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Air freighting of perishable agribusiness products: Process and issues

**A Dissertation submitted in partial fulfilment of the requirements
for the degree of Bachelor of Commerce (Hons)**

At

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By

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Abstract

In 2017 New Zealand's export revenue from the primary industry sector reached \$38.101b, meaning that over half of the country's export revenue was produced through the agribusiness sector. Within this sector there has also been substantial growth in the production of perishable products in New Zealand including produce, meat and seafood. Such growth not only illustrates the increase in demand for New Zealand agribusiness products, but also generates problems for supply chains. With a significant proportion of these products being perishable, and the trend of agribusiness exports increasing, there is significant reliability on effective and efficient transportation and handling in order to reach customers in export markets in optimal time and quality. Air freighting is the most feasible mode of transport for these perishable products as it provides a suitable timeframe for perishable goods in transit, therefore the goods are limited to a short amount of time in less than optimal conditions. This leads to the question of whether there is enough air freight capacity at Christchurch International Airport (CHC) to cope with the growing production of perishable agribusiness products.

The two key research objectives were: to identify the process that perishable agribusiness products move through air freight to international markets, and secondly, to pinpoint issues in the process, recognise how these impact the stakeholders in the process, and make recommendations to improve these.

In the literature review, Beilock (1988) stated that the literature is "virtually silent" in regards to the area of losses in the supply chain for perishable goods. This was found to be the case with very minimal literature in regards to this area of study, showing the importance of exploring this research topic. Other prior literature such as Tozi et al., (2006), Pozar (2001) and Claypool & Morris (1952) provided information on the vulnerability of perishable agribusiness products and why they require suitable and rapid transportation and handling. International Air Transport Association (IATA) (2016) and The Ministry of Transport (2016) gave insight into the demands for air freighting perishable products and why it is an essential mode of transport. Lastly, Ministry of Business, Innovation and Employment (MBIE) (2017a; 2017b; 2017c), Bez (2016) and the Dodd (2014) illustrated

alternate versions of supply chain processes for perishable produce, with some relevance in regards to air freight and operations in New Zealand, but lacked specific detail of the process such as this study.

This research was a case study focusing on qualitative data. The research objectives guided the research, with the scope being on the global logistics businesses (GLBs) and the airlines operating within Christchurch that are licensed to export perishable products. Once determining the sample of the population, the data collection involved interviewing each respondent using pre-determined questions. Following this the responses were transcribed verbatim and summaries were provided in the Results Chapter. Results were then compared and contrasted in the Discussion section.

The results helped form a process model detailing the steps from the perishable exporter through to the products being loaded on to the aircraft and exported from CHC. Several issues in the process were then exposed including freight capacity shortages, excessive licensing and auditing, cool store shortages and lastly, unit load device (ULD) shortages. Similarly, a number of strengths were also found in the process including seasonal operations and alternative carriers, tourism campaigns, import capacity and airport initiative.

To conclude the study, recommendations were made in order to reduce the issues and their effects on the process. The first recommendation involved continued investment by CHC into tourism campaigns to bring more visitors to Christchurch and therefore increase carriers out of CHC for perishable products. This also linked to the promotion of agritourism which will help agricultural businesses and their operations, but also solve capacity issues. Next, CHC introducing a new cool store for the perishable market will help solve the shortage of cool store space which the market is currently facing. Government support through Ministry for Primary Industries (MPI) to streamline the documentation process and reduce or remove unnecessary licensing and audits will have a positive impact on the process and its stakeholders. Finally, airlines achieving better forecasting will help to solve their issue of supplying enough ULDs to their clients.

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List of Abbreviations

3PL	Third Party Logistics
AVSEC	Aviation Security
AWB	Air Waybill
CHC	Christchurch International Airport
CTO	Cargo Terminal Operators
DOC	Declaration of Conformity
ED	Eligibility Document
EU	European Union
GLB	Global logistics business
ICPR	Importing Country's Phytosanitary Requirements
IATA	International Aviation Transport Association
MBIE	Ministry of Business, Innovation and Employment
MPI	Ministry for Primary Industries
QA	Quality assurance
ULD	Unit load device

1 Introduction

1.1 Background information

1.1.1 Perishable agribusiness products

Davis and Goldberg (1957) originally defined agribusiness as “the growing interdependence of agriculture and the industries that supply agriculture, and that process and distribute the products of agriculture”. Thus, agribusiness products are the outputs of agricultural operations. In other words, agribusiness products are those that originate from agricultural production and manufacturing. Below is a table listing the agribusiness products that are most commonly exported out of New Zealand:

Table 1.1: Agribusiness products being exported out of New Zealand
Source: MBIE (2017)

Agribusiness industry	Products
Horticulture: Fruit	Apples, avocados, kiwifruit, blueberries, strawberries, lemons, mandarins, oranges, tangelos, feijoas, grapes, kiwi berries, nashi, nuts (pistachio and other nuts), passionfruit, pears, persimmons, apricots, cherries, nectarines, peaches, plums, tamarillos
Horticulture: Vegetables	Asparagus, beans, brassicas (broccoli, cauliflower and cabbage), capsicums, carrots, garlic, lettuces, melons, mushrooms, onions, peas, potatoes, pumpkins, shallots, squash, sweetcorn, tomatoes, vegetable juices
Horticulture: Other	Flowers and foliage, plants, vegetable seeds, bulbs, moss
Meat	Sheep, beef, poultry, deer, processed meats, animal fats
Seafood	Wild capture (white fish, hoki, squid, tuna, scallops, other crustaceans), lobster, mussels, salmon, oysters, processed seafood
Dairy	Cheese, milk powder, fresh milk, butter
Other	Honey, seeds, frozen blood, animal serums, bull semen

The vulnerability of agribusiness products in any supply chain, from the grower or producer through to the final customer are significantly high, especially for those which are exported out of the country. In many instances agribusiness products are perishable and therefore they are particularly vulnerable to time, climatic conditions and handling (Beilock, 1988). This leaves a great deal of responsibility on each of the stakeholders in the supply chain including the growers, carriers and receivers. They must provide conditions that will keep any deterioration of agribusiness products to a minimum (Claypool & Morris, 1952). Ultimately, this means that each individual step in the supply chain must be executed with a

great deal of precision and safety to ensure these products reach final customers at the highest level of quality.

1.1.2 Air freighting of perishable products

The volume of air freight cargo being exported from New Zealand had a steady growth up until the mid-90s when it seemed to stabilise, contrasting greatly to that of the substantial growth in sea freight in the same period of time (Ministry of Transport, 2016). While air freight exports have increased from 0.06 million tonnes of gross weight in 1990 to 0.1 million tonnes in 2010, sea freight has increased from 10 million tonnes to almost 30 million tonnes in the same time period (New Zealand Productivity Commission, 2011). Highly perishable agribusiness goods for export generally have one practical mode of transport and this is air freight. Air freight is the only mode of transport which has a feasible timeframe for perishable goods in transit, meaning that the goods are limited to little time in less than optimal conditions.

