain Power and Negotiation

Weber (1947) states that power is the possibility for an actor in a social network to still fulfil their will despite resistance. Emerson (1962) defines power as the ability of one party to perform will on the other. All the definitions indicate that power in a supply chain relationship refers to a member who occupies a dominant position in negotiations and has a strong ability to control and attract other members.

Supply Chain Power

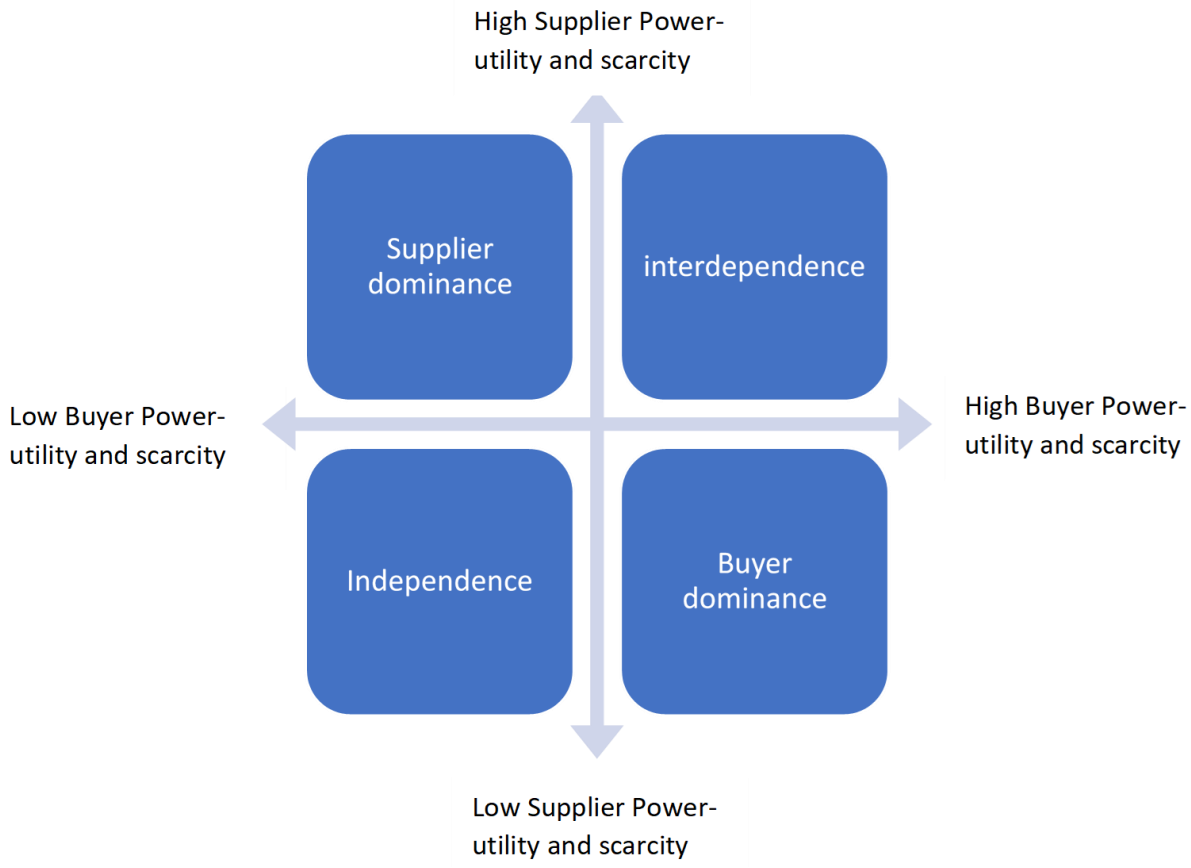
Power can be defined as "the ability of an actor to influence another to act in the manner that they would not have otherwise" (Emerson, 1962). Supply chain power is defined as the skill and proficiency of one marketing channel member to sway and change the buying and selling decisions of another marketing channel member (Brown et al., 1983, 1995; Goodman & Dion, 2001). A firm possesses power when they control the resources that another firm needs to conduct their business. Power asymmetry results from one firm needing another firm's resources more than the other way around (Casciaro & Piskorski, 2005).

Having power within a supply chain may also be defined as having the ability to affect the conditions of a supply chain through one's capability to influence the behaviour of others within a supply chain (Borgström & Hertz, 2007). One may argue, most power in a supply chain lies at the very end, with the consumer. The consumer wields their power through demand, quite simply if there is no demand for a product, retailers will not purchase it, and producers are sent back to the drawing board. It may, however, not always be quite so simple in the real world. Parsons (2009) argues that one of the rules that drives New Zealand's economy is; consolidation equals power. The aim of gaining the most power in a supply chain is to be the price maker. The price maker gets to "*extract the biggest margin and call the tune for the rest of the chain*" (Parsons, 2009). While consumers choose to purchase a given product, they are said to have very little, if any power to negotiate. The collective demand of the consumer and thus collective power is used by retailers by proxy. In New Zealand, the duopoly of grocery retailers is Woolworths NZ and Food Stuffs. These highly consolidated retailers typically serve as the price makers in their supply chains, leveraging their power to increase turnover and profit margins.

A variety of roles have been explored in the case of how significant and relevant supply chain power is, including, category management, procurement, inventory and supply management, transport and marketing channels (Brown et al., 1983, 1995; Dapiran & Scott, 2003; Goodman & Dion, 2001; Cox, 2001; Benton & Maloni, 2005; Zhao, Huo, Flynn, & Yeung, 2007). Maloni & Benton (1999), suggest that through management roles, supply chain power influences relationships of inter-firm connections, resulting in a congruent effort towards integration throughout the supply chain that also impacts on its performance. Maloni & Benton (1999) conclude that if the

performance or accomplishments are contingent and reliant upon inter-firm connections or relationships, the importance and value of supply chain power and the awareness of it is significantly increased.

Cox, Sanderson, & Watson (2000) present four basic types of power structures: supplier dominance, buyer dominance, buyer-supplier interdependence (high mutual dependence), and buyer-supplier independence (low mutual dependence) (see Figure below). In the case of an independence relationship, the buyer and supplier are independent due to high market competition and they are not required to be loyal to one another. In the interdependence relationship state, a buyer and supplier share the risks and rewards and have the opportunity to collaborate in a 'win-win' situation. The stability and longevity of the cooperative relationship between two parties are closely related to the degree of interdependence, furthermore, mutual trust and commitment would be the characteristics of these relationships (Geyskens, Steenkamp, Scheer & Kumar, 1996).



Power and Dependency Structure (adapted from Cox, Sanderson, & Watson, 2000)

French & Raven (1959) identified five major types of power, these are; expert, reward, coercive, legitimate and referent power. Customers possess both coercive and reward power that prominently influences the operations of firms whereas, firms use expert, referent and legitimate power to influence other firms in order to attain their objectives. There is a sixth power which is termed 'information power', which is whoever holds all the information, even though this is rarely visible it is very powerful.

While power can be found within individuals and their relationships, power can also involve

the context, situation or environment in which negotiations take place, this importantly includes alternatives to even having the negotiation (Saunders et al., 2016). Adler and Silverstein (2000) propose a number of actions that can increase power, such as building momentum through multiple deals in sequence, using competition to leverage power, constraining oneself, finding good information, asking lots of questions and doing whatever one can to control the process (Saunders et al., 2016).

Whether it is a supplier dominance or buyer dominance relationship, power implies that one party can easily make a profit at the expense of the other party. The asymmetric and unequal relationship will bring drawbacks for the weaker side, forming a 'win-lose' situation. The balance of power and dependency plays an important role in a healthy business relationship.

According to He et al. (2016) power and trust unavoidably co-exist throughout supply chain members and the way in which these factors are managed can have an impact on the entire supply chain performance. He et al. (2016) identified two primary indicators of power between members in a supply chain: availability of alternatives and restraint in the use of power. Availability of alternatives describes the dependency of a supply chain member on others: for example, if a blueberry grower has many options of retailers to supply to, the grower has more bargaining power. Restraint in the use of power relates to dependency for not being exploited by a supply chain member; for example, a retailer may consider the significance of a long-term partnership with a grower as more important than exploiting bargaining power.

In almost all supply chain relationships, power may be used to claim a higher share of value that is available when exchanges between two or more firms take place in order to gain maximum benefit (Crook & Combs, 2007). While many supply chain management papers have highlighted benefits resulting from collaboration between parties who created joint values within the supply chain, the question remains on how the value is distributed. The balance of power between the parties involved in the business, directly or indirectly, has a large influence on value distribution (Chicksand, 2015; Crook & Combs, 2007).

Negotiation within the Supply Chain

Even though negotiations play a fundamental role in managing supply chains, less research have been published on this topic. The published literature is limited and fragmented and focuses on different technical aspects. As an example, Schoenherr and Marbert (2007) investigate the interrelation among bundle structures and bidding stipulations, while Kaufmann and Carter (2004) examine the practicality of reverse negotiations. The findings of the research conducted by Zachariassen (2008) provide a comprehensive outlook on negotiation strategies applied within supply chains.

A primary role of managing supply chains is to communicate and negotiate effectively with supply chain members. It is an absolute necessity that communication is effective to be competitive and without this communication, negotiation in the supply chain would cease. Negotiation is one of the most demanding and sophisticated activities carried out by all purchasing functions in the management of competitive and cooperative buyer-supplier relationships alike. It is an essential element in the generation of all forms of sustainable competitive advantage (Ramsay, 2007).

Carnevale & Isen (1996) define the act of negotiating as "*a process by which two or more people make a joint decision with regard to an*

issue about which there are initial differences in preference."

Negotiation is also defined as a series of interactions and activities between two or more individuals, agents or organisations, in which buyers and sellers engage in an array of back and forth offers and counter offers, as presented by contractual states. It is assumed that integrity and honesty are displayed by agents who bargain and trade, as to not retract or go back on presented offers (Carnevale, & Isen, 1986, p.1; Bravo et al., 2005; Tamma, Phelps, Dickinson, & Wooldridge, 2005; Besnard, Doutre, & Hunter, 2008, pp. 140–143; Dong, Hussain, & Chang, 2008). To negotiate progressively and continuously, the result of a selected negotiation style will be used to govern and guide the behaviour and nature of successive negotiations. Through negotiating sequentially, a system called "*FuzzyMan*" was incorporated to manage and support multilateral negotiations (Kurbel et al., 2004; Kurbel & Loutchko, 2005; Wong & Fang, 2008).

Negotiation Strategy

According to Zachariassen (2008, p. 770), "*a negotiation situation arises when a dispute, disagreement or conflict arises between two groups, in this case between firms in a supply chain.*" Negotiators generally meet in person to resolve any disagreements or issues and at this point negotiation research differentiates between two strategies that supply chain actors can employ when initiating negotiation; a distributive negotiation strategy and an integrative negotiation strategy. Zachariassen suggests that it is effective to know in advance what style of negotiation is best suited to an exact situation in order to gain advantage.

The distributive negotiation strategy is employed by parties who assume they hold contrasting interests to the other party. Distributive bargaining "*Is when conflict is approached as a distribution of a fixed amount of positive outcomes or resources, where one side will end up winning and the other losing*" (Musonza, 2013). Essentially, it can be deemed that there will be a winner and loser and thus, the strategy is to negotiate as assertively and hard as they can in hopes of persuading the other party to agree to their terms. A power imbalance is often displayed when a distributive bargaining approach is followed. According to the literature, when negotiating strategic partnerships, most negotiators opt for a distributive approach, even though it is considered inappropriate to do so given the benefits of the integrative approach instead.

On the other hand, the integrative negotiation strategy focuses on resolving both parties' interests and develop a mutually beneficial agreement where both are winners. Integrative bargaining can be defined as "*Making trades and working on problems for mutual benefit or benefit of one party at no cost to the other party*" (Tracy & Peterson, 1977). This form of negotiation is typically more effective in creating long-term relationships and requires trust, shared understanding and honesty (Zachariassen, 2008). Stelzer (2017) agrees with this and states that there is an outcome of negotiations where achieving equal economic benefits for all parties involved is certainly possible, however in most negotiations, there is usually a winner and a loser.

In a study conducted by Thomas, Thomas, Manrodt and Rutner (2013), it was discovered that these types of negotiation strategies influence intended information exchange, communication and operational knowledge transfer. Win-lose situations reduce values, though notably this was only the case when there is a level of interdependence. Thomas, Eastman, Shepherd and Denton (2018) find that negotiators should use a win-win strategy if they want to be in a more cooperative relationship with their negotiation partner and

want to continue to invest in the relationship in the future.

In a well-integrated supply chain, negotiations continue to reduce costs, but the firms can also bargain for some extra services or benefits in a deal. This can improve the efficiency of the entire chain (Rosemary, 2014). Effective communication is crucial factor in negotiations. Other important factors in the process of negotiation are, trust between parties, personalities, influential strength, application of partnership philosophies and using the terms of contract (Zachariassen & Kovacs, 2008).

Atkin and Rinehart (2006) posit that in recent times, there is a general movement away from conventional arm's length relationships, traditionally seen between retailers and small farmers, towards more cooperative inter-organisational relationships, as seen in the blueberry cooperatives. These different relationships come with different strategies in negotiation, due to the vast differences in the balance in power. However, in 1999 Calhoun & Smith still argued strongly that most supply chain companies treat negotiation as an independent event rather than part of the long-term performance of the supply chain. Therefore, even if the win-lose strategy may threaten and harm the cooperative relationship between the negotiating parties, in order to pursue a high proportion of benefits, the enterprise will still force the other party to accept the terms at any cost.

Building on the first step of having shared values and treating supply chain partners as members of a community, supply chain partners need to engage in negotiation to workout appropriate levels of risk and reward. Supply chain management is particularly concerned with improving performance and sustainability in the long-term, not only the performance of individual companies, but the whole supply chain. This can be achieved through systematic and strategic coordination of essential business functions within, as well as, across the supply chain (Mentzer, DeWitt & Keebler, 2001).

Negotiating teams are becoming more common. Supply chains are becoming more complex, often with multiple owners within one supply network and therefore when negotiating, both internally and externally, a team of negotiators, rather than a single negotiator, is often more appropriate. It should be noted that a negotiating team does not necessarily comprise of individuals from the same firm, but rather, must join together through mutual interests and objectives related to the negotiation (Brodt & Thompson, 2001; Zachariassen, 2008).

Negotiators will want to use power in negotiations to help them achieve their goals. This is to create an imbalance, giving the negotiator the advantage by either increasing their own power or diminishing the other's power and hence pave the way to dominate a relationship, create a competing strategy and a favourable distributive agreement. The other way is to create a power equalisation, removing either sides' ability to dominate the discussion and perhaps leading to a more integrative agreement. In general, negotiators who are less concerned about their power or who have matched power with the other party find that the negotiation proceeds more easily and simply whilst producing a mutually beneficial outcome (Saunders, Lewicki, & Barry, 2016).