At CHC there is a few scheduled freight aircraft that transport air freight each week, while the remaining air freight is carried in passenger aircraft (B. Forbes, personal communication, March 3, 2018). These specialist international freight aircraft are operated by Qantas, Singapore Airlines, Emirates and Tasman Cargo Airlines (DHL). Several domestic flights also run from Christchurch to Auckland and are linked to international flights which fly out of Auckland. The majority of these are Air New Zealand carriers, while the Tasman Cargo and New Zealand courier post aircraft are also utilised in busy periods. The Ministry of Transport (2016) state that passengers and their baggage are the first priority when it comes to capacity on passenger aircraft, therefore air freight has many uncertainties associated with it getting loaded on to aircraft. Many airlines have addressed this by introducing pricing structures which mean that freight guaranteed on a flight costs more than freight which has the potential to be delayed until a later flight (Ministry of Transport, 2016).

Table 1.2 illustrates the international airlines that could carry agribusiness products on their aircraft and operate out of CHC, as well as their freight handling agents.

Table 1.2: Passenger carrying airlines and their handling agents operating out of Christchurch International Airport.

Source: Forbes (2018)

Airlines	Freight Handling Agents
Air New Zealand	Air New Zealand
Singapore Airlines	Air New Zealand
Qantas	Air New Zealand
Virgin Australia Airlines	Air New Zealand
Jetstar Airways	Air New Zealand
Fiji Airways	Air New Zealand
China Southern Airlines (seasonal)	Air New Zealand
Emirates	Menzies Aviation Ltd
Cathay Pacific (seasonal)	Menzies Aviation Ltd

Table 1.3 illustrates the specialised freighters that operate out of CHC and their frequencies of operation.

Table 1.3: Freight aircraft operating international routes out of Christchurch International Airport

Source: Forbes (2018)

Freighter operators	Frequency
Qantas	767 aircraft, five flights a week, all year around
Singapore Airlines	747 aircraft, ad hoc, usually 3-5 per year generally around the stone fruit season
Emirates	Ad hoc, usually 1-2 per year
Tasman Cargo Airlines (DHL)	Previously ad hoc, summer programme starting 2018

1.2 Importance of research

Export revenue from the primary industry sector reached \$38.101b during the year of 2017 (MPI, 2018). The revenue for all goods and services exported out of New Zealand in the same year was \$71.8b (StatsNZ, 2017). This illustrates that over 50% of New Zealand's export revenue was produced through the agribusiness sector, and therefore there is a significant reliance on the productivity within the sector in order to drive the nation's economy.

A large proportion of the primary industry exports will be perishable, therefore meaning that air freight will need to be utilised in order to deliver these products to customers overseas. Between 1999 and 2015 the share of air freight carried (by total trade value) grew at a smaller rate compared to that of sea freight, with the share decreasing from 22% to

17% (Ministry of Transport, 2016). Changes in technology including better temperature control and equipment has allowed for some perishable products to be freighted via sea rather than by air. Furthermore, air freight rates tend to be 10-20 times more than those charged for sea freight (Ministry of Transport, 2016), acting as a big factor for those who have the option to choose between the two. Nonetheless, air freight remains incredibly important for our most perishable export products and continues to increase in absolute volume.

The trends in each separate primary sector industry, such as horticulture, meat and seafood, are very compelling too. During the year 1985, New Zealand exported \$481m of horticultural products including fresh fruit and vegetables, processed fruit and vegetables, and other horticultural products. This grew to \$1.3b in 1995, \$2.3b in 2005, and 2016 ended at \$5.1b worth of horticultural products being exported out of the country (Freshfacts New Zealand Horticulture, 2016). In a report released by MBIE (2017a), they also found an increase in the value of produce exports. In 2005, New Zealand exported \$1.061b of produce including kiwifruit, apples, emerging fruit (avocados, cherries, blueberries, and other fruit), nuts and vegetables. In 2010 this figure increased to \$1.327b, and by 2015 equated to \$1.884b. As well as horticulture, the export value of the meat produced in New Zealand has also increased over the last 10 years. During 2005, New Zealand exported US\$3.4b worth of meat products including beef, sheep, deer, animal fats, poultry and other processed meats. In 2010, that figure increased to US\$3.84b, and by 2015 reached just below US\$5b (MBIE, 2017b). Finally, the seafood sector has also had export growth over the past 10 years. In 2005, New Zealand exported US\$873m worth of seafood, including wild capture, lobster, mussels, salmon, oysters, and other processed seafood. In 2010, US\$1.033b worth of seafood was exported out of New Zealand, and during the years 2012 to 2014 the industry exported over US\$1.2b worth of seafood out of the country (MBIE, 2017c).

Substantial growth in each of the industries not only illustrates the increase in demand for New Zealand agribusiness products, but also generates problems for supply chains. With a significant proportion of these products being perishable, and the trend of agribusiness

exports increasing, there is significant vulnerability in terms of them reaching customers in export markets in optimal quality.

Beilock (1988) stated that the literature is “virtually silent” regarding the area of losses in the supply chain for perishable goods, and this shows how there is significant importance to explore this area of research, in order to understand the problems, and develop solutions to resolve such problems.

1.3 Research objectives

Within this research there are two key objectives that will be examined:

1. To identify the process (supply chain) by which New Zealand perishable agribusiness products move through air freight to the international markets;
2. Pinpoint any issues in each of the process steps (supply chain), recognise how these issues affect stakeholders in the process, and make recommendations to improve these.

2 Literature Review

The academic literature contains a few relevant components to the problem, however, there are no major foundation studies which are core to this research. It had been suggested that the literature on the scope and origin of perishable product losses in a supply chain is limited (Beilock, 1988). The three sections examined in this literature review are: perishable agribusiness products, air freighting of perishable products, and lastly, the supply chain of exported perishable agribusiness products. The gaps in the literature will then be analysed.

2.1 Perishable agribusiness products

This section looks to examine perishable agribusiness products and provide the current understanding of the topic from existing literature. Hernandez and Peeta (2013) defined perishable products as being those which spoil over a certain period of time, or are prone to damage. A global trend in the demand for perishable agribusiness products and fresh, value added produce (Van der Vorst, 2000, as cited by Tozi & Muller, 2006) has led to perishable goods being one of the three largest categories of air cargo in terms of growth worldwide (Mergeglobal, 2005, as cited by Tozi et al., 2006). There is a common trend in literature that states the high vulnerability of perishable products in transportation and logistical processes (Beilock, 1988). For this reason, stakeholders along the supply chain, more specifically, carriers and receivers, should be aware of these vulnerabilities (Beilock, 1988). Claypool & Morris (1952), discuss the responsibilities of these stakeholders from the field to the final consumer, and how they must be extremely cautious of these vulnerabilities. Moving perishable goods through the supply chain as quickly as possible is vital in order to retain the highest product quality (IATA, 2016). Furthermore, Tozi et al., (2006) stated that perishable goods have limited shelf life, and will deteriorate over time if there is any delay in the delivery to final consumers. These products are highly sensitive to time, handling and climatic conditions (Beilock, 1988). Pozar (2001) discussed three reasons why the supply chain of perishable products is more difficult to manage than that of functional products. He stated that the demand patterns and forecast methods are far more challenging due to shorter product life cycles, as well as higher carrying costs due to the obsolescence of perishable products.