Yang and Shang (2015) analysed negotiating power, stating "*In a two-stage supply chain with one risk-averse and one risk-neutral member, the risk-neutral member captures all the extra profit but needs to pay a compensation fee to the risk-averse member. However, when the risk-averse member tries their best to strengthen its negotiating power, the extra profit is likely to be transferred*

gradually away from the risk-neutral member. This is similar to the negotiation between two risk-averse members: if one member's relative negotiating power is strong enough, it can capture all the extra profit." To summarise this it is suggested that if the level of risk between the two parties differ enough, the member taking the least risk will often financially come out on top and can potentially take the entirety of the excess profits from the agreement, as they have significantly more power in the discussion.

Applying the Principles of Power and Negotiation to New Zealand's Blueberry Supply Chains

Negotiation is a skill that can be learned by all parties, buyers and growers. The effectiveness of these negotiations can have a major impact on performance and in the end how long the relationships will last. No one party has absolute power over anyone, and the power dynamic can be fluid.

Hingley (2005) finds that large-scale retailers have more power. O'Keeffe & Fearne (2002) also state that the vertical coordination process is driven backward by the retailer, not forward by the grower. Poole (2008) investigated Spanish citrus producers and found that more than 80% of producers had no power to negotiate. The retailers, especially big supermarkets (such as Foodstuffs and Woolworth) appear to have more power in negotiations in New Zealand's blueberry market. However, Bain (2010) found in the Chilean fresh fruit industry that large-scale fruit producers and exporters are becoming more powerful in negotiation and leadership.

Sweden's blueberry industry has shown momentous changes and shifts of power for its seasonal workers, from its traditional businesses, corporations, government and

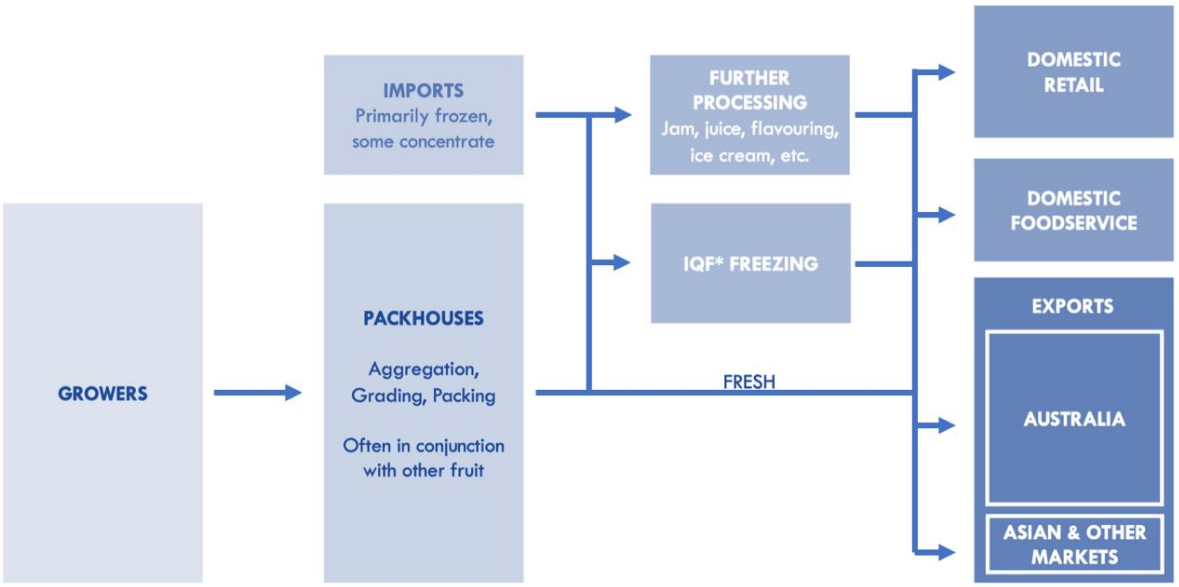
unions of trade to a new equilibrium of power among upstream firms in the supply chain (Cook et al., 2006; Tsing, 2016; Wilson & Jackson, 2016; Eriksson, Tollefsen, & Lundgren, 2019). The Swedish model for its labour market is based and acted upon formal, stiff and strict negotiations between agents, parties and individuals in their respective trades in the industry. The terms of the negotiation for migrant workers caused a protest which exposed weaknesses in the Swedish labour unions and institutions. Hence, processes were designed to protect migrant pickers and workers. Unethical treatment of the migrant pickers through the abuse of power and leadership from middle management affected the reputation of the berry industry and consequently swayed the balance of power (Katz, 2004; Coe & Jordhus-Lier, 2010; Eriksson, Tollefsen, & Lundgren, 2019).

Strudler (1995) warns against the ethics of deception in negotiation and how deception can (1) cripple, hurt and undercut trust, (2) harm business relations and (3) treat individuals or groups as a means to an end. Deception in negotiations is harmful to the buyer and will impact the culture of the seller if brought to light, as deception comes in many shades (Gaspar, Methasani, & Schweitzer, 2019).

Prior to 2014, Coles and Woolworths appear to have acted with the assumption that they are the holders of power regarding their stakeholder relationships in Australia. In this sense, the suppliers do indeed become "diminished" and do not appear to exercise any degree of influence in the relationship (Grimmer, 2017). The major Australian supermarket dominance was due to the superior buying power and the information flow and the control that they possessed. Prices and performance can often lead to trial and error partnerships. The market for blueberries as an export into Australia is dominated by major buyers, Driscols and Dole. With exporting to Australia being the more lucrative market, this partner holds the power in the negotiation. The exporters need these distribution networks all over Australia and with more buying power, the terms of the contract can be dictated. New Zealand blueberry companies are aware that any omissions in fulfilling their contractual obligations can lead to financial losses. Contracts with sustainability demands and consumer guidelines create a road map for growers to follow and to which they have knowingly and willingly entered. Pressure from these secondary stakeholders has made growers respond with better sustainability practices and ultimately a greater standing when facing contract negotiations.

Historically, primary producers in New Zealand have been unified through various statutory bodies or producer boards. These were established to protect producers' interests using a consolidated effort to significantly influence market forces in their respective supply chains (Parsons, 2009). The monopolistic control of supply afforded the statutory bodies the most power in their supply chains, and the ability to set prices. Interestingly, while most boards were deregulated in the 1980s, there is still a single-desk monopoly on the export of kiwifruit in New Zealand, Zespri (formally the New Zealand Kiwifruit Board) has own these rights since the 1990s. The single desk approach aggregates the output of all New Zealand kiwifruit growers and averages the growers return price. This highly integrated approach offers greater transparency across the whole kiwifruit supply chain, resulting in reduced price uncertainty, but also fosters collaboration between growers. Hanfield and Nicols (1999) point out in today's business world, power within the supply chain relies heavily on information and the sharing of such. The structure that allows for extensive sharing of information within the

kiwifruit supply chain affords the Zespri model good value returns for each link in the supply chain. Due to this, Zespri is viewed as the gold standard. The use of a single desk approach for the export of New Zealand blueberries could help to further distinguish New Zealand blueberries from other countries in the global market, ensuring that uniform high quality becomes synonymous with the Product of New Zealand brand. In the diagram below, arrows indicate the flows of the supply chain. In any location where material or indeed information flows, negotiations most probably need to take place and power could potentially be asserted in any of these points.



A representation of New Zealand blueberry supply chain (adapted from Coriolis, 2020)

More recently there has been a push for scales of economy and cost reduction to remain relevant in global export markets, driven by competing countries with the ability to export more volumes of cheaper fruit. This has seen grower numbers in New Zealand appear to decline, however, the truth is that growers are consolidating, either into larger growers or cooperatives of small to medium-sized businesses (Coriolis, 2020). These cooperatives give more power to their members. By outsourcing their marketing and negotiation function to get their blueberries to market, growers can focus on their core competency – growing.

In New Zealand many growers cultivate the Eureka berry variety due to its high demand. This variety is owned solely by the Mountain Blue company based in Australia. Hence, the selling and growing of Eureka berries can only take place through means of an agreement with Mountain Blue. As Mountain Blue possesses exclusive authority over a crucial resource, it exerts immense power over other members of the supply chain. But if the business fails to maintain its standards of supply, the market may decide to switch to a different variety. Hence, it can be established that while variety producers such as Mountain Blue have significant power, they must actively function in a way that both growers and the market are satisfied.

The government also facilitates negotiations and play a key role in the blueberry industry. Free trade agreements are a key driver in New Zealand fruit exports. Exports are a strategic growth point for the New Zealand blueberry industry. Exports are currently predominately directed to the Australian market; in 2019 Australia imported 89% of total blueberries

exported from New Zealand (Statistics New Zealand, 2020). Markets that have been highlighted for growth are Thailand and Vietnam, both of whom imported over $1 million worth of fresh blueberries in 2019 (Statistics New Zealand, 2020). Both these countries form part of New Zealand's free trade agreement with the ASEAN countries. China is a potential market where favourable access would be highly beneficial. The Chinese consumer will happily pay a high premium for high-quality fruit, which New Zealand can produce in abundance. While exports of both fresh and frozen blueberries to China have been tariff-free since 2013, imports have been minimal - only 504 tonnes were imported in 2015 (Statistics New Zealand 2020). In order to gain attractive accesses to the Chinese market, further negotiations are required. These negotiations have been on the "priority list since 2017" (Coriolis, 2020). As an example of the cost of not being able to negotiate, the Australian blueberry industry estimates to lose $44 million of annual export revenue due to their lack of access to the Chinese market.

Supply Chain Collaboration and Leadership

Excellent supply chain performance requires balanced operating procedures and stable collaboration between enterprises. Leadership makes cross-industry and cross-sector collaboration possible (Andraski, 1998). It sets the tone and organizational culture of internal collaboration in the supply chain (Wong, 2001). Barratt (2004) suggests that the most important element of collaboration is a collaborative culture. A collaborative culture is built on a foundation of trust and commitment across all parties and is required for long and sustainable relationships. Barratt also argues that a collaborative culture is only achievable if it is supported by the leaders and senior management across the firms involved so that any issue that may arise can be overcome.

Andrasaki (1998) states that "*general resitance to change stands high as a SCM (Supply Chain Management) barrier. Resistance to change ranges from the production line supervisor to the senior leader of a business group because often they do not believe that supply chain management can stand up to its billing*." Fawcet, Magnan, and Ogden (2007) present similar findings, stating; "*Unfortunately, the findings of our focus study suggest that while managers spend more time today than ever evaluating SC-enabled business models, most have not learned how to work together as members of a cohesive team. This is not to suggest that managers are not talking about collaboration. They are! Collaboration has become a common word in the SCM lexicon. But few managers fully grasp the nature of collaboration and what it takes to achieve a true collaborative capability.*"

Supply Chain Collaboration

Supply chain collaboration is a process of making mutual decisions by supply chain partners in effort to save cost and improve efficiency. It requires taking ownership of decisions and sharing the responsibility of outcomes (Stank et al., 2001). Collaboration can be defined as "*an affective, volitional, mutual shared process where two or more departments work together, have mutual understanding, have a common vision, share resources, and achieve collective goals*" (Schrage, 1990). Daugherty, Richey, Genchev, & Chen (2005) state that failure of collaboration was usually due to insufficient attention paid to the selection of suitable partners, matching the needs and capabilities of the internal organization.

Supply chain collaboration is important today as most supply chains are decentralised and no single entity has full control of the supply chain. Without collaboration a supply chain will not work efficiently. Supply chain collaboration is achieved by supply chain integration and communication. This is done through vendor management, relationship management and information sharing through information systems. Anthony (2000) indicated that collaboration is an agreement between companies to exchange common plans, information, executive management and performance evaluation. Collaboration

promotes supply chain management and integration and reaches achievements that individual enterprises cannot obtain (Simatupang & Sridharan, 2002). Wilding & Humphries (2004) introduce the concepts of cooperation and coordination, these are needed before collaboration can be fully reached.

Based on information technologies and relationship factors, there are four levels of cooperation. A first form is collaboration focuses on transaction. Demand and distribution between supplier partners are the focus of this form of partnership. Low investments in information infrastructure and interactions between both the participants are involved. The second is collaboration focused on technology. This method of partnership focuses on data technologies and depends on information sharing between collaborators. The third is cooperation, focused on affinity that emphasizes partnership management. The basis of such a form of partnership is trust and interaction. The last form is collaboration focused. Following are the five key activities that significantly drive collaboration in a supply chain:

- Trust
- Commitment
- Decision synchronization
- Incentive adjustment
- Data sharing

Trust

Barrett (2004) identifies the basic elements of collaboration as the cultivation of a collaborative culture, internal and external trust, shared mutuality, unencumbered exchange of information, clear communication channels that foster understanding, and finally, adherence to core values of openness and honesty. To build a collaborative culture the first step is ensuring the value and ethical system is aligned, however, even with a universal value system, a large number of current corporate cultures are not set up to support collaboration, either externally or internally (Barrett, 2004). Developing internal and external trust requires "*a willingness to take risks and a willingness to rely on an exchange partner in whom one has confidence*" (Salam, 2015, p. 301). In the context of the supply chain, Salam (2015, p.301) argues that trust is dependent on "*the extent to which supply chain partners perceive each other as credible and benevolent. Trust exists when one party has confidence in an exchange partner's reliability and credibility.*" Trust contributes significantly to an organisation's long-term stability and provides a foundation for effective supply chain coordination (Barrett, 2004).

Trust is one's belief or expectation that another organization or person will be reliable and will do what both parties have agreed to in terms of the relationship (Dyer & Chu, 2000; Ireland & Webb, 2006; Cheng, Yeh, & Tu, 2008; Laureano Paiva, Teixeira, Marques Vieira, & Beheregaray Finger, 2014). Ghosh and Fedorowicz (2008) argue that trust is needed for supply chain governance and coordination. Trust is also important to create and develop long-term relationships (Cannon, Doney, Mullen, & Petersen, 2010) as well as having a positive relationship on supply chain integration (Vijayasarathy, 2010). Lindgreen (2003) argues that there are different kinds of trust, these being generalised trust, system trust, process-based trust and personality-based trust and that all the types of trust are important strategic aspects to consider. They continue to argue that when one form of trust is not available, it may be possible to use some of the other types. Han and Dong (2015) show through their modelling that numerous positive occurrences of trustfulness are required to gain trust, but only a few negative experiences will cause a loss of trust. This supports that, it can be hard to build trust, but

easy to lose it. Any firm that tries to build trust will need to think carefully and into the future about what they plan to do.

Vertical Collaboration

Vertical Collaboration refers to the alliance with suppliers and intermediaries in order to achieve mutually beneficial goals. In vertical collaboration, partners establish long-term relationships, which helps them concentrate on their core competencies and outsource the rest. The use of information technology facilitates data sharing, better forecasting and planning. Partners not only share information, but also have a common strategy to make the supply chain more responsive and agile to changing customer demands (Barratt, 2004; Martin, 2004). Downstream it is more about creating and enriching the relationships with more profitable customers, offering more customized services and cooperating to achieve common goals. The visibility from customers on actual sales figures and demand helps to reduce the bullwhip effect upstream (Martin, 2004). While collaboration can occur internally between departments, and externally in vertical and horizontal connections, it should be made clear that supply chain collaboration is not the same thing as vertical integration, in which there is common ownership of supply chain linkages (Kampstra et al., 2006). Kampstra et al. (2006) classify the members of a typical collaboration within a supply chain into three groups; the collaboration leader, the collaboration coordinator and, collaboration members.

CPFR

Collaborative planning, forecasting, and replenishment (CPFR) is a cooperative supply chain initiative or program designed to improve collaboration efforts. Danese (2007) defines it as "*a business practice that combines the intelligence of multiple SC partners and synchronizes them into joint forecasting and planning with the aim of improving demand visibility and SC efficiency.*" The aim of CPFR is to find ways to remove or minimise obstacles that negatively affect supply chains. These obstacles can result from a lack of visibility of customer demand, as well as inefficiencies created by inaccurate information (Barratt & Oliveira, 2001). Effective implementation of CPFR should potentially increase gross sales, (Voluntary Inter-industry Commerce Standards, 1998), inventory management, the cost of goods sold ratio (Hill, Zhang, & Miller, 2018), cost efficiency, customer relations, market performance, more effectively share forecasting data, improve supply chain performance and, importantly, supply chain innovation capability (Singhry & Abd Rahman, 2019) among other attributes. The model was created by the Voluntary Inter-industry Commerce Standards (VICS) who developed a 9-step process involving agreements, contracts, order and sales forecasting, resolutions and order generation (VICS, 1999). However, not all business types should aim for the same type of forecasting model as CPFR may be too complicated or simply not required for all industries. Småros (2003) and Danese (2007) offer some examples of alternative practical models of collaboration, forecasting and planning. Panaihfar, Heavey and Byrne (2015) offer selection criteria for how to select CPFR partners and offer insight on how to practically plan and implement CPFR. For more information on CPFR, refer to the following chapter.

Horizontal Collaboration

Aside from the well-known vertical integration often seen in modern supply chains, there is also horizontal integration. Horizontal integration occurs when two or more organisations at the same level of the supply chain actively collaborate to share resources and information and form a cooperative organisation. Currently, organisations operate in a complex and ever-changing environment where it has become a necessity to collaborate

with competitors to meet the changing demands of customers and improve overall performance across the supply chain. They produce the same or similar products and perform comparable logistics functions, they will collaborate and share resources such as warehousing and distribution or share information to create and develop new products together for the benefit of all parties involved (Chavarría-Barrientos,Espinosa, Batres, Ramírez-Cadena, & Molina, 2015; Simmer, Pfoser, Grabner, Schauer, & Putz, 2017). According to Soosay, Hyland, and Ferrer (2008), horizontal collaboration can result in greater purchasing power, lowering of fixed costs, reduced logistics expense and improved access to markets due to the continued supply of products. Rather than working in isolation and accepting the inefficiency that results from it, it is the practise of working together to improve efficiencies (Ferrell et al., 2019). However, Ferrell et al. (2019) imply that unlike vertical collaboration, there is actually limited examples of successful implementation of horizontal collaboration available and there is insufficient case-based research to confidently identify the benefits of horizontal integration. Horizontal collaboration can be two rival firms or firms who offer complimentary services in the channel (Martin, 2004; Sarka & Pavla, 2016). Collaborating with the rival firms is called "co-opetition", which means collaborate to compete. Competitors collaborate to increase the market demand and then compete for the share. Collaboration with competitors can also be for shared resources like transport, warehouse, distribution or technology. Horizontal collaboration could also include collaborating with organizations offering complementary services. This increases consumer appeal and adds greater value. For example, Coca Cola's partnership with McDonald's (Martin, 2004).

Sheffi et al. (2019) argue that the key governance mechanism to successful horizontal collaboration is based in joint value propositions. This means that, in order to have successful collaboration, firms need to ensure that the propositions benefit all parties involved. Three other governance mechanisms include informal, formal and information exchange. Informal governance depends on social settings and trust. Formal governance is based on contracts, and Information Exchange governance is based on strong communication methods. All these governance mechanisms are important to improve the chances of success.

Supply Chain Leadership

Supply chain leadership is the ability of an organisation within a supply chain to influence the operations and behaviour of other firms in order to improve their commitment towards achieving a common vision (Hu & Zaho, 2018; Mokhtar & Kumar et al., 2019). Supply chain collaboration can only be achieved through leadership who view the workings of all parts of the supply chain, not just their small component. They must see the benefits of sharing the supply chain risks and rewards, creating a win-win situation. A good leader will see that the benefits of a win-win goal and will focus on joint benefits, a strong long-term relationship and take into consideration their partners' goals (Thomas, 2018).

Under normal pretences, the firm that possesses the most power and resources functions as the leader of a supply chain. The supply chain leader plays a significant role in managing the supply chain as they govern how members of a supply chain operate and are a driving force behind major decisions that impact the supply chain at large (Sinha & Kohnke,2009). In recent times, the concept of supply chain leadership has caught the attention of many researchers and emphasis has been placed on the significance of leadership within a supply chain. Ou and Liu et al. (2010) state that leadership is a prominent

component and coordinates the supply chain as a whole to generate better performance. Similarly, Sharif and Irani (2010) argue that effective leadership is a crucial component in creating an efficient supply chain. Power in the supply chain should not be perceived however, as "*the sole source of supply chain leadership*" (Jia et al., 2019). Kampstra et al. (2006) warn that it would be naïve to believe that power does not play a role in supply chain collaboration, under the guise of leadership.

Typically, leaders within the supply chain model behaviour and visions that others aspire to, they also foster and maintain relationships built on transparency, trust and confidence. While several other elements can be identified as pertinent to leadership, research by Nanjundeswaraswamy and Swamy (2014) shows how leadership styles have direct effects on organizational commitment and profitability.

The supply chain leader is characterized as the organization who demonstrates higher levels of the four elements of leadership in relation to other member organizations, i.e. "*the organization capable of greater influence, readily identifiable by its behaviours, creator of the vision, and that establishes a relationship with other supply chain organizations*" (Jia et al., 2019).

Leadership Types

In James Burns' book '*Leadership*' originally published in 1978, but re-published in 2012, two distinct types of leadership are explored; transactional leadership and transformative leadership. These two types of leadership can be mirrored in the types of relationships with supply chains.

Schuster (1994) theorises that power brokering devices are utilised in a transactional leadership style. Those are devices such as the withholding favours or only doing something when something is offered in return. This is reflective of an arm's length relationship, and disproportionate power in the supply chain. Though not all relationships within a supply chain must be collaborative, some function better at a disconnect, due to this, it can be said that "*transactional leadership satisfies the immediate and separate purposes of both leaders and followers.*" (Banerji and Krishnan, 2000). Transactional leadership rewards firms who achieve set standards (Bass, 1990).

Transformative leadership, as Burns (2012) describes, is more complex than transactional leadership, but is more 'potent'. Through satisfying higher needs of followers, leaders who engage with the transformative leadership style, foster mutual benefit within the supply chain and aim to elevate followers into leaders themselves. A transformational leader in a supply chain is an individual or organisation who acts as an example to other members and motivate them to adopt best practices. This leadership style improves supply chain members' commitments towards common objectives and leads to innovative concepts that will benefit all members of the supply chain (Bass & Avolio, 1990). Transformational leadership inspires others to be more ingenious, inventive and thinking critically for problem solving.

There are different theories of leadership, the Situational Theory of Leadership comes from behaviour theory and claims that leadership should change according to different situations. Contingency Theory of Leadership assumes that leaders' styles are stable and whether their style is appropriate or successful will depend on the situation (Jia et al., 2019). The Leader-Member Exchange (LMX) Theory focuses on the relationship between a leader and their subordinates and how the relationships can differ between subordinates (Yukl, 1998) and the most popular is the Multi-Factor Leadership Theory, which involves shifting between transformational and

transactional leadership styles (Clifford Defee, Esper, & Mollenkopf, 2009). In their study Birasnav and Bienstock (2019) discover that the transactional and transformational leadership styles have different effects on supply chain integration. They argue that transactional leadership works well in internal integration efforts and that transformational leadership works better when attempting to integrate externally.

Applying the Principles of Supply Chain Collaboration and Leadership to New Zealand's Blueberry Supply Chains

New Zealand blueberry supply chain companies have achieved effective collaboration in four aspects and improved industry supply chain performance. This includes decision-making and investment support, sharing advantageous resources, formalizing agreements, and actively expanding collaboration relationships.

The blueberry industry in New Zealand should work on developing trust with its supply chain partners. Opara (2003) notes that in fresh food supply chains, like the blueberry industry, where operations are often having to move quickly due to the perishability of the fruit, trust and transparency are major issues for all parties who are involved. Fischer (2013) argues that in supply chains where speed is imperative, being able to trust business partners is essential. Complex negotiations or large swathes of paperwork with supply chain partners are more time-consuming and expensive options and since food quality can change quickly from delivery to delivery due to changing conditions, authors argue that the "*food business remains a trust business.*"

Improvements gained by implementing integration efforts and coordination are shown by many sources during this report, but how to implement them is still difficult. One way is by improving trust levels between firms. To obtain some of these advantages, the blueberry industry could ensure that they work together on supply chain planning. Laureano Paiva et al. (2014) argue that supply chain planning positively effects trust, by using both buyer and supplier information, and using this information to develop a cooperative supply chain plan, the business can increase trust among its supply chain partners. Planning shows all parties that a future commitment has been made between the buyer and supplier and this helps to improve trust. To build trust, the industry must *want to* believe in developing close continuous communication and commitments with the rest of the supply chain.

The blueberry industry in New Zealand can potentially benefit from CPFR adoption. From a customer demand perspective, the supply chain is a pull system, which means that demand forecasting is important. When excluding exceptional situations, like droughts and pests, production volumes can be predicted to a 90% accuracy. It is useful and efficient to know exactly what is happening with customer demand in order to enable limited wastage and depreciation of the products in the supply chain. CPFR will help with this, and whilst demand forecasting is already being practised, it can always be improved, be more efficient and more profitable. CPFR adoption will be slightly different in the agricultural industry since the product is time sensitive and will depreciate quickly, as well as being a seasonal product. To help with this issue, Fang Du, Leung, Long Zhang and Lai (2009) developed a model to help implement CPFR in an agricultural environment and Shen, Lai, Leung and Liang (2011) build on this from a food retailer's point of view to ensure efficiency and a reduction in wastage.

Vertical integration is about the cooperation between institutions placed at different levels of the channel (Caputo & Mininno, 1996). This can enhance the supply chain coordination. Control over the inputs can also offer a point of difference and the profit margins of upstream and downstream vertical integration can be captured. Strong Relationships increase the likelihood that information will be exchanged and that firms are willing to work together to coordinate the entire supply chain for the benefit of all firms in the channel (Moberg et al. 2002). Building trust amongst partners can be considered a foundation of a successful partnership. The New Zealand blueberry industry relies on Australian partners, these relationships should not be entered into lightly. Both partners should share similar visions and outcomes.

Another area that holds potential for collaboration is between existing supply chains and manufacturers of value-added products. Wilkinson & Morris (2020) report that future growth in the sector could be achieved by better leverage of value added products, such as nutraceuticals, natural health care products leveraging of the scientific benefits from blueberries, and select food and beverages such as liqueurs, liqueur-filled chocolates, powdered and freeze dried blueberries. If providing value added products is going to be a continued function, then growers and packhouses should identify strategic partners to form closer more collaborative relationships with so that greater efficiencies and better information flow can be achieved. For instance, a grower such as Mamaku Blue® could enter a collaborative relationship with Natural Health Products New Zealand®, one of New Zealand's leading nutraceutical companies. A collaborative relationship would be beneficial because any research on the

health benefits of blueberries conducted by either business will help the other sell product. Without sharing information, both companies might miss out on marketing opportunities. It would also be beneficial to Mamaku Blue® because currently they are only experienced in working within a fresh produce environment, whereas the nutraceutical market has different needs and the way the products are sold to end customers is a completely different model.

In 2016, Zespri and T&G Global (NZX-listed) reached a collaboration agreement on the marketing of apple and kiwifruit in southeast Asian countries (Cambodia, Myanmar, Laos, and Thailand), both parties are committed to jointly develop the Southeast Asian market and increasing export sales (Hutching, 2016). In addition, T&G Global has agreed to a joint venture with one of the world's largest berry growers, CarSol Fruit Export, enabling the year-round supply and sale of high-quality berries into the lucrative Asian market under the Orchard Rd brand in the future ("*Partnerships bring bigger, tastier berries*", 2020).

As the blueberry industry does not control all of the product that is exported, they need a premium brand that is marketed to the world. Access to this brand should only be to produce that meets the high standards though auditing and monitoring. This may be similar the kiwifruit industry and may require a fair degree of transactional leadership.