2.2 Air freighting of perishable products

This section focusses on air freight, with an emphasis on perishable agribusiness products and how they depend on this mode of transport. Air freight or cargo is defined by Agarwal et al., (2009) as the freight carried by aircraft excluding mail and passenger baggage. Furthermore, Reich-Weiser and Dornfield (2009) stated that air freight is the quickest and most flexible transportation mode.

Air freight is essential for the transportation of perishable products as it guarantees speed, reliability and security (IATA, 2016). Thompson, Bishop and Brecht (2004) stated that market needs can be responded to at a much faster rate with the far shorter transit times of air freight.

The Ministry of Transport (2016) and Tozi et al., (2006) however, both discussed the changing demands for the transportation of freight, especially witnessed by the increase in sea freight, likely due to technological advancements. Broderick (2014) and IATA (2016) revealed that over 15 million metric tons of freight had shifted from transportation via aircraft to ship globally between 2000 and 2014.

Some analysis concluded that although there are provisional supply shortages of air freight capacity to certain destinations at certain times, in most cases, there is enough capacity to meet the demands in New Zealand (Ministry of Transport, 2016). However, in the same study, The Ministry of Transport (2016) suggested that the fairly stable level of air freight transported out of New Zealand may imply certain limitations of aircraft fit to serve the demands. Innes (2009) found that South Australian exporters of perishable products were struggling to find space on aircraft when transporting their products to overseas markets.

2.3 Export processes

This section explores the exporting processes featured in previous literature which illustrate the steps that perishable products go through, starting from the grower or producer, right through to the final consumer.

Dodd (2014) developed a fresh fruit supply chain process in South Africa which shows each of the stages that fresh fruit goes through to reach its final customers in international markets (see figure 2.1). This, and other literature from overseas have limited research related to the air freighting of perishable goods, and rather focus on shipping or sea freight methods. Similarly, Ortmann (2005) discussed the supply chain of the South African fruit industry. The flow of the process was consistent with that of the Dodd (2014); identifying the growers, packers and coldstores, with the same focus on sea freight rather than air freight.

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Figure 2.1: South African fresh fruit supply chain
Source: Dodd (2014)

MBIE (2017a; 2017b; 2017c) provide three models of supply chains of New Zealand agribusiness industries: Produce, seafood and meat. Each of the three figures displayed by MBIE separately illustrate the procedures that each product from each industry follow. Depending on the product, the process starts at the grower, progressing through pack houses, processors, and wholesalers before reaching the domestic or international markets. The focus of this study is on the air freight component of these MBIE models.

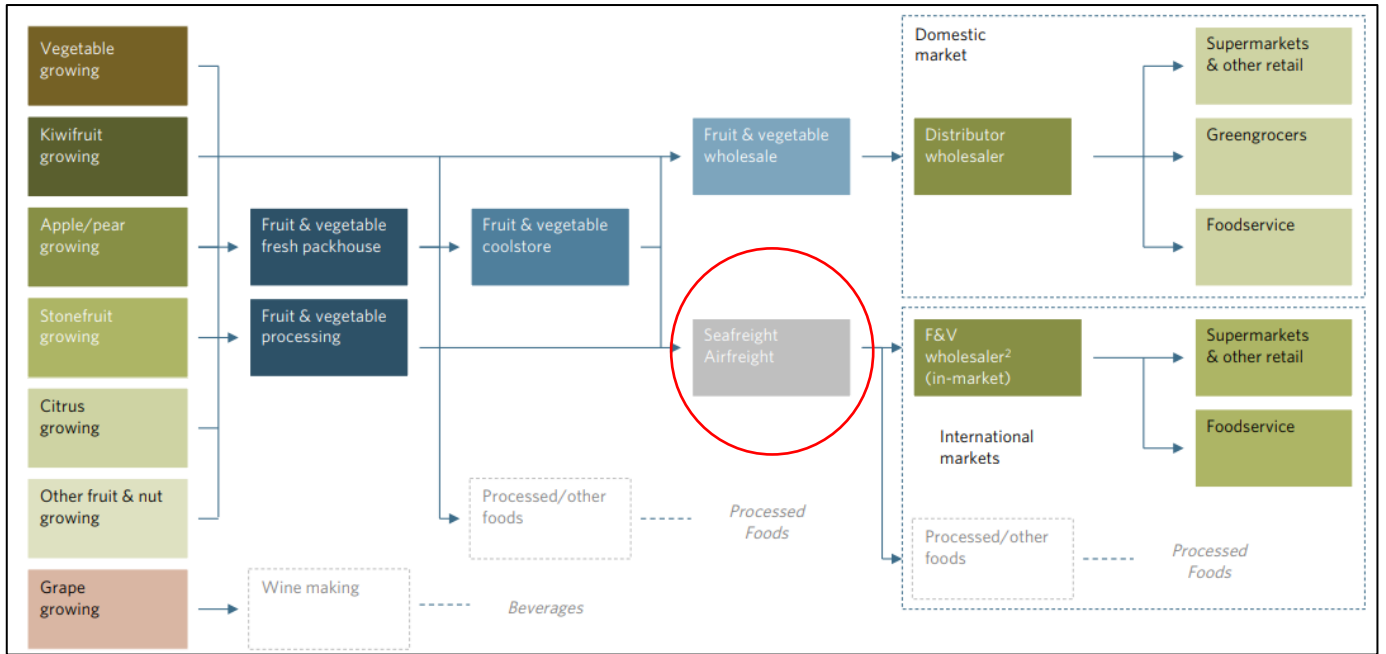


Figure 2.2: New Zealand produce supply chain
Source: MBIE (2017a)