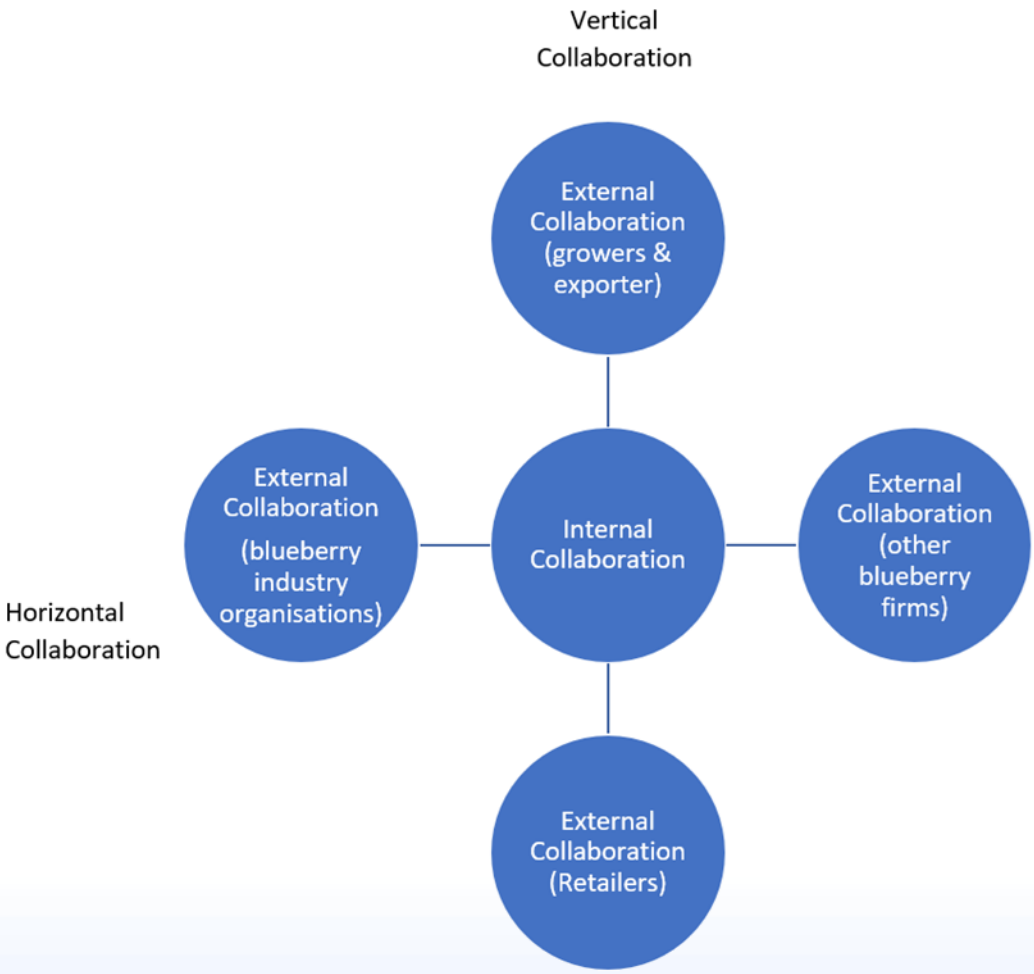
There are direct links between collaboration and innovation, collaborating as one big group and pooling resources will ensure they can make technological gains, such as robotics and automated picking systems. Horizontal collaboration is extremely beneficial if the growers want to pursue innovations and compete in the international market (Simmer, Pfoser, Grabner, Shauer, & Putz, 2017). Technological advances are not the only type of innovation that can be explored, knowledge sharing between firms to create new varieties of blueberries and better growing systems may also be explored. The result will be differentiating New Zealand blueberries in the export market, creating the blueberry version of Zespri Gold. The collaborative culture and willingness are already present in the blueberry industry, but there are many opportunities for continued collaboration in the industry to add value and generate greater returns for everyone when competing outside of the domestic market.

Blueberries are currently in a transition period from an individualised to a collaborative model. It is also becoming more export focussed, which is driving a more collaborative approach. New Zealand blueberry firms can collaborate with a broad range of organisations. According to a report of the New Zealand Ministry of Business, Innovation and Employment (MBIE), the most recognized organisations in New Zealand are Blueberries New Zealand, United Fresh, Horticulture New Zealand, and Plant & Food Research (see Table below) (CORIOLIS, 2020). The horizontal collaboration between scientific organisations and industry is the key to maintaining and developing a robust supply chain (Aitke, Kerr, Hewett, & Hale). The collaboration between organizations and the blueberry industry can include, amongst others, breeding, bio-protection, intelligent picking & packaging, resources (water, land, and fertilizer) management, sustainable production and preservation technology.

Four recognised horizontally collaborating organisations in the blueberry industry

Organisation	Focus
BLUEBERRIES · NEW ZEALAND ·	Blueberry Industry Direction & Advocacy
United Fresh New Zealand Incorporated	Industry Advocacy & Advisory
Horticulture™ New Zealand	Grower Support & Advocacy
Plant & Food™ Research Rangahau Ahumāra Kai	Industry Science & Research

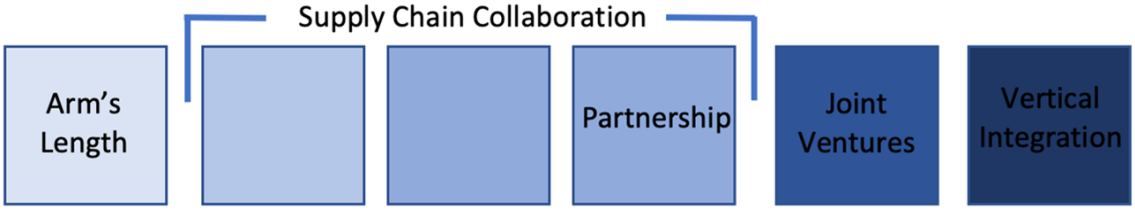
Blueberries New Zealand represents the New Zealand blueberry industry on a global scale. It is a collaborative venture that seeks to further the interests of the New Zealand blueberry industry. Blueberries New Zealand is also the entity who represents New Zealand within the International Blueberry Organisation (IBO). There are currently over 80 members, representing a mix of growers, exporters and other interested parties. Blueberries New Zealand executives are elected internally, they seek to promote blueberries on both a national and international scale, assist with export market access as well as importing new genetics or cultivars for their members use (International Blueberry Organization, 2012; Blueberries New Zealand, 2020). There is a current push from Blueberries New Zealand as the advocacy group for growers, to pool resources to further the industry.



Different forms of collaboration explored in the blueberry industry

The blueberry industry also needs to consider collaboration with competitors, via sharing some activities that can create value, for instance; design and distribution of products, as well as technology innovation (Ghosh & Morita, 2007). These are opportunities to create a unique product across businesses. The Peru blueberry industry has a highly consolidated industry made up of large operators at scale; Hortifruit and Camposol accounted for 64% of the Peruvian blueberry exports in 2018. Chile also has a relatively consolidated blueberry industry, Hortifruit accounted for 21% of Chilean blueberry exports in 2014 (CORIOLIS, 2020). In contrast, the New Zealand blueberry industry is relatively divided.

Berry Co is a joint venture between New Zealand based Southern Produce and Australian owned Valley Fresh. These two suppliers of fresh fruit and vegetables have been recognised as global industry leaders (International Blueberry Organization, 2020). It can be argued that joint ventures are not the same as supply chain collaboration as displayed in the figure below. The reasoning behind this argument is because for a joint venture there is typically shared ownership, which moves more to the realm of vertical integration. Simply, purchasing a part of the supply chain is not the same as collaborating with it. However, Berry Co also describe themselves as a "*partnership presenting significant varietal developments, which will ensure the creation of a vibrant and sustainable berry fruit industry in New Zealand unlike anything seen before*." (Berry Co, 2020). The partnerships that Berry Co establishes with growers and other collectives such as Miro, show how they engage supply chain collaboration in keeping with the framework offered by Simatupang and Sridharan (2005), following a "*collaborative performance system, information sharing, decision harmonization, incentive alignment, and integrated supply chain processes*."



Types of relationships with a supply chain. Adapted from Kampstra et al. (2006).

In the context of the blueberry industry, supply chain leadership plays a vital role in the success of the industry. Blueberry New Zealand functions as the main advocacy group and is the driving force within the industry. The industry seems to be functioning effectively in terms of leadership as other large growers and private groups have accepted and followed the strategy set by Blueberry New Zealand. While there are some contrasting views to Blueberry NZ in certain occasions, overall, the members of blueberry supply chains work well together in collaboration with each other according to the vision of Blueberry NZ. Another factor that supports the efficient leadership that exists in the blueberry industry is that the entire industry is moving in a similar direction and have focused on aspects, such as improving growing strategies, accessing new markets, and growing the industry in size and scale. Hence, it can be understood that the blueberry industry has a strong grasp on the concept of supply chain leadership.

The blueberry industry in New Zealand needs to have transformational leaders who push the industry further into the global marketplace. A

good place to start is with the study by Akhtar, Kaur and Punjaisri (2017), who investigated the effectiveness of different leadership styles in a New Zealand agri-food context. Although they specifically looked at the European connection, the results are relevant to a wider audience.

Supply Chain Planning and Coordination

Planning is "*the process for determining appropriate future action*" (Davidoff & Reiner, 2008, p.103). In other words, planning sets out the actions and steps required to achieve a sought-after future state. As soon as more than one entity is involved to achieve this end state, coordination is required to ensure that both parties are working towards the same thing. Malone and Crowston (1994, p.88) define coordination as "*a process of managing dependencies between activities*." Supply chain planning is treated like an exercise established by a business to advance and develop its capability, capacity and competence to specifically and accurately couple the supply and demand for its goods and services (Chopra and Meindl, 2007; Sodhi, 2003).

Morash and Clinton (1998) posit that collaborative 'closeness' allows supply chains to be agile in their response to changes in market demands. The result of integrated supply chain planning and coordination is the overall agility of the supply chain; *i.e.* the ability of all supply chain members to be responsive to changes in market conditions, rather than being reactive. Supply chain planning is defined as "*the process of gathering information from buyers and suppliers to help the company plan its future actions and satisfy the demand at minimum cost*." (Laureano Paiva et al., 2014). Supply chain coordination is defined as "*coordinating, combining and harmonising various cross-company activities in both vertical and horizontal links of the supply chain; all focused on a mutually beneficial goal while sharing risks and rewards in a fair manner*" (Yuen & Thai, 2016; Gruchmann et al., 2018).

According to Albrecht (2010), advanced supply chain planning is a key building block of supply chain management. Planning helps to determine how the supply chain will integrate as a whole, and as a business grows and collaborative efforts are successful, it is likely to change from regional interests to whole industry collaborative efforts. Planning and co-ordination are important and due to the complexity of this task and the multiple parties involved, real world organisations are looking to be supported by software to assist their planning and co-ordination tasks. They are also implementing systems, such as collaborative planning, forecasting, and replenishment (CPFR), which is an initiative between all partners to jointly manage the planning and information sharing process. Information technology is important in CPFR efforts and assists with managing demand uncertainty, replenishment plans, reduce inventory costs and improve forecasting accuracy (Seifert 2003; Hill, Zhang, & Miller, 2018).

Supply Chain Planning

Supply chain planning can be defined as the forward-looking process of coordinating assets to optimize the delivery of goods, services and information from supplier to customer, and also carrying out a production process optimally with the limited resources available while balancing the supply and demand (Anaplan, 2019). Planning for agriculture is a

vital factor since it highlights the importance of agriculture and food production to society. This helps to establish a public policy framework to support agricultural development and to protect and conserve farmland for current and future generations (Farmland Information Centre, 2020).

A reasonable supply chain plan (SCP) can maintain a balance between supply and demand for upstream and downstream enterprises in the supply chain. This is also the original motivation for supply chain integration. Rouse (n.d.) explains that a well-developed SCP is a series of forecasting processes, including output, transportation costs, sales and demand. Supply chain planning is across the whole supply chain and includes procurement, manufacturing and distribution. Planning will use information on input capacity constraints, material or product availability and demand forecast. The result of supply chain planning is an optimal supply chain with a supply that meets the demand in the best possible way.

There are three levels of supply chain planning (Bashiria, Badria, & Talebib, April 2012):

- Strategic planning – long-term planning focusing on 3-10 years ahead. Strategic planning will influence the future of a business and has long lasting effects and require large investments.
- Tactical planning – medium-term planning focusing on 6 months -1 year. Tactical planning will focus of maximising efficiency in the current operations.
- Operational planning – short-term planning, daily or weekly activities needed for the tactical goals.

Strategic planning is defined as "*the process of deciding on the objectives of the organization, on changes in these objectives, on the resources used to attain these objectives, and on the policies that are to govern the acquisition, use, and disposition of these resources*" (Anthony, 1965). This is the highest level of planning and is where the goals and directions of a supply chain are set out (Hauksdóttir & Nielsen, 2014). It sets out the steps to take in order to transition the activities in a supply chain from the current state to a future state so that strategic objectives will be met; usually these objectives are set for five to twenty years into the future (Hauksdóttir & Nielsen, 2014). Activities such as financial planning and supply chain network design fall under the umbrella of strategic planning (Soto-Silva, et al., 2016). The Strategic level of planning is conducted by the highest level in the organisation (Hauksdóttir & Nielsen, 2014).

Tactical planning involves "setting annual goals and objectives, which follow, of course, from what the strategic plan outlines" (McClamroch, Byrd & Sowell, 2001, p. 372). Tactical planning is the next level down from strategic planning, this is where the vision and broad plans at the strategic level are reformed into plans of action. These action plans are usually shorter in duration, focused on one to two years, but still enable the business to move towards the strategic goals (Staines, 2009). The tactical plans take the strategic intent and convert it into actions that need to be completed so that the supply chain is moving towards its strategic goals. Examples of tactical planning within the agri-supply chain sector are harvest planning, crop scheduling and selection and future labour requirements (Soto-Silva, et al., 2016).

Operational planning is defined as "*plans that specify details on how overall objectives are to be achieved and to implement tactical plans*" (Robbins and Coulter, 1996, p. 214). Operational planning could be referred to as the month by month, on the ground planning. This would typically be focused on the needs of the short-term and are the steps taken every

day to achieve the higher level of tactical planning (Hauksdóttir & Nielsen, 2014). Operational planning is from the shop floor and includes production scheduling, transportation and storage planning (Soto-Silva, et al., 2016).

Information and Communication

Information sharing, information availability and forward integration is essential in an integrated supply chain. It involves constant communication between all firms from suppliers to producers and manufactures through to the end customer. It is in this seamless ability to gather, store and share information in a timely fashion, that allows middle to top tier supply chain managers to react to changes and uncertainty with accuracy and clarity (Simatupang & Sridharan, 2005; Tsanos & Zografos, 2013; Prasad et al., 2017). Just as information is key to coordination so is communication, the speed and the efficiently of communications has a direct and positive effect on the information flow and in turn supply chain planning and coordination (Qi, Tang, & Zhang, April 2014). Businesses cultivate activities for the purpose of creating additional knowledge, to develop and gain more quality and to reduce time to market (Dyer and Nobeoka, 2000; Dyer and Chu, 2011).

Push / Pull Supply Chains

A pull supply chain can be described as a retailer driven supply chain which is based on customer demand where the retailer initiates supply chain operations (Yang & Cai et al., 2018; Fowler & Kim et al., 2019; Jiang & Wu et al., 2020). In such a supply chain, the retailer places orders during the selling season. In this context, suppliers are faced with managing the risks associated with inventory (Yang & Cai et al., 2018). Pull supply chains result in less wastage as production is carried out according to the customer's demand. But such a supply chain model also bears the risk of not being able to meet unforeseen increases in demand (Sharma, 2020).

Push supply chains function in contrast to pull supply chains. In this case the supplier initiates supply chain operations and plays the major role in coordinating the flow of products and information (Yang & Cai et al., 2018; Fowler & Kim et al., 2019; Jiang & Wu et al., 2020). In such a supply chain the supplier approaches the retailer with an offer of sale. In this context, the retailer faces the risk associated with managing inventory (Yang & Cai et al., 2018). The disadvantage of such a push system is that there is a possibility of excess production, which will result in the wastage of excess products (Zheng & Lu, 2009). In terms of research published in this space, Yan, Cai and Chen (2018) presented a comprehensive study that analyses the shift of risk between suppliers and retailers in both push and pull systems. Further, in recent years researchers such as Fowler, Kim and Shunk (2019) have acknowledged the formation of hybrid supply chains that operate and shift between push and pull models.