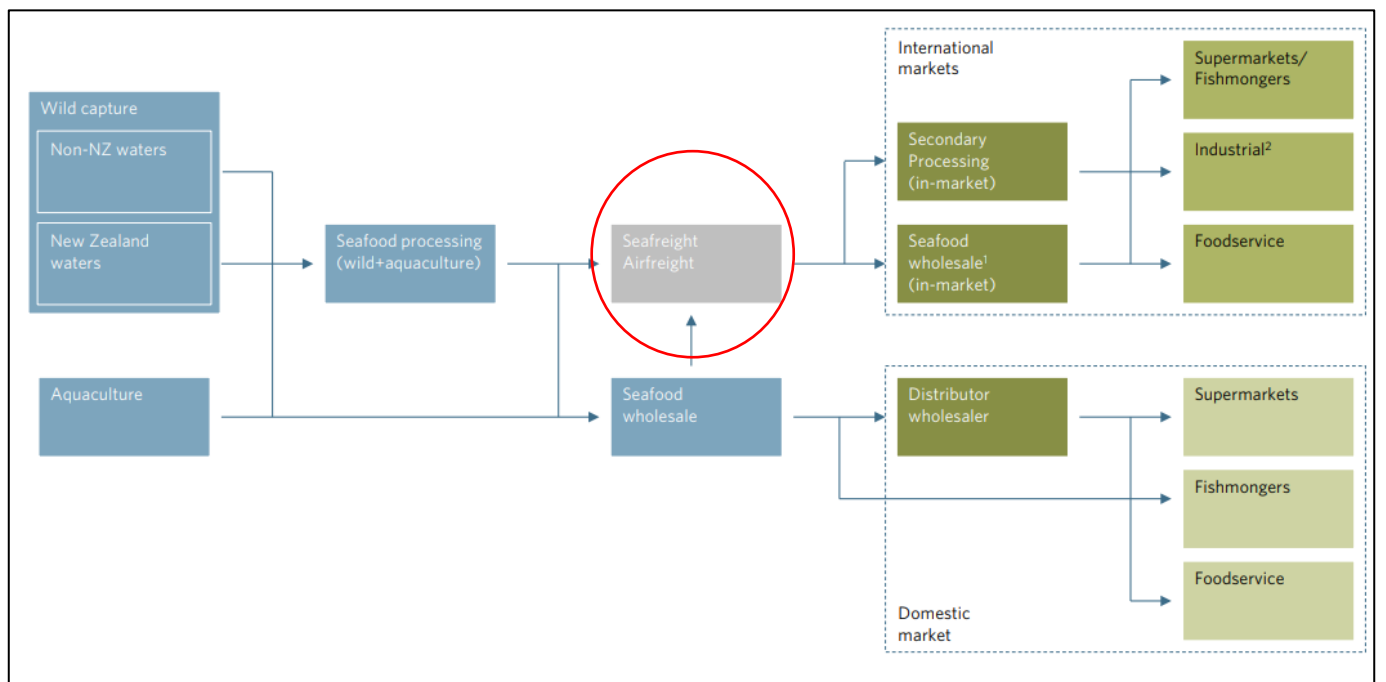


Figure 2.3: New Zealand seafood supply chain
Source: MBIE (2017c)

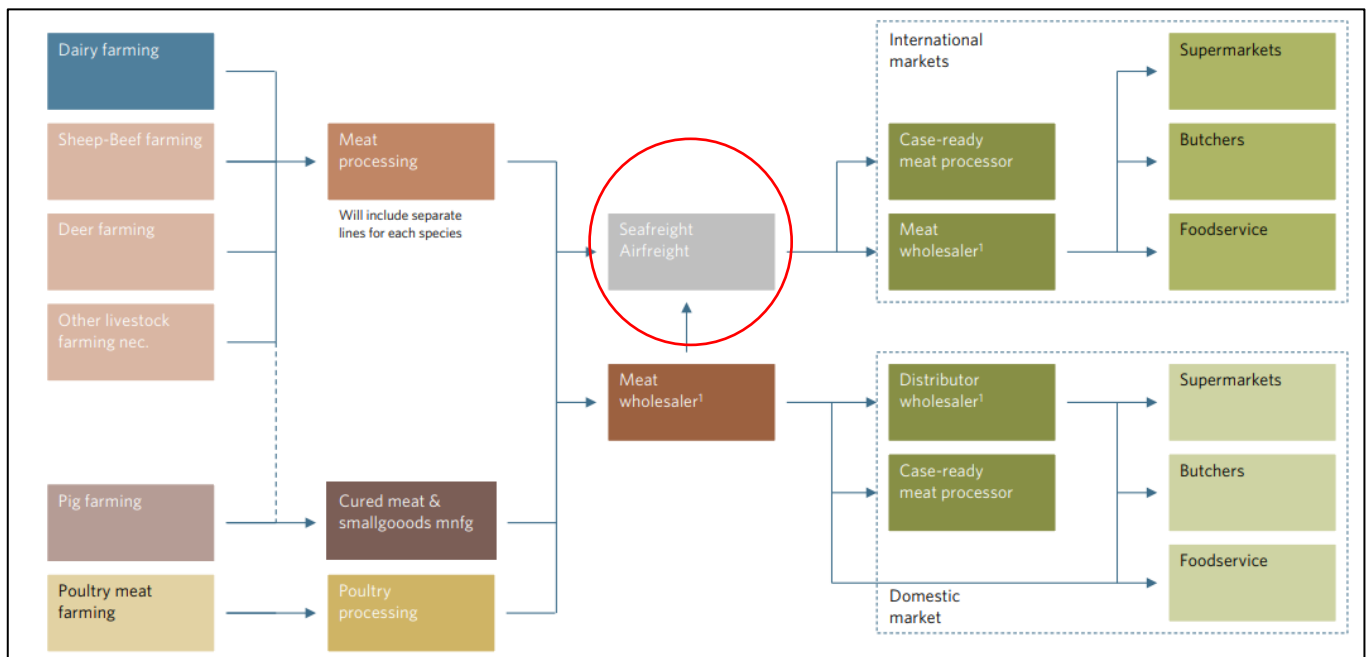


Figure 2.4: New Zealand meat supply chain
Source: MBIE (2017b)

As seen in Figures 2.2, 2.3 or 2.4, not one of the models splits up air freight and sea freight, nor do they fully document all of the steps or supply chain stakeholders involved specifically in air freighting perishable agribusiness products out of New Zealand.

Alternatively, Bez (2016) depicted the supply chain of Kiwi berries in New Zealand, featured below in Figure 2.5. Like the models from MBIE (2017a; 2017b; 2017c), the chain begins with the growers of the Kiwi berries and continues on to the pack houses. However, this model is more focused on exporting the product via air freight, rather than having domestic markets and sea freight as options in the chain. There is a declining volume of Kiwi berries being exported via sea freight due to inconsistent maturities (Bez, 2016), meaning that air freight is the primary mode of transport. The model (Bez, 2016) is similar to the focus of this research, but again may not fully document all of the specific steps involved in the air freight exporting process.

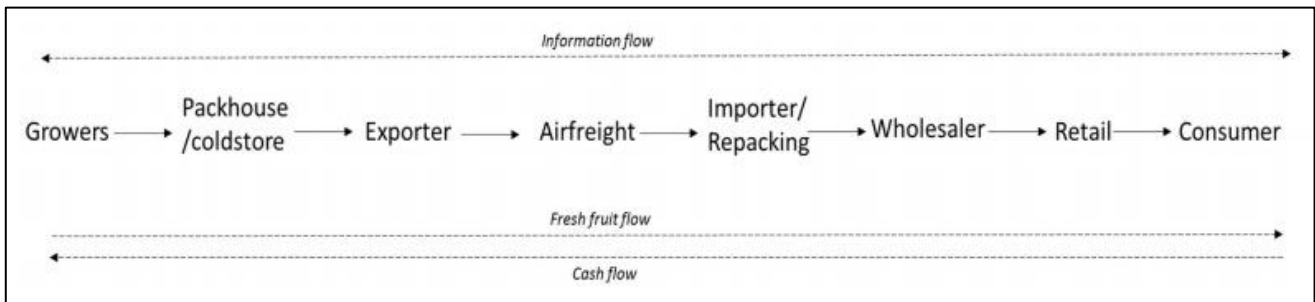


Figure 2.5: Kiwi berry supply chain
Source: Bez (2016)

2.4 Gaps in literature

Although there is some discussion on air freight and perishable agribusiness products in the literature, each of the authors in the literature review have a core research objective that is different to this research. This research looks to identify the process by which perishable agribusiness products are air freighted and the issues that are involved in the process. Bez (2016) was the only study to analyse the supply chain of a perishable agribusiness product being air freighted out of New Zealand. However, this study only focused on the exporting of Kiwi berries, rather than the whole category of perishable agribusiness products and did not look at the air freight process in any detail. Ortmann (2005) and Dodd (2014) featured somewhat relevant fresh fruit supply chains based in South Africa, however, they solely looked at the use of sea freight rather than air freight, and only focused on the exporting of fruit compared to all perishable agribusiness products. As well as this, studies with a focus in other nations have little relation to that of New Zealand as there are a number of varying factors that impact the supply chain, such as geographic location and agricultural production.

Overall, there is minimal literature on the supply chain of perishable agribusiness products being exported via air freight, and even less that is based in New Zealand. Therefore, this research aims to achieve a distinction in this field of study by determining a definite process and identifying any issues that are associated with it.

3 Methods

This research aims to identify the process of exporting New Zealand agribusiness products via air freight to the international markets, and subsequently pinpointing any issues in each of the steps, before generating potential resolutions. The methodological approach is qualitative because rather than testing a hypothesis and collecting quantitative data to perform statistical testing, alternatively, the two research objectives helped develop questionnaires and collect qualitative data from respondents to form case studies.

3.1 Research design

As this research is focused on qualitative data, a case study is the logical approach. More specifically this research was one of an exploratory nature. A case study is a key form of research that specialises in measuring and recording human behaviour rather than just verbal information (Yin, 1989, as cited by Chetty, 1996). Yin (1989) discusses how case studies investigate contemporary events or occurrences, and allow for multiple sources of evidence to be used. Chetty (1996) briefly describes how case studies can provide a holistic view, and a deeper understanding of the characteristics of real life situations. Both Yin (1989) and Chetty (1996) provide comprehensive understanding of the use of case studies for qualitative research. This is a very applicable approach for this research in terms of the scope, data collection, and analysis which are discussed in this method chapter.

3.2 Scope of the research

Figure 3.1 illustrates a basic supply chain for exporting agribusiness products via air freight. However, rather than focusing on the whole process, this research will be concentrated on the final two stakeholders of the value chain: The global logistics businesses and the airlines. Although the focus is on these two stakeholders, issues along each of the steps are in scope of this research, however, from the perspectives of these two stakeholders.

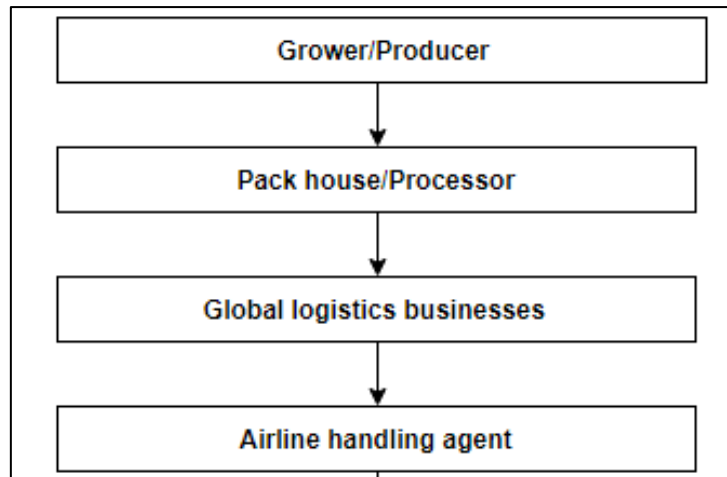


Figure 3.1: Process for exporting agribusiness products from New Zealand via air freight

The scope of this research is therefore the global logistics businesses located in Christchurch that are licensed to export perishable agribusiness products via air freight to international markets, as well as the airlines and their handling agents that operate out of CHC.

3.3 Instrument development

Due to the limited amount of literature available on this area of research, an initial interview with a GLB representative was required in order to gain a better understanding of the basic concepts and to develop a semi-structured questionnaire for the interviews with GLBs. This interview took place on 1 March 2018 with a branch manager of a GLB. The selected business is involved with air freighting perishable agribusiness products out of Christchurch.

The GLB questionnaire contains five sections (See Appendix 1). The first section of questions relates to the general business including the size and outputs, as well as the respondent's role in the business. The second section investigates the perishable agribusiness products that the specific business is handling and/or exporting out of the country. This section focusses on the origin of the products and the final destination or market that the product will be sold in, as well as the certification process of exporting perishable products. The third section looks into the process of exporting perishable agribusiness products via air freight, and identifying any issues that are involved in the process. The fourth section of the questionnaire is in regards to the cargo holds of the aircraft, and identifying any issues that have the potential to affect product quality. The final section is about the future of the

industry and gaining a better understanding of the potential to improve the current operations.

3.4 Population

There are only six global logistics businesses operating in Christchurch that are licensed to export perishable agribusiness products. As well as this, there are only nine airlines that export these products out of CHC. With such a small population, the plan is to interview as many as global logistics businesses and airlines as possible. The six global logistics businesses that are included within this population are:

- Hellmann Perishable Logistics
- Kuehne + Nagel
- Balance Cargo
- Mainfreight
- DHL Global Forwarding
- GVI Logistics

The airlines that export perishable agribusiness products from Christchurch include:

- Air New Zealand
- Singapore Airlines
- Qantas
- Cathay Pacific
- Virgin Australia
- China Airlines
- Fiji Airways
- China Southern Airlines
- Emirates

3.5 Sample

Four of the six firms which made up the total population of GLBs in Christchurch participated in this study. The remaining two firms either refused due to participate due to confidential information, or because of timing issues. In terms of the airlines, two of the nine operating out of CHC participated in this study. This small sample resulted due to many of the airlines being seasonal and therefore not having any respondents based in Christchurch at the time of the research, or due to confidential information that the airlines were not willing to share.