Supply Chain Coordination

Coordination in supply chain is defined as "*the meshing and balancing of all factors of production or service and of all the departments and business functions so that the company can meet its objectives*" (Martin, 2010). A lack of coordination is often recognised by the presence of delays, discrepancies, issues, mistakes and problems between supply chain members (Kaur, Kanda, & Deshmukh, 2006).

Supply chain coordination refers to the act of joining and harmonising related activities for the achievement of a single goal (Yuen & Thai, 2016). A supply chain without coordination means each member improves only its own objective, without considering the impact on

the whole supply chain. There are two main forms of coordination:

- Horizontal coordination refers to the coordination efforts of organisations in the same tier of the supply chain, and
- Vertical coordination refers to coordination between organisations at different tiers of the supply chain.

Wood (2010) suggests that vertical coordination in supply chains is more frequently researched; nevertheless, horizontal coordination can be a valuable way of developing competitive advantages for clusters. Essentially, supply chain coordination grows and improves connections or relationships between organisations with the purpose of enhancing total system performance. It seems that one of the major issues in attempting to achieve coordination relates to different stages of the supply chain having conflicting objectives (Chopra & Meindl, 2016). Aligning supply chain decisions of individual entities with individual objectives is a challenge (Vosooghidizaji, Taghipour, & Canel-Depitre, 2019). As a result, individual members might act myopically by focusing on maximising their own profits, disregarding the potential decline of total supply chain profits.

Supply chain coordination refers to the integration of all processes of a supply chain, such as sharing of information, relationship management, sharing and transferring of the technology and application of latest technologies to the field. To evaluate the effectiveness and the efficiency of coordination within the supply chain, product quality, innovation and satisfying customers are major factors (Signh, Kumar & Chand, 2019). By synchronizing supply chain coordination with a collaborative approach tend to increase visibility across the network, allowing them to minimize variability compared to those who do not.

Coordination involves finding and managing the interrelated interests and actions that are present in completely separate activities. Essentially it means finding similarities that enable entities to work together. A supply chain is composed of a collection of entities that need to work together to meet supply and demand (Mentzer et al., 2001). In relation to supply chains, coordinated planning constitutes "*an interactive process in which partners continuously collaborate and share demand information to jointly plan their activities*" (Andrés, Poler & Hernández, 2013, p. 49). For supply chain partners to successfully work together they need to coordinate their actions. Planning provides the means for them to achieve this in a way that ensures future goals are aligned and individual plans are not in conflict with the plans and actions of their supply chain partners.

Coordination of the supply chain between members is done to benefit from advantage-share, share of risks, gain more power and growth, and increase the aggregate distribution network in order to generate more value for consumers (Yang, 2011). Coordination with multiple partners who have independent business goals and interests becomes a challenge. Hence in order to achieve coordination in a supply chain the following actions must be achieved (Chopra & Meindl, 2013):

- Having a common goal across the supply chain – Each supply chain partner should think of overall benefit to the chain along with individual profits.
- Sharing the benefits across the chain – This encourages partners to consider overall supply chain cost and not focusing on costs of individual functions.
- Improving transparency and accuracy of data sharing – In order to eliminate the bullwhip effect, it is essential that

correct sales and demand data are transferred to partners.

- Integration of common technology – All partners in the system should be enabled with similar IT applications to make the information exchange simpler and smoother.
- Common strategies with partners – This strengthens the relationship between partners resulting into better cooperation, increased trust and visibility. Set contracts also saves transaction costs.

There are four different attributes on which a coordination mechanism could be based. These attributes are (1) the structure of resource sharing, (2) the style of decision making, (3) the control level and (4) the sharing of risk/rewards (Xu & Beamon, 2006). Handayati, Simatupang & Perdana (2015) point out four different types of coordination mechanisms, which are Supply Chain Contracts, Information Exchange, Joint Decision Making, and Collective Learning (Pasternack, 1985).

Among supply chain contracts, researchers suggest that contract farming can be viewed as the trendiest way to coordinate the agri-food supply chain (Zhou, Zhou, Qi, & Li, 2019, Prowse, 2012, Wang, Wang, & Delgado, 2014). Contract farming is defined as the agreement between the farm producer and buyer, it may specify the quantity, price, time, quality and incentive alignments. Contract farming consisting of producer (upstream) and retailers (downstream) becomes the supply chain mainstream, that would ease the opportunism in blueberry production to a certain extent (Miyata, Minot, & Hu 2009, Zhou, Zhou, Qi, & Li 2019, Pandit, Lal, & Rana 2014). Different supply chain coordination mechanisms exist, these are:

- Price coordination mechanisms (quantity discount pricing, buy-back and returns policy, two-part tariff),
- Non-price coordination mechanisms (quantity flexibility contracts, allocation rules, promotional allowances, cooperative advertising, and exclusive dealings), and
- Flow coordination mechanisms (VMI, Quick Response, CPFR, ECR and postponement) (Fugate, Sahin, & Mentzer, 2011, Albrecht, 2009).

When there are multiple owners within a supply chain with misaligned objectives, each member will try to maximise their own profits; often diminishing total supply chain profitability. Other obstacles to supply chain coordination include a lack of information sharing, inaccurate information sharing, delayed information sharing, operational inefficiencies resulting in large lead replenishment times and large lots, forward buying and a lack of trust which increases the difficulty of achieving supply chain coordination (Chopra & Meindl, 2013; Hill, Miller, & Zhang, 2018; Singhry & Abd Rahman, 2019).

The Application of Planning and Coordination within the Blueberry Industry

The Coriolis report identifies issues in the blueberry industry with obtaining labourers, software implementation and joint planning. Joint planning will create better visibility across all the areas and can determine the best places to have staff allocated, whether this be farms or packhouses to minimise wasted time and resources.

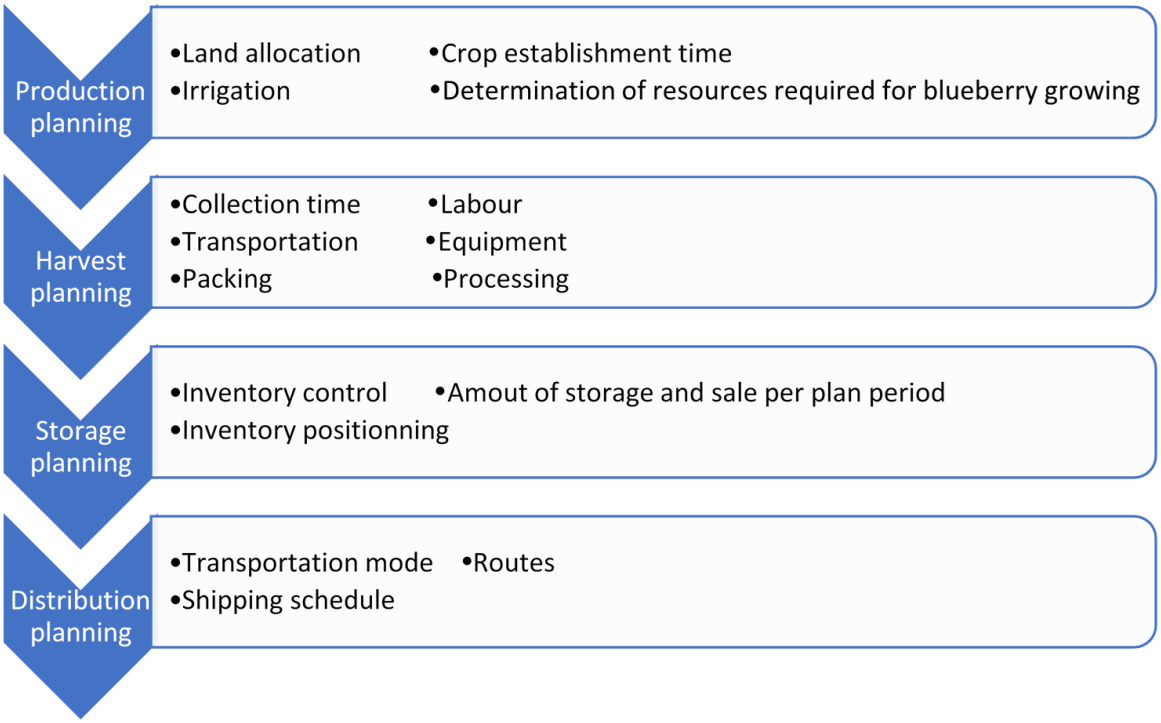
Noting the industry challenges around planning and coordination, there is regular communication concerning quality, volume and known or suspected issues between growers, marketing and supply chain partners, especially when leading up to and during the peak season. It has been suggested to firstly implement horizontal collaboration and industry wide collaboration before focusing on vertical integration. For horizontal relationships and integrating into larger farms throughout New Zealand, joint planning and information sharing is required. There is already advanced technology in the blueberry industry used by individual farmers, an example of this is Detaphyll, designed for the horticulture industry and targeted at improving efficiency and capturing data on each orchard. This is evidence that the industry is open to advancing in this space and using technology to assist in improving processes, this can be taken even further through implementation of CPFR systems, firstly across the collaboration groups within the regions and then eventually industry wide as horizontal collaboration becomes stronger. Although focusing on predominately horizontal in this report, there are opportunities for the blueberry industry to investigate CPFR with logistics providers and integrated systems to make the post-harvest phase more efficient.

As reported by Wilkinson & Morris (2020) there are opportunities to expand into some of the Southeast Asian blueberry markets with both fresh fruit and other berry products. Choosing which markets to expand into and setting out the timeframe for this expansion are strategic decisions that need to be planned. To achieve this, the CEO's and managing directors of the organisations who grow, pack, transport and distribute blueberries need to align their strategic objectives. Decisions around when to enter the new market, how the market will be tested, a universal quality management system and further strategic alliances will need to be made and a clear plan set out to meet these milestones. Looking at the strategic goal of entering more Asian markets, tactical planning for the blueberry industry needs to include; what crops to cultivate for this new market, the supply chain needs, and when and what types of spray and pesticides will be used. Every region of the world has different requirements concerning spraying and strict regulations of how closely to the time of consumption spraying can occur.

Blueberries New Zealand has a detailed planning system for irrigation, plant spacing, weed control and production (Blueberries New Zealand, n.d.). The blueberry supply chain in New Zealand efficiently manages the planning aspect efficiently by utilizing the limited

resources to meet the increasing demands. As an example, Blueberries New Zealand have planned a strategic timetable which is forecasted for 5 years ahead; in the first year plants are ordered, by the second year adjustments are made to meet the soil requirements for growth, by the third year the plants are cultivated, in the fourth year fruit production is started and in the final year harvesting is well established (Blueberries New Zealand, n.d.).

In the context of the blueberry industry, supply chain planning includes four main functional processes: production planning, harvest planning, storage planning, and distribution planning (see figure below) (Ahumada & Villalobos, 2009).



Four functional process levels of supply chain planning for New Zealand blueberries

Most logistics tasks fall under the scope of operational planning, so operations managers and logistics managers across the supply chain need to plan how and when the berries are going to be moved. These plans need to include measures to keep cross contamination out of the supply chain, while also ensuring that the blueberries are not damaged in transit. At this level plans should also be put in place to have a shared database that allows operators to capture information on when a shipment has departed an orchard so that other chain members can prepare their facilities in accordance with the tactical plans.

It can be argued that the blueberry supply chains shift between a push and pull system according to the circumstances. Under normal conditions, the blueberry industry functions as a customer-driven pull supply chain. The growth of the New Zealand market is one that exists around opportunities and value creation. Growers identify a need or a vacuum in the market and start growing blueberries to facilitate the market requirement. The coordination within this model should be driven by retailers who communicate the market requirements to the growers. Accordingly, growers should plan their operations in such a way to efficiently cater to the requirements set by retailers.

The blueberry industry is more likely to suffer from 'bottlenecking', rather than the bullwhip effect. A bottleneck is a point of congestion in the supply chain, where the materials flow arriving is too much for the next supply chain process to handle. This occurs as the total capacity of supply chain partners is not uniform across the whole system. In the New Zealand blueberry industry, this could occur at packhouses, a distribution warehouse, or even at the retailer. To minimise the chances of bottlenecking occurring and fresh blueberries spoiling before reaching the market, collaborative supply chain planning and coordination is key. Supply chain coordination is reliant on each member of the supply chain sharing information, but also to be aware of how their actions can affect the supply chain as a whole (Chopra & Meindl, 2016).

In New Zealand, the blueberry season runs from November to April. Depending on the variety, blueberries can be kept in cool storage for up to 42 days (Concha-Meyer et al., 2015). Seasonality leads to a concentration of supply; while the ability to store blueberries for a month allows for some drip-feeding to reduce flooding of markets and protect farm gate prices. This length of time is minimal when compared to apples or kiwifruit, which under optimal conditions can be held for up to a year. Due to the seasonality of fresh blueberries, there is heightened demand for fresh blueberries in the beginning of the season, where customer demand effectively generates a 'pull' system within the blueberry supply chain. When the market becomes saturated at the height of the season, prices drop, and the blueberries are 'pushed' through the supply chain to market. Demand rises slightly again towards the tail end of the season, as the supply of fresh blueberries diminishes.

There are advantages and disadvantages to push and pull supply chain approaches. In the push supply chain, production and sales forecasts are determined based on long-term historical data. Demand information changes significantly and more frequently. Manufacturers will bear the cost of wasted resources and idleness when the forecasted output exceeds the demand. On the contrary, when the demand is greater than the forecast, the supplier needs to increase the production cost to meet the market demand. Downstream companies in the supply chain are facing the same dilemma. As inventory levels increase, transporters will be forced to increase transportation costs. Especially during peak demand periods, the bullwhip effect will lead to lower product delivery efficiency and lower customer satisfaction rates. When product demand drops, inventory costs will increase, and products will become obsolete or deteriorate, especially products with short life cycles, such as blueberries. Pull supply chains are the opposite. A demand-driven supply chain can balance market demand and production plans and is also conducive to coordinating supply chain activities (Jonathan, n.d.). As the demand information changes, the utilization rate of production resources will increase. Suppliers can more effectively control output and reduce inventory costs. However, the pull supply chain also has disadvantages. It is difficult to produce large-scale supply chain advantages to plan production based solely on demand. Moreover, the pull supply chain requires parties to establish a fast and accurate information transmission mechanism. Therefore, the principle of choosing a supply chain plan should not only consider the production capacity and scale of the supplier, but also the actual market demand. The New Zealand blueberry industry can establish different supply chain plans according to different markets. The principle of the plan is that businesses use a pull supply chain when market demand is uncertain and use a push supply chain when demand is stable. Similarly, if market demand is unstable and the industry

does not form large-scale cooperation, the supply chain will not be able to reduce costs holistically.