3.6 Data collection

The method of data collection for this research involves interviewing the participating GLBs and airlines. The interviews conducted at each of the businesses were face to face with the respective branch or cargo manager. The interviews were carried out at the business site or office and were structured interviews. These interviews took place from July to September 2018. The set of questions began with several basic questions regarding the business and the interviewees role in the business, and then flowed on to more specific questions regarding the process of exporting agribusiness products, and the issues that they face in their operations, as well as what they expect for the future. These questionnaires are found in the Appendices section. In order to gather the interviewee's responses in full, a voice recording device was used, making the transcribing and analysis far more straightforward.

The advantages of using personal interviews is that there is more of a willingness to cooperate in the research, and higher response rates (Sekaran & Bougie, 2016). As well as this, the interviewer can clarify any questions that the respondent may not understand in person, helping aid more accurate responses (Sekaran et al., 2016). Generally, personal interviews have a number of disadvantages too. High costs, time, and geographical limitations are common, but in the case of this research, these are limited. Because the interviews took place in the off-peak period, time was not a critical factor for interviewees nor myself, and similarly, each of the businesses are located in a fairly small proximity to one another, reducing travel costs and time associated. In some cases, respondents are concerned about confidentiality. However, this research has passed the Human Ethics Standards procedure through the Lincoln University Human Ethics Committee (Applicant No. 2018-20), and confidentiality is promised to each respondent prior to the interviews in the consent forms.

3.7 Pilot Interview

A pilot interview was carried out with a senior manager of one of the GLBs before the actual interviews in order to ensure the terminology of the questions were correct and understandable for respondents in their respective field. The questions were read out to the

respondent, with the task of providing feedback and recommendations in terms of their understanding of the question, and their confidence to answer them.

The respondent provided very useful feedback for a number of questions in the questionnaire. Firstly, the respondent made recommendations on adding a general question regarding the business model and identifying where their focus and expertise lies in the business; whether it was air or sea freight. Question 3a was then added to the questionnaire regarding this point. Secondly the respondent believed that question 10 would require an extensive answer and therefore recommended breaking the question up into a few sub-questions in order for it to be easier for respondents to answer. Therefore, the question was broken up into more basic questions. The final change made to the questionnaire was to question 17. The respondent in the pilot test found the question to be confusing and so changes were made in order to improve it for future respondents.

3.8 Data analysis

The data collected from the interviews was transcribed verbatim off the voice recording device. Summaries of the interviews are provided in the Results Chapter. Following this, each of the responses from the interviewees were compared and contrasted in the Discussion section. Trends were based on their perceptions of the issues they face, as well as the improvements that can be made in the process.

4 Results

4.1 Case study: Global logistics business 1 (GLB1)

The first GLB business to be interviewed is a multinational freight forwarder, operating in over 150 countries with offices all over the world. This freight forwarder is placed in the top ten for multinational forwarders in terms of size, and employs over 1000 staff globally. The business has a strong focus towards handling perishable freight, not only in New Zealand but also globally. This firm has huge investments in their facilities on a global scale, which allows them to operate door to door clearances where perishable products can be transferred to their own facilities in other countries before entering a market.

The Christchurch branch employs 12 full time staff, with a large number of casual staff added during their busy periods such as exporting meat to Europe during the Christmas and Easter periods, as well as the fruit operations running from December through to the start of March. These busy periods are relatively short and very intense, meaning that more employees are required in the store and even sometimes in the office during these times. The firm's meat operations can total upwards of 800 tonnes, while the fruit operations can equate to around 600 tonnes.

The interviewed respondent was the Christchurch operations manager who is also involved in the business development for GLB1.

4.1.1 Perishable agribusiness products

GLB1 handles a wide variety of perishable agribusiness products throughout the year. They forward all types of fruit, meat, dairy and seafood; a large number of the vegetables except for pumpkin and sweetcorn which are more commonly transported via sea freight; and lastly, the majority of other horticulture products such as flowers and foliage, vegetable seeds, bulbs, and a small number of plants (see Table 1.1). These products typically come from the South Island, with a large volume of fruit originating from Central Otago. However, occasionally some products will get trucked down from the North Island in order to be exported out of Christchurch. All of these products are exported globally by the business into major markets in the USA and Europe, as well as Asia and Australia. These destinations

are obviously determined by the market the exporter wants to target and so the global logistics business has the task of choosing the airline which is most suited, whether it is done by contract rates or alternatively, ad hoc. This is also highly dependent on the capacity of the aircraft.

When asked about any problems regarding the product quality from suppliers, the respondent stated that “generally overall it is pretty good”. Operating with an inwards receipting process within the store means that all inwards goods are checked for temperature and damage when coming off the truck. If the temperature is above the specified limit then GLB1 contacts the exporter, who then goes back to the pack house or plant who supplied the product in order to determine whether or not the product should still be exported; or alternatively whether it requires additional pre-cooling before being exported. If the goods come over a certain temperature limit the regulations in the destination country may prohibit these goods being imported to that country. Their operations are very driven by the importing country’s requirements. In addition to temperature checks and damage control carried out by this business, many exporters often have their own quality assurance (QA) agents come in and do further tests such as pressure checks and unit counts. Most of the products that arrive at the store are pre-cleared for export. However, if they are not, then they must segregate products before being approved by certain countries and being cleared for export.

4.1.2 Export process

GLB1’s process begins when the client advises them of a booking. This booking will involve the client detailing the type of product being exported, where the product is going to be exported to, and who the supplier is, depending on whether it is a plant or pack house. The next step is for the firm to arrange air space with the appropriate airline depending on the intended destination, and depending on the volume, organise ULDs. The firm can specify to the airline the type and quantity of ULDs they require. The airline may also have special requirements; this may be due to the trim of aircrafts used for the transport. Once these decisions have been made the booking is then put in place with the airline.

The product then arrives at the GLB'1 premises and the inward receipting process begins, this receipting process depends on the type of product. Different forms are used to capture information for different products such as meat, dairy, horticulture and seafood. This involves the store staff going through each pallet and filling in the respective forms. Then store staff begin to label the cartons, measure the temperature of the products, do piece counts, and weigh the pallets before storing them in the cool store or freezer. Generally products such as meat or seafood will come in with an Eligibility Document (ED), and for horticultural products they may come in with a Declaration of Conformity (DOC). These documents are export certifications which essentially act as a passport for the products so that they can enter an importing country's borders ("Export certification", 2018). Each export certification varies slightly depending on the product, however, each certification is likely to include: The country of origin, treatment details, microbiological status, the product's health status and several other specifications. The certifications are issued when the MPI are satisfied with a product and believe it complies with the relevant regulatory and administrative requirements ("Export certification", 2018). The ED and DOC are put with the documentation of each shipment. A DOC can cover multiple shipments, most commonly those are fruit shipments.

Then the documentation process begins with GLB1 staff creating an Air Waybill (AWB), which goes together with goods shipped and provides detailed information about the shipment, as well as allowing it to be tracked. They also follow any special instructions given by the exporter. For example, it could be a notified party at the destination, or it could just be contact details. The exporters may also have some specific instructions that they want on the AWB; these instructions can be implemented as long as they comply with New Zealand regulations. However, GLB1 staff cannot manipulate or change documents in any such way even though some countries may want them to. GLB1 have very strict policies around manipulation of documentation. The next step in the documentation process is to do the customs entry so that the products can clear customs and be permitted to be loaded on to the aircraft. As well as this, health certificates and sometimes certificates of origin are created. This documentation process is a trail of paperwork depending on the importing country's requirements.

The next step is to do a load plan for the store, which may include special instructions, like how a product of a specific shipment is to be insulated, or whether dry ice is to be used. Store staff then take the pallets out of the cool store or freezer, line up the selected units, and then begin to load ULDs and prepare the ULDs for the airline handling agents to load on to the aircraft. Once this is completed the ULDs are finally transported over to the aircraft for loading with all of the completed documentation, most importantly the AWB.

The respondent was also asked if they experience any problems around timeframes when exporting the products out of New Zealand. The respondent stated that although their products do make flights 98-99% of the time, they do have problems sometimes with the timely arrival of the goods. The business are reliant on goods arriving prior to the flight cut-off time, which is typically 3 to 4 hours prior to the departure. Obviously delays caused by unexpected events like trucks breaking down or road closures caused by natural hazards (e.g. like the Kaikoura earthquake in 2016) makes it difficult for GLB1 to complete their part of the process. There can be times where there is 30 minutes until the cut-off time and they still have not received the product. Although the airlines are usually helpful in such circumstances, the airlines can only do so much as they require their final figures in order to create the load plans for the aircraft. The respondent did however mention that there has been an improvement in GLB1's time management over the past few years, especially during the fruiting season.

In terms of these problems affecting product quality, it is only when these unexpected events do happen that product quality can be impacted. If a truck was to break down and the generator in the truck was to stop working, or a truck was to tip over and products were damaged, obviously there would be problems with the quality of the products. However, GLB1 will always perform damage control when the product arrives with them and check the temperature of the products. If the temperature is over a certain limit for the product's requirements then the exporter will be contacted and they will make the decision on whether to still export the product, or to get GLB1 to hold the product back and to lower its temperature before being exported. This does occur more in the summer during the fruiting season, as the fruit is more susceptible to perish in the warmer months.

The respondent was asked whether GLB1 has ever had products they were not able to export, either because the products did not meet requirements, or for alternative reasons. They stated that they did have the odd pallet which didn't meet the requirements, and in this case the product is downgraded and delivered to the local markets. During one fruiting season that started much earlier than normal, extreme temperatures in the Central South Island resulted in the quality of the products not being as good as they had been in previous years. Because it was an early season, the products were too early for the market meaning that there was a lot of products which were hard to sell. As well as this, Chilean products were already moving into the overseas markets, as well as other exporting nations products, so as a result, a large amount of New Zealand products that were going to be exported for that year were downgraded and sold locally. Nevertheless, every year is different.

When discussing GLB1's relationship with the airlines and their handling agents, the respondent implied that it was a partnership between the two stakeholders. The respondent stated that "we value them as much as they value us". During the busy periods GLB1 do not get as much space as they would like on flights for their cargo and they are often not happy about it, but they believe that it is common amongst freight forwarders. GLB1 currently rely on the likes of Singapore Airlines, Emirates, and Qantas who operate freighters out of Christchurch. All wide-body services out of Christchurch are fully utilised to ensure their operations remain. The respondent explained a wide bodied aircraft as being an aircraft which features two passenger aisles, with at least seven seats abreast. With Air New Zealand being the national carrier, GLB1 also try to put as much cargo as they can on their flights too. This includes the new Dreamliner which has only just recently been introduced out of Christchurch which flies to Auckland and is also a wide-bodied aircraft.

The respondent stated that space related issues always go back to the fruiting season when all of the trees ripen at once. There is a bottleneck where there are vast amounts of fruit ready to be exported all at once but there are only a limited number of flights with limited amounts of space for cargo. In one day during the season, the firm can get up to 100 pallets of fruit going through their store and they basically have to move it by the following day. This demonstrates how much fruit is coming through from Central Otago. As well as this, Cathay Pacific and China Airlines both operate seasonal flights which has been very

beneficial. In previous years the business were getting to a point in their busy periods, such as the fruiting season, where they would have an over capacity of product which could not be exported out of Christchurch, and they were therefore having to fly the excess products to Auckland, and then the Auckland branch were picking up the product, repacking them, re-doing all the processes, and then finally exporting them out of Auckland to international markets. GLB1 try to avoid this method as it is costly, time consuming, and involves much more handling.

The respondent was asked whether some destinations are harder to get products into than others. They found that it was harder to get products into some specific countries such as China and Vietnam due to the health certificates and import permits or requirements. The products for these countries must have an import permit and be translated into English by an approved translation service. However, as long as the documentation supports and is certified for that country then it is not an issue, it is more a matter of agents getting space on aircraft for the client's freight. Getting this space is sometimes determined by cost, and some exporters are willing to pay more for space on aircraft, while others can't as they will lose out on the profit margin.

When asked whether there is enough international flights operating out of Christchurch, the response was that it is never enough. They did however state that it is seasonal and ultimately passenger driven. Seasonal flights are extremely helpful and seem to be perfect timing for when their busy periods begin, however, they said "it would be nice to have another two or three wide-bodied services across the Tasman, maybe to Melbourne, that would be very beneficial; one even to the USA, and then if Cathay Pacific could come in a few days a week throughout the year that would be awesome".

The next question asked was whether GLB1 ever had problems sourcing ULDs or other equipment that they required to load the products. They stated that they don't normally have problems, but in the peak seasons they do. Many of the airlines can be short on ULDs during these periods and therefore they are reliant on the ULDs being transported from Auckland or coming in on inbound flights. In some cases airlines do share their ULDs with

other airlines but normally they only do this if it is convenient and is going to the same destination.

Following this the respondent was asked to describe the firm's relationship with CHC and whether they have much of an involvement in the firm's process of exporting perishable products out of New Zealand. The respondent stated that their relationship is very good, and although CHC do not have much involvement in the process, they do keep the firm in the loop with any potential changes and things happening at the airport.

The respondent was then asked whether they believed there was a lack of cool store space at the handling agent's facilities. The stated that at times there are definitely shortages of space. GLB1's own facilities can generally accommodate all of their products, but it can be tight for space especially in their busier periods. With the airlines, cargo needs to be delivered a minimum of three hours prior to the flight departure, and at times there is not enough space to accommodate all of the perishable cargo in the cool stores. It was stated that this is also a problem at Auckland International Airport. With that said, one airline is upgrading their cool store, but there is no guarantee it will be any larger than it was previously. For now, GLB1 must ensure that they insulate and waterproof their products as thoroughly as possible, as well as using dry ice for some perishable products. These are crucial in order to reduce the risk of decreasing the product quality.