In the domestic blueberry market, the New Zealand blueberry industry has used a mature push supply chain plan. This plan will be based entirely on the life cycle of blueberries. The replenishment volume during the peak demand season is controlled within a reasonable range. In addition, inventory will be balanced in each link of the supply chain to avoid shortages. On the other hand, in overseas markets, customer demand for New Zealand blueberry products is unstable, and the scale of cooperation within the industry can be improved. Many blueberry companies are operating independently in the international market. Therefore, the New Zealand blueberry industry can use comprehensive planning and coordination strategies in the international market, not just a pull supply chain strategy.

With the trend towards covered growing, the blueberry industry in New Zealand is starting to see an elongation in the practical growing season, a reduction to fruit damage, spoilage due to bird strikes and an overall increase in total fruit quality (Coriolis, 2020). These factors help with consistency in both crop yield and quality, which simplifies matters for the supply chain.

Supply Chain Risk Management

Jüttner (2005) observed that after the September 11th attacks in the United States, supply chain risk management suddenly became less important, quoting an interviewee claiming "*We got this continuity plan for the supply chain but, we basically ran around like headless chickens, chucked it out of the way and tried to do it off the cuff, just fire fight it.*" Later, managers were quoted saying "*It's no good looking at your own patch in isolation, it is a supply chain issue so it's important to flow that requirement down to all your suppliers and all your suppliers' suppliers*."

Supply Chain Risk Definitions

The definition of supply chain risk is not easily articulated, Ho et al. (2015) demonstrate that while definitions do exist, they vary more than overlap. Jüttner et al. (2003) also note that in historical literature the term risk is not simply a 2D concept. It can be used in reference to a source of risk within a supply chain, for example, political risks or market risks. These risks negatively affect the ability to predict outcomes of a supply chain due to uncertainty. Risk can also be used to refer to the consequences of threats, these may include operational risks, or risks such as that to customer service levels (Jüttner et al., 2003).

Supply chain risk is an interruption problem that may affect the normal operation of the supply chain (Klimov & Merkuryev, 2006). Fan & Stevenson (2018) define supply chain risk management as the identification, evaluation, processing, and monitoring of supply chain risks, in support of internally implemented tools, technologies and strategies, as well as external collaboration and coordination with supply chain partners. Supply chain risk management aims to decrease vulnerability and ensure continuous profitability to improve competitive edge. Based on this, supply chain risk management can be classified into three parts: risk identification, risk assessment, and risk mitigation. With the implementation of lean manufacturing, increased outsourcing, and other modern supply chain efficiency strategies, supply chains are more fragile to disruptions. Supply chain disruptions can impact supply chains and firms considerably.

To identify and mitigate the harmful and disruptive effects caused by risks, organisations need to implement some form of supply chain risk management (SCRM). It is becoming more important to recognise and appreciate the risks and their effects on the agri-value chain and to form strategies to deal with them.

Ho et al. (2015, p. 5035) define supply chain risk as "the likelihood and impact of unexpected macro and/or micro level events or conditions that adversely influence any part of a supply chain leading to operational, tactical, or strategic level failures or irregularities". These threats, or risks, could stem from a wide variety of sources, including financial uncertainty, legal liabilities, strategic management errors, accidents and natural disasters (Rouse, 2020). A disaster could be any

number of different events: natural, technological; sudden, slow creep; cascading; simple or complex. Disaster risk management is the application of disaster risk reduction policies and implementing strategies in-order to prevent new disasters, and reducing existing disaster risk while managing residual risk, contributing to the strengthening of resilience and reduction of disaster losses (Smith, Brown & Saunders, 2016). The way in which the types of risks are classified differs between researchers; for example, internal and external risks or macro- and micro-risks (Ho, Zheng, Yildiz, & Talluri, 2015). The process of supply chain risk management typically consists of identification, assessment, mitigation and control of risks as a way of counteracting the potential adverse impacts (Tarei, Thakkar, & Nag, 2020).

Ennouri (2013, p. 291) formally defines supply chain risk management as "the process of risk mitigation achieved through collaboration, co-ordination and application of risk management tools among the partners, to ensure continuity coupled with long-term profitability of the supply chain."

Manning, Baines, & Chadd (2006) formulates risk as:

Risk = Probability × Consequence

The Role of Risk Managers

Supply chain managers have great influence over the success of supply chain risk management strategies. Following the establishment of risk measurement, they should seek to create better network understanding throughout the supply chain and the ripple effects that can be experienced throughout. Once understood, managers can better control and manage risk. (Barratt, 2004; Manning, Baines, & Chadd, 2006; Univeristy of Bath, 2013).

Risk assessment is comprised of understanding hazards, the likelihood of their occurrence and the consequences or impacts if they do occur. Following identification and assessment of risk, mitigation involves analysing alternatives and implementing appropriate controls relevant to the level of risk posed. To mitigate risk effectively, supply chain managers should be looking first to avoid the risk altogether. Is there scope to relocate high risk areas to low risk areas? For example, this could mean moving manufacturing plants from an earthquake prone geographical location to a less vulnerable location. If total avoidance is not attainable, supply chain managers should instead attempt to reduce the impact of the risk, this could be having alternative suppliers where required or making the supply chain more flexible with interchangeability of products, processes or plants. Risk management also involves the ongoing monitoring, both internal and external, of existing identified risks, new risks arising and effectively communicating risk strategy to supply chain partners. Ali and Shukran (2016) argue that developing long-term collaborative relationships, firms and, in particular agricultural firms in Australia were better able to deal with risk. Hale and Moberg (2005) designed a process to help decide on locations to set up the supply chain to increase resilience.

For risk assessment, Tuncel and Alpan (2010) designed a framework to assess the risk in a supply chain and show how risk management can reduce these risks. Fang and Marle (2012) developed a decision support system to model and assess risks in projects and Dong and Cooper (2016) propose a framework that includes multiple processes designed to sort risks by order of priority and size.

Risks can also be divided into the following forms (Schmitz, 2012):

- Financial Risk
- Reputational Risk
- Natural Disaster Risk
- Man-Made Risk
- Geopolitical Risk
- Cyber Risk

Known and Unknown Risk

Risks are either known and identifiable, or unknown and not possible to anticipate. Known risks are managed through risk mitigation plans and tasks. Unknown risks can only be managed by having a strong business with quick responsive processes to help becoming aware of the risk when it arises and react quickly. To mitigate known risks in the supply chain, Christopher and Lee (2004) suggest reducing supply chain risk by improving complete visibility through the supply chain. Vilko and Hallikas (2012) found that some members of the supply chain were only aware of their own functions in the supply chain and only had some idea how disruptions would affect it. They suggest that effective risk management requires a holistic understanding of the supply chain. According to Skipper and Hanna (2009), businesses can reduce their unknown risk exposure through flexibility, and several other studies claim that flexibility it key due to the unpredictable nature of supply chain disruptions. Flexibility is enhanced through key strategic planning within the organisation, and is the ability of the business to adapt when unexpected circumstances arise, being able to do this fast and resolve or exploit the unexpected emergency or opportunity (Stalk, 1988; Goold and Campbell).

Micro and Macro Risks

It is widely accepted that there are two overarching categories that supply chain risk falls into: operational risk and disruption risk (Kleindorfer & Saad, 2005; Knemeyer, Zinn, & Eroglu, 2009; Tang, 2006; Wakolbinger & Cruz, 2011). Operational risk, also called micro-risk, occurs when processes, people and systems originating from either the internal activities of an organisation and/or their relationships with other partners fail or are inadequate, resulting in a mismatch in supply-demand co-ordination (Chen, Sohal, & Prajogo, 2012; Ho, et al., 2015). The second overarching type of risk is disruption risk. Also known as macro-risk, disruption risk is caused by natural disasters like earthquakes and extreme weather as well as man-made events like terrorism, war or unstable political climates (Chen, et al., 2012: Ho, et al., 2015). Generally, disruption risks have a greater negative impact and are less controllable then operational risks (Byrne, 2007; Ho, et al., 2015). Unfortunately, agribusiness supply chains are often susceptible to both overarching categories of risk, and the New Zealand blueberry supply chain is no exception.

Macro risks are similar to external operational risks (Kumar, Tiwari, & Babiceanu, 2009), disruption risks (Tang, 2006) or value-at-risk (Ravindran, Ufuk Bilsel, Wadhwa, & Yang, 2009). Supply chain risk management methods can use either a reactive or a proactive strategy.

Micro risks can also be referred to as operational (Sodhi, Son, & Tang, 2011) or miss the target (Ravindran et al., 2010). Micro-risks are potentially recurring events (Ho, et al. 2013). Micro risks can be broken down into four types (Ho et al., 2013); demand risk, manufacturing risk, supply risk and infrastructural risk. Infrastructural risk breaks down into another three types; information technology, transport and financial systems.

To take care of internal risks two approaches are followed; either to be redundant (increase the safety measures in anticipation of occurrence of disruptions like increase in safety stock, diversified supplier base, more

suppliers for a single product), or to be flexible (make alternate process or a backup plan to respond to the disruptions which are unavoidable) (Joel, 2009; Christopher, 2011).

Demand, Supply and Operational Risk

Research carried out by Johnson (2001) states that there are two main types of risks associated with a supply chain, supply risk and demand risk. Diabal and Govinda et al. (2011) built on the findings of Johnson (2001) and identified three types of risks associated with supply chains; demand risks, operational risks and supply risks. Demand risk refers to the uncertainty associated with moving goods between the firm and its customers. Such risks include excess inventory and stockouts. Operational risks are based on a firm's ability to produce products that contribute to the profitability of the business. These include risks related to processing, technology and breakdowns. Supply risk focuses on the risks concerning the movement of material between suppliers and producers. While the research conducted by Diabal and Govinda et al. (2011) provide an extensive outlook on the risks associated with food supply chains, there have also been other key findings in the context of risk management, such as a study conducted by Juttner (2005), who categorises supply chain risk sources into external, internal and network-related risk categories.

The Application of Supply Chain Risk Management in the Blueberry Industry

Blueberries are a high value perishable good and are spatially and temporary concentrated during the harvest season. Because of this and the geographical separation of production and end users when exporting blueberries, there are significant risks in the cold chain. The cold chain concerns the transportation of temperature sensitive goods throughout a supply chain using refrigerated packaging methods and logistical planning to ensure the safety of the goods. Considering the current wholesale price of blueberries of NZ$110 per tray, the loss of one container could equate to NZ$422,000. The fact that this can happen just through the negligence of one person cements the importance of managing this risk continuously.

It is not uncommon for supply chain partners to attempt to shift risk in hopes of minimising their own exposure. Throughout the blueberry supply chain, from growers to the retailers, each segment has its own responsibilities to identify and mitigate risks. There is also a group responsibility regarding risk because each partner in the supply chain has some level of liability to the consumer.

A seasonal reduction in labour has resulted in an increase in the cost of blueberry products. Moreover, rising packaging costs and energy consumption have also increased the cost of air transportation.

As agricultural industries are difficult in their ability to be controlled or outcomes predicted, the flexibility of the supply chain as a whole, is a significant factor when mitigating supply chain risks. Flexibility in the supply chain does not mean focusing on trying to predict risks or events that cause disruptions but ensuring that the business can respond when an event occurs.

Growers are believed to ultimately hold most of the risk because they effectively create the final product that the other supply chain partners often merely handle. The way in which risk travels through the supply chain directly relates to possession of title or ownership of the fruit. It is not until the blueberries move from the packhouse to the marketer or exporter that the possession of title and the responsibility of the fruit moves on from the grower. The table below (adapted from Coriolis, 2020) provides a breakdown of some of the potential risks.

Upstream Supply Chain Risks	Downstream Supply Chain Risks	Market Risks
• Disease outbreaks (cf. PSA) • Prevention of introduction of new genetics and new rootstocks by New Zealand biosecurity • Foreign phyto-sanitary protocols of other countries limiting extent and speed to market Changing climatic conditions impacting production rates, quality (e.g. hail damage)		• Growing production of blueberries in Peru and Chile; • Chilean and Peruvian free trade agreements with Australia with blueberries identified as an opportunity • Re-labelling frozen imported fruit as "Made in New Zealand" in-market endangering NZ reputation • Other global centres of fruit development coming up with better products • Time frame for protocols to gain access to new markets

Risks and threats to the New Zealand blueberry industry (adapted from Coriolis 2020)

Production Risk

Weather has a significant effect on the yields in blueberry production, for instance; cold weather can drastically delay the fruit from ripening, rain around the time of fruit picking causes damage to the fruit, delays the picking process and causes packaging issues, which can affect storage life and product quality (Piddock, 2017). In an industry already exposed to small margins (Wang & Chen, 2017; Wilkinson & Morris, 2020), the effect of poor weather and reduced berry yields, imply that berry prices will increase in order to cover costs. Alternatively, too much sunshine causes the fruit to ripen quickly, flooding the market, driving prices down and decreasing the already tight margins. One method to dealing with

disruption risk is through the collaborative sharing of information (Kleindorfer & Saad, 2005). By sharing information, the visibility across the supply chain improves allowing each enterprise to identify vulnerabilities in the chain and to more accurately develop plans that will which reduce uncertainty and delays (Kleindorfer & Saad, 2005; Skipper & Hanna, 2009).

Food Safety

Jaffee, Siegel & Andrew (2010) summarize the main risks as irresistible risks (severe weather risk, natural disaster, pest risk, environmental risk, public policy risk) and risks throughout the entire agri-food supply chain (management risk, operational risk, logistic risk, infrastructure risk, market-related risk). Although natural disasters, cool-chain failure and product relabelling can be classified as high risks, the most serious risk tends to be food safety-related. In 2018, the strawberry needles crisis cost the industry in Queensland around $12 million. The estimated value declined by 8% and many farmers had to discard tonnes of fruit and install metal detectors (Withers, 2019).

The incident in 2002 when blueberries were linked to the spread of Hepatitis A can be cited as an example (McIntyre & Cressey et al., 2008). This incident led not only to the waste of a large amount of product, but also somewhat discouraged customers to make purchases of blueberry related products. Another such incident where food safety issues had created many disruptions in the blueberry supply chain was when a customer found a rusty thumbtack in a blueberry punnet sold at Papamoa Pak'n Save (Hunter, 2019). As a result, the batch of blueberries was pulled out of the store, which involved large costs, time, and effort in terms of reverse logistics and investigative operations.

From the grower's perspective, there are a wide range of biological and environmental risks; such as, pests and diseases or human contamination and illness (Louw & Jordaan, 2017). Contamination affecting food safety also falls under this category of risk and is certainly viewed as one of the primary concerns, particularly regarding chemical residue levels, unwanted contaminants, or pathogens on the fruit; such as E-coli, listeria or salmonella. Consumers expect high quality food standards and if a consumer were to open a pack of blueberries and finds one blueberry not up to their standard, there will likely be a level of tolerance by that consumer. However, when considering food safety, there is zero tolerance. A single food safety incident can destroy a brand. It is a risk that needs to be managed continuously and with a high level of diligence. A food safety related risk in the blueberry industry can be a chemical hazard, biological hazard or physical hazard (Soon & Baines, 2013). Three methods exist for risk identification: qualitative methods, semi-quantitative, and quantitative methods. The EMRISK model, Food Safety Objective (FSO), Quantitative Risk Assessment (QRA), and Quantitative Microbiological Risk Assessment are examples of some models for risk assessment. The use of Interpretative Structural Modelling (ISM), Life Cycle Analysis (LCA) and Normal Accident Theory (NAT) would assist in the mitigation of supply chain risk. Proactive measures to help mitigate this risk include ensuring that the best technology, training and techniques that the firms can afford are used and consistent quality management is employed. MacKenzie and Apte (2017) developed a qualitative model and method to find and deal with disruptions in a fresh produce supply chain due to contamination and other risk factors.

Market Risk

New Zealand cannot currently compete with other nations on volume due to the high costs

and lack of infrastructure, however, by focussing on high quality, New Zealand growers are making their mark in the international market (Wilkinson & Morris, 2020). If the quality received is not up to the market's expectation, then the New Zealand point of difference has disappeared and more importantly, reputation will be lost. Risk of brand damage, associated with poor quality, will not just affect one grower and their supply chain (Petersen & Lemke, 2015). Therefore, it is important that the whole industry collaborate to ensure an acceptable level of quality is maintained. Curently growers take most of the financial risk when it comes to quality as they only get payed when the product reaches the consumer.

Market-related risks also need to be monitored, such as changes in demand that might impact the prices of blueberries. The perishability of blueberries means that typical ways of mitigating some risks are simply not feasible; for example, on the subject of demand risk assessment, which concerns the impact of demand volatility, a blueberry organisation cannot hold safety stock. There are a range of post-harvest risks for blueberries that need to be considered; reduced access to markets, increased costs or lack of available transportation, competition and unavailability of packaging material (Louw & Jordaan, 2017).

Market restrictions create uncontrollable risks as demonstrated in a new regulation where Taiwan changed the residue standards for a specific chemical type from 5 days to 180 days in 2019. Most growers were two months away from harvesting and could not meet these new requirements.

A potential risk is for one of New Zealand's competitors to break through Australia's biosecurity risk wall. A large portion of exports from New Zealand enter Australia and currently New Zealand is the only country that complies to the stringent Australian standards. The blueberry industry needs to ensure that backup plans exist to export somewhere else, or act more aggressively in the Australian market, should and competitor gain access into this country.

The New Zealand blueberry industry did not do well in the Northern American market when cheaper South American blueberries started to penetrate, as illustrated by the lack of exports to Canada since 2011 and a gradual decline in exports to the United States, leading to zero tonnes of fresh blueberries exported in 2019 (Statistics New Zealand, 2020).

Growing blueberries overseas can expand the scope of cooperation to enhance the stability of the supply chain. The blueberry industry can engage countries who have signed a free trade agreement with New Zealand to cooperate and establish a stable blueberry growing organization, such as Australia and Taiwan. This can establish a common blueberry planting base. This not only stabilizes the blueberry market share, but also avoids costs caused by competition, especially logistics costs and labour costs.

Other Risk

Lobos et al. (2018) argue that while in a traditional sense, the main sources of risk in primary production have been due to variability in yields and prices, and, technological advances and governmental policies, more recently risks associated to loss of assets and even climate change are becoming more prevalent. Ranford (2020) argues that an increase of 2°C in temperatures could potentially destroy the blueberry industry of New Zealand.

Supply Chain Performance Measurement and Benchmarking

In order to make the supply chain efficient, logistics managers continually try to improve their operations. To know whether the operations and business is making progress, it is essential to know the current state of process. And hence, measuring performance is necessary (Donald, 2009). Measuring performance can establish whether the product is suitable for the market and whether the product adheres to the standards. Benchmarking helps to position the product by comparing it with competitors' products or by competing internally among groups inside the organization.

Supply Chain Performance Measurement

Neely, Gregory and Platts (1995, p.81) define performance measurement as "*the process of quantifying the effectiveness and efficiency of action.*" According to Shepherd and Gűnter (2006) *effectiveness* relates to delivering a product that meets the customer demands and *efficiency* is how economically a business can deliver that product. The first term looks outward to the customer to see if the companies' market offering is meeting the demand, while the second term, *efficiency*, is internally focused on assessing how the organisation is meeting that demand.

Supply chain performance is defined as "*the benefits derived from supply chain cooperation, including efficiency improvement, cost reduction, and enhancement in cycle time*" (Ryoo, & Kim, 2015, p.3031). But these benefits cannot be quantified if they are not measured. In their 1989 book, "*Planning and Measurement in your Organization of the Future*", Sink and Tuttle claim that what is not measured cannot be managed. This thought helps to define traditional performance measurement as "*the process of quantifying the effectiveness and efficiency of action*" (Neely et al., 1995). Chen (2003) further adds that in current business management systems, performance measurement goes "*well beyond merely quantification… [it] provides the necessary information for management feedback for decision-makers and process managers.*" Performance measurement provides a basic understanding of the overall health of a supply chain. Measurement systems provide feedback that allow for improvements or corrections.

Measuring the performance of a supply chain is an essential task to optimise and improve a business. It is also an important part in setting the business objectives, evaluating its performance and deciding the future directions (Gunasekaran, Patel, & McGaughey, 18 Feb 2004). Luzzini et al. (2017) ague that while it is important to measure the internal performance, it is also crucial to monitor the performance of external supply chain partners as well.

During recent years, supply chain performance has grabbed the attention of many practitioners and researchers due to its significance. The research carried out by Gunasekaran et al. (2004) provides a comprehensive framework for measuring

supply chain performance and provides a detailed analysis of measurements and metrics associated with supply chain performance. It is a complex and difficult task to decide what performance measurements must be used amongst all the available performance measures to best suit the objectives of the supply chain. In this regard, Beamon (1999) enunciates that while having an insufficient amount of performance measures provides an incomplete picture of an organisation's performance, having too many performance measures to analyse the operational efficiency of an organisation or supply chain also creates complexities. Hence, it is important to identify a set of Key Performance Indicators (KPIs) and use them for analysing an organisations performance. Due to the prevalence of many performance measures, studies such as that of Neely et al. (1995) categorised performance measures for the ease of analysing and studying these measures.

Moreover, both cost and non-cost should be regarded as metrics for evaluation. In addition, resources and benefits, coordination capabilities and trust are also important factors in supply chain operations. Five core links in the supply chain need to be evaluated, including suppliers, manufacturing processes, logistics, sales and customer service. These measures are both tangible- quantitative and intangible- qualitative. The intangible elements, such as customer satisfaction are measured by converting information to numerical values by considering factors like customer complaints received or customer reviews (Donald, 2009). The metrics that are used to measure supply chain performance are called performance measures (Neely et al., 1995). There are many different metrics other than cost used in performance measurement, for example, Ruamsook, Russell and Thomchick (2007) note six types of measures, these are product quality, process (IT and production capability), time (goods arriving on time, cycle time), quality (shipment accuracy, whether there was delivery damage), cost (price, transportation, inventory management) or Chan (2003) considers cost, quality, resource utilization, flexibility, visibility, trust and innovativeness.

Bowersox et al. (1999) suggest five categories of measurements; customer service, cost management, quality, productivity and, asset management. The Table below offers a range of metrics that can be used to measure performance within a supply chain. Performance metrics affect the efficiency of the supply chain, whereas outcome metrics affect the efficacy of the supply chain.

Typical Performance Metrics (Adapted from Bowersox et al., 1999)

Customer service	Cost management	Quality	Productivity	Asset management
Fill rate	Total cost	Damage frequency	Units shipped per employee	Inventory turns
Stockouts	Cost per unit	Order entry accuracy	Units per labour dollar	Inventory levels, number of days supply
Shipping errors	Cost as a percentage of sales	Picking /shipping accuracy	Orders per sales representative	Obsolete inventory
On time delivery	Inbound freight	Document/ invoicing accuracy	Comparison to historical standard	Return on net assets
Backorders	Outbound freight	Information availability	Goal programmes	Return on investment
Cycle time	Administrative	Information accuracy	Productivity index	Inventory classification (A,B,C)
Delivery consistency	Warehouse order processing	Number of credit claims	Equipment downtime	Economic value added (EVA)
Response time to inquiries	Direct labour	Number of return customers	Order entry productivity	
Response accuracy	Comparison of actual versus budget		Warehouse labour productivity	
Complete orders	Cost trend analysis		Transportation labour productivity	
Customer complaints	Direct product profitability			
Sales force complaints	Customer segment profitability			
Overall reliability	Inventory carrying			
Overall satisfaction	Cast of returned goods			
	Cost of damage			
	Cost of service failures			
	Cost of back order			

Quantifying the performance of the supply chain can effectively evaluate, improve and enhance the efficiency of the supply chain. Neely and Platts (1995) state that performance can be viewed as a quantitative process of supply chain activity effectiveness. The Supply Chain Operation Reference (SCOR) model is regarded as a standardized model for comprehensive evaluation of supply chain performance. It does not use single metrics to

measure performance, but comprehensively evaluates the performance of multiple key points in the supply chain. This includes the establishment of resource channels, procurement and product supply, product delivery, transportation processes, distribution and customer service, supply chain management standards and risk assessment. SCOR is a process model that includes business process engineering, benchmarking and best practise and incorporates this into a framework. White (2018) explained that SCOR uses five metrics to evaluate supply chain performance, namely cost, market responsiveness, flexibility, reliability and asset management capabilities. However, Shepherd and Günter (2010) argue that innovation can also be a metric of the performance evaluation system. Other performance measurement systems include the balanced score card approach (Brewer & Speh, 2000), Rafele (2004) introduces the SERVQUAL or service quality approach, the SMART model was introduced by Cross and Lynch, (1988) and Chelariu, Kwame Asare, and Brashear-Alejandro (2014) suggest the ROSE framework which incorporates the relationship, operational, strategic and efficiency dimensions.

It is argued that supply chain performance cannot truly be measured from an integrated approach and that most existing models measure intra-organisational supply chain performance rather than inter-organizational performance. Supply chain performance, particularly in the food industry, consists of three main categories; these being efficiency, flexibility & responsiveness and quality. When assessing performance in supply chain efficiency, the two key areas to be examined are transport efficiency and inventory efficiency. Flexibility and performance may be assessed by scrutinising customer response times, dependability, speed and specifications to customer demand. Quality features to be assessed consist of taste, sensory qualities, nutritional value, health risks, types of processing and toxins. Although supply chain performance has been argued as targeted more towards intra-organisational activities and performance rather than inter-organisational, if managers apply CPFR to their supply chain, it holds great promise for performance improvement, both financially and operationally — particularly with decreased forecasting errors (Shepherd & Gunter, 2006; Gold, Kunz, & Reiner, 2017; Hill, Miller, & Zhang, 2018).

Beamon (1999) and Shepherd & Günter (2010) disagree on the availability of proper tools to measure the effectiveness of a supply chain. Beamon, states that there are too many tools; "*A large number of different types of performance measures have been used to characterize systems, particularly production, distribution, and inventory systems. Such a large number of available performance measures makes performance measure selection difficult.*" While Shepherd and Günter (2010) state that "*despite considerable advances in the literature in recent years, a number of important problems have not yet received adequate attention, including: the factors influencing the successful implementation of performance measurement systems for supply chains; the forces shaping their evolution over time; and, the problem of their ongoing maintenance*."

Supply Chain Benchmarking

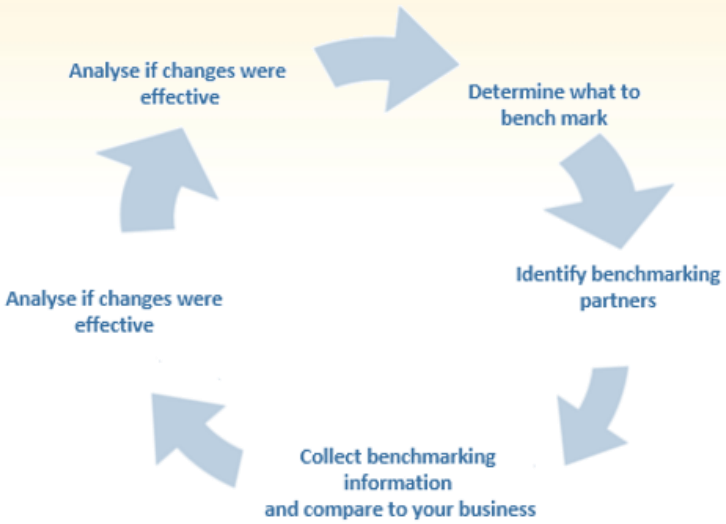
Benchmarking can be defined as "*a continuous, systematic process for evaluating the products, services and work processes of organizations that are recognized as representing best practices for the purpose of organizational continuous improvement*" (Wong & Wong, 2008, p. 27). Tutcher (1994) notes several benefits for benchmarking, these include; providing a framework for making not just small (as some business improvement methods do), but large jumps in improvement. It can help to set and achieve effective goals and objectives and it provides an opportunity to increase staff ability by improving their knowledge and offering them opportunities for wider experience.

Benchmarking is also defined as a systematic approach to comparing an organisations performance to the best practices of another organisation in order to create opportunities for continuous performance improvement and develop operational efficiencies (Elmuti & Kathawala, 1997; Marr, 2004; Burt & Styles, 2004).

Benchmarking is defined by Talluri & Sarkis (2001, p.211) as "*a continuous, systematic process for evaluating the products, services and work processes of organizations that are recognized as representing best practices for the purpose of organizational continuous improvement*."

Cross and Iqbal (1995) condense this further to "*the search for industry best practices that lead to superior performance." Best practices can be defined as "field-based or research-tested actions intended to affect a positive change*" (Spencer et al., 2013). It can be said then that benchmarking is not simply what we want to achieve, but also how it is achieved, through the processes that are used (Cross & Iqbal, 1995).

The concept of benchmarking was popularised by Xerox, which used the approach to compete and capture a significant market share (Wong & Wong, 2008). Studies conducted by researchers, such as Dattakumar and Jagadeesh (2003) and Garvin (1993) articulate that while benchmarking is commonly considered as a form of imitation, but in reality, it is a mechanism that drives innovation and allows companies to learn from other organisations and move ahead of its competition to achieve higher performance standards (see figure below). Further, Fong and Cheng et al. (1998) argue that the concept of benchmarking is based on the Deming cycle and follows four phases that include plan, do, check, and action stages to achieve continuous improvement. Although, it is argued that there is sometimes a negative perception around benchmarking and some people may see it as a concept of imitating or copying others, companies with this perception may be less willing to share information and become involved in benchmarking. It is just a way to learn quickly and create new performance standards (Wong & Wong, 2008).



The continuous benchmarking cycle (adapted from Wong & Wong, 2008)

Instead of investing a tremendous amount of time and effort to create a collaborative process from scratch, chain members can identify better ideas and practices through benchmarking other collaborative supply chains (Simatupang & Sridharan, 2004). To obtain the benefits from supply chain collaboration, all participating members are required to put in a reasonable amount of effort (Barratt & Oliveira, 2001; Corbett, Blackburn, & van Wassenhove, 1999). In this way benchmarking provides opportunities to make improvements based on the processes and performance standards of supply chains that are collaborating well (Simatupang & Sridharan, 2004).

Coronado (2015) states that benchmarking can be divided into two categories according to the purpose of evaluation — qualitative benchmarking and quantitative benchmarking. They are tools for identifying the best improvement plans and processes in the supply chain. On the one hand, qualitative benchmarking can analyse the gap between strategy and objective conditions and can also analyse the status of competitors to provide supply chain improvement solutions. On the other hand, quantitative benchmarking usually focuses on KPI to predict and analyse inventory turnover, profit and other performance metrics. Benchmark testing includes three aspects — internal benchmarking, external benchmarking, and competitors' benchmarking.

Benchmarking exists for individual supply chain activities, such as strategic purchasing, quality management, logistics services, research and development, sales forecasting and agile manufacturing. However, it is more difficult to apply benchmarking to an integrated supply chain as a whole. When approached from an integrated supply chain perspective, it becomes sophisticated and complex as supply chains themselves are growing in complexity and there are often multiple owners within a supply chain. When establishing benchmarking for integrated supply chains, managers should look at the integration of performance measures for individual supply chain partners and apply an awareness, understanding and sensitivity to these situations prior to implementation. Having a clear understanding of these characteristics will assist in providing a more optimal methodology (Dattakumar & Jagadeesh, 2003; Wong & Wong, 2008).

Supply chain benchmarking can be applied to a supply chain as whole and not to a single firm (Peng Wong & Yew Wong, 2008). There are various tools and methods used for benchmarking. Some of the most popular ones are, Gap analysis, ratio methods, statistical methods, balanced scoreboards and data envelopment analysis. There are three aspects of benchmarking which are: evaluation of technical indicators (internally and externally), appraisal of the system processes and an evaluation of product service to users and their satisfaction levels with that product service (Burt & Styles, 2004).

Firms can use different tools to help them benchmark and then interpret the results, for example, when looking externally at other firms they can use the SCOR model or data envelopment analysis (Talluri & Sarkis, 2001). There are several different benchmarking techniques that firms can use when benchmarking internally, such as the framework suggested by Soni and Kodali (2010) or the approach used by Ghose (2011), to derive meaningful results from an analysis of performance measures.

Applications of Supply Chain Performance Measurement and Benchmarking in the Blueberry Industry

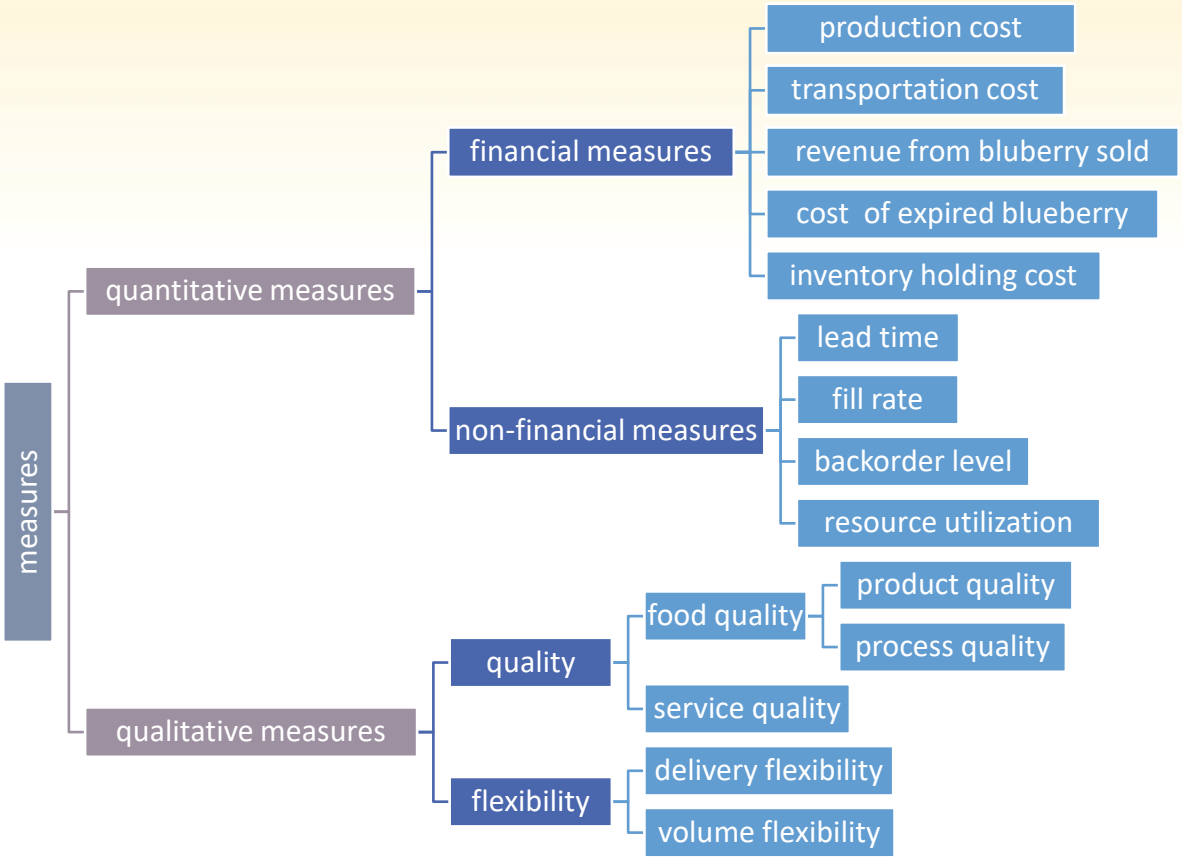
Measuring performance in the agri-food supply chain is complicated as various characteristics need to be considered, such as shelf-life constraints, long production, seasons, food safety, cool-chain & cool-storage (Aramyan, et al., 2007). Aramyan et al. (2007) established a framework of supply chain performance measurement from four categories and indicators for the agri-food industry, namely; food quality, efficiency, responsiveness, and flexibility.

The main performance indicator of the blueberry industry is ultimately the value delivered to the business. Within the industry, value is extensively measured in terms of Orchard Gate Return (OGR). This refers to the effective value returned to the orchard gate before attributing costs within the grower's control. This performance measure is often influenced by the costs associated with both packing and harvesting, what markets the fruits are sold in, and what is the quality and performance outcomes of the produce. It can be observed that, while value acts as the prominent performance measure, there are other performance metrics used to effectively manage operations in blueberry supply chains.

One field that that the blueberry industry wishes to explore is the emerging developments in robotics. Being a small delicate soft berry, the blueberry still needs to have the human element when it comes to picking so this area will be a long way off, but development has started. The use of infra-red cameras and self-guiding robots has the potential for some improvements. Some of those functions could include detecting water stress in produce, bruising, identifying disease, bush irrigation planning, forecasting the yield of the crop and being able to see if there is foreign matter on the produce.

Time metrics determine the time needed for the berries to be picked, packed and the amount of transport time between orchard and packhouse and to the ports and final markets. Taking into consideration the idle time or delay in delivering the same supply with no delays. Throughout the process there are also value-added items and measurements need to be taken to account for this as well. Cost metrics or monetary metrics are points that are recognized in the supply stream where savings can be made. These can be identified as the transport costs, the labour costs and the cost of supplies and equipment for the orchard. Quality metrics on the other hand determine the frequency of substandard berries and how many blemishes are in the samples. These are all tested by plumpness, colour, amount of juice and taste. At harvest, blueberries are classified into at least 5 different cosmetic classes. Classes 1 - 3 are cosmetic and drive price premiums. Class 4 is damaged and will be frozen or processed before reaching the market and finally, a waste class. Quality measures take place throughout the supply chain; at harvest, packing and when blueberries reach the market. If the fruit does not meet quality standards at any point, it is rejected.

There are initial quality measures with regards to harvesting, packing and in the market level to review the supply chain performance of the blueberry industry. Growers report the quality of harvest through a real time system and also as a report on the next day. This also shows the quality of the harvest and shows if there are any issues with the current harvest and the management of pickers in the field. Afterwards, the blueberries are sent to the packhouses which packs the product and the automated systems provide reports of the percentage of defects, which are then categorised into several classes. Growers have access to these reports and can change their picking strategies or growing strategies accordingly.



A conceptual framework of performance measurement in the blueberry industry

There is currently a lot of focus on benchmarking the quality of blueberries, and in this capacity the New Zealand blueberry industry appears to be doing well. However, the New Zealand blueberry industry have not identified opportunities to improve supply chain performance through benchmarking,

Within the blueberry supply chain, each supply chain member has their own set of metrics to determine its performance. Growers look at information, such as quality of the harvest and crop yields. Automated packhouses generate reports on fruit defects and fruit class, which in turn are used to determine the price paid to the grower. As the blueberry industry is not fully collaborative, there is not an industry-wide approach to benchmarking.

The berry cooperatives pool data from grower members for internal sharing of best practices and internal benchmarking systems. However, often growers will only be able to see the fruit of their competitors in retail channels.

It is suggested that the blueberry industry adopts the practices of the Zespri model for kiwifruit, which not only carries out a significant amount of internal benchmarking and data sharing, but also extensively focuses on the performance of their external competitors. The industry and each firm and supply chain should conduct internal benchmarking since there is access to information and this can provide a smaller jump to external benchmarking in the future (Soni & Kodali, 2010). Hyland and Beckett (2002) argue that, in order to remain competitive in international markets, organisations must ensure they have a good standard of learning that improves on previous practises and creates new ones. To keep learning, internal benchmarking is one of the best tools (Southard and Parente, 2007). The

firms and supply chains should then later benchmark against New Zealand's competitors. During such an exercise inconsistencies can be attributed to a number of issues, including but not limited to; geographic differences resulting in differing lead times, different cultures, infrastructure differences, economic and political instability (Meixell and Vidyaranya, 2005; Dornier, Ernst, Fender, & Kouvelis, 2008). It is also important to note while this may be true of places in South America for example, it is unlikely to be the case in countries more similar to New Zealand, such as Australia.

Moazzam, Akhtar, Garnevska and Marr (2018) comprehensively explore frameworks in their study using the backdrop of New Zealand dairy/agri-food and argue that their conclusions will also work for fruit. There is adequate room for supply chain managers to start exploring frameworks like this. It is also important to note that Deming's (2000) quote that reads: "*It is wrong to suppose that if you can't measure it, you can't manage it – a costly myth.*" Deming emphasises the importance that some aspects of the supply chain cannot be measured, and managers should not get completely carried away and solely rely on performance metrics only.

Recently the New Zealand blueberry industry was compared to Peru, but only at a macro level (Wilkinson & Morris, 2020). While both nations are southern hemisphere producers and cater to the demand during the northern hemisphere off season, the two have vastly different aspects which make them hard to compare. For instance, Peru is geographically located in a very populous area of the world and has easy access to other areas. With the Americas and Europe only 24-29 days away via sea freight (Freightos, 2020), Peru has easy access to some of the biggest markets in the world (Wilkinson & Morris, 2020). The minimum wage that a Peruvian blueberry picker could expect to earn is S/ 11,160 (Sol) per year, which equates to NZ$4,685 (Tradingeconomics, 2020). The Peruvian blueberry industry have invested heavily in large irrigation systems and expansive farms to produce economies of scale (Wilkinson & Morris, 2020).

In contrast, New Zealand is 10-15 days away via sea freight from Sydney in Australia and 20-34 days away from Singapore (Freightos, 2020), both these shipping times have so much variation it is not viable for the movement of fresh blueberry transportation since by the time they reach port, the berries could be spoiled, affecting the NZ quality image. In New Zealand the minimum wage per year is NZ $39,312 (Employment New Zealand, 2020). Compared to Peru, New Zealand pays significantly higher labour costs to pick berries. In New Zealand the blueberry industry is still developing, and capital expenditure is limited to what individual farms can afford. These factors mean that Peru is better suited for producing high quantities where they can achieve economies of scale, while New Zealand focuses is on quality and taste instead (Wilkinson & Morris, 2020).

Since the Peruvian blueberry industry is operating to produce a high quantity product and New Zealand is focusing on a high-quality, benchmarking between the two countries is incongruent. New Zealand would benefit more from benchmarking against New South Wales in Australia and some of the established northern American supply chains. The Australian example is pertinent because they have similar employment laws and minimum wage schemes to New Zealand. Australia also focuses on the quality of their product (Berries Australia, 2020). Looking to industries with similar challenges, the New Zealand blueberry supply chain will be able to more accurately benchmark its performance.

Relevant Resources at Massey University

- **The Centre for Postharvest and Refrigeration Research**
- **Massey Agri-food Digital Laboratory**
- **Joint Graduate School of Horticulture and Food Enterprise**
- **The New Zealand Food Safety Science and Research Centre**
- **The New Zealand Centre for Precision Agriculture**
- **The Farm Business Management Centre of Excellence**

Relevant Qualifications offered by Massey University

- **Bachelor of Agribusiness**
- **Bachelor of Engineering Mechatronics (Hons)**
- **Bachelor of Food Technology (Hons)**
- **Bachelor of Horticultural Science**
- **Bachelor of Science (Human Nutrition)**
- **Diploma in Science and Technology**
- **Graduate Certificate in Science and Technology (incl. Postharvest)**
- **Graduate Diploma in Logistics and Supply Chain Management**
- **Graduate Diploma in Science and Technology (incl. Postharvest)**
- **Master of Agribusiness**
- **Master of Business Administration**
- **Master of Food Technology**
- **Master of Food Safety and Quality**
- **Master of Management Agribusiness**
- **Master of Quality Systems**
- **Master of Supply Chain Management**
- **PhD in Science**
- **Postgraduate Diploma in Agribusiness**
- **Postgraduate Diploma in Quality Systems**
- **Postgraduate Diploma in Science and Technology (Agricultural Science, incl. Postharvest)**
- **Postgraduate Diploma in Supply Chain Management**

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