4.1.3 Aircraft

When asked about any problems on board or in the hold which may affect product quality, the respondent stated that every aircraft is different, and therefore some aircraft such as the A380 wide-bodies can control the temperature in the different holds to some degree, while others such as the A320s cannot as they only have one hold. If A320s have animals on board they do turn the temperature up, therefore no perishables can go on that flight because the hold is too warm. These restrictions do make it difficult for GLB1 as it reduces the number of flights available for their perishable products. A380s do however have the ability to split up perishables and pets in different sections of the hold. The temperature sometimes does get up to 8-9°C on some flights, which illustrates the importance of insulation and dry ice for some perishable products.

4.1.4 Future

The respondent was asked about how they see their future in the global logistics industry over the coming few years. They were confident in seeing a large growth within the industry, especially with the environment in which they operate in. They believed that the industry continues to get increasingly advanced, and far more demanding, with many more processes to go through than there once was. There are however far more products for export as a result of the increased demand and production of New Zealand agribusiness products, and airlines such as Air New Zealand are introducing new locations and flights which illustrates the growth in the industry. The respondent said “I can only see it continuing to grow”.

The final question of the interview was whether or not GLB1 is seeing a shift towards consumers purchasing products directly through the internet. The respondent stated that they had worked with a few clients with prepared meals and consumer packs, especially in Asia where it is hugely popular. These sorts of products are high end, value added products, and more and more exporters are getting into this line of work. However, the complexity around these products is not impacting GLB1’s current operations as such because “cargo is cargo, we move it however the product is given to us”. These sorts of operations do however impact the exporter, and a lot of this difficulty does originate from MPI and their stringent requirements. Prepared meals and consumer packs sometimes have horticultural products and meat on the same plate which can increase the complexity of the process, and can create far more processes to go through in order to get the products out of New Zealand. Nevertheless, the respondent did believe that it would eventually happen on a much larger scale, with a limited impact on GLB1’s operations.

4.2 Case study: Global logistics business 2 (GLB2)

The next global logistics business to be interviewed has three pillars key to its business which are: global forwarding, international couriership, and lastly, supply chain or warehouse and distribution. All three of these pillars operate globally. Within New Zealand the business have two gateway offices, one in Christchurch and the other in Auckland. As well as these offices, they also have sales representatives in Wellington and Napier, and satellite sales in Hamilton and Whakatane. GLB2 employ 18 staff in the Christchurch office and 163 throughout New Zealand.

During the peak season between mid-October through to mid-March the business export anywhere between 80-100 tonnes via air freight on an average day. During the off-peak season, GLB2 are exporting around 60 tonnes of air freight per day. In terms of the goods the firm are exporting, approximately 10-15% of these are perishable goods, while the remaining freight is non-hazardous, non-perishable retail goods which the business specialise in.

The interviewed respondent for GLB2 is the South Island Manager of the business and is also a part of the New Zealand senior management team, working with the business for about 12 years.

4.2.1 Perishable agribusiness products

As only 10-15% of the goods handled by GLB2 are perishable, they do not have a wide variety of perishable products which they export out of New Zealand. The only perishable products which GLB2 do export are some vegetable seeds, honey, animal serums and frozen animal and human blood. The firm do not export any horticultural products, meat, seafood or dairy. The bulk of the products that they export are from Mid and South Canterbury, and occasionally other parts of the South Island, however, they do not export any perishable products out of the North Island. The major markets that GLB2 export products to are in Asia, especially Japan and Korea. They also operate a lot into Europe during the summer, mainly into Italy, as well as some into the USA in this period.

The respondent for GLB2 was asked whether they ever have issues with product quality from suppliers. In response they said that they aren't necessarily aware whether the product quality is not up to standard until it is too late. GLB2 are only looking whether the packaging is suitable for the method of transport, and that is pretty much all. GLB2 would not check the quality of the product itself, as they are not trained for this. If seeds for example have been sent to an importer prior to the final purchase being made, and the importer finds that the product delivered does not match the same standard as the samples, then that product has to be brought back to the New Zealand exporter. In terms of quality checks carried out, GLB2 do not touch the product as such. Aviation security says that they cannot physically touch the product unless they consider the product to breach airport security, in which case they may intervene.

GLB2 find that the steps taken in order to become a certified exporter of agribusiness products is reasonably good. "There are certain processes and procedures that must be in place, however is it pretty good". The business are a transitional facility and that allows them to have products through that are perishable agribusiness products. In terms of the costs involved, the respondent stated "the steps are getting more and more costly simply because MPI are under pressure from a resource point of view, and as a user-pays arrangement, there is a cost to it". These costs include annual inspection fees and annual auditing fees, and then with these there are the non-conformances which then also incur a cost which must be rectified to. All of these costs are carried by the firm and they just see it as a cost of being in business.

GLB2 also do not have cool stores on site and therefore sub-contract cool store space with their chosen third party (3PL) when they require storage for chilled or frozen products. This 3PL is also a freight forwarder and tends to only work with perishable products.

4.2.2 Export process

The exporting process for GLB2 begins with the booking request being received from the customer. At this point the export team will then make a booking with an appropriate airline depending on where the product is being exported to. This flight information is then relayed back to the exporter so that they can create their paperwork and prepare the shipment.

GLB2 then receive the freight and begin their own internal checks and processes. The documentation steps include a basic check-in sheet which details how many pieces GLB2 have received, the weight of the products and what the size of the products are. These steps act as the firm's quality check, allowing them to make sure that the shipment matches the documentation they have received. This step also acts as a security check in order for GLB2 to confirm the packaging is tamper proof and the pallets meet quarantine standard which includes heat treatment. Once the visual checks have been completed the information is relayed to the operations office at GLB2 who then produce the final documentation such as the AWB. The shipment is then transported to the terminal and the handling teams situated there. The shipment is then loaded on to the aircraft ready for departure.

The respondent was asked whether the business ever have issues around timeframes when exporting their products out of New Zealand. During the peak season when everyone is competing for the same space with airlines, the business do have problems meeting timeframes. Perishable products such as chilled meat, seafood and horticultural products get a higher priority over products or commodities such as vegetable seeds which GLB2 are most commonly exporting. It is common for lower priority products like vegetable seeds to be offloaded from flights. Products such as seeds are debated on their perishability. The respondent of GLB2 did state that "we have time on our side to be fair", however, once a shipment has been paid for, their customers want to be paid, and this only happens once the shipment has been received, therefore there are triggers when products are uplifted from flights. If a product is delayed in cases such as this then it is "more of a pain for the exporter rather than a deal breaker". However, normally if a product has been uplifted for three or more days, GLB2 will begin to chase up the airlines about it.

When asked if issues around timeframes ever negatively impact products, the respondent said that GLB2 have never had any product rejected through product deterioration, however, circumstances such as this do "stretch the relationships" as there are only so many times that GLB2 can tell a customer that their product has been offloaded again. These problems do occur more in the peak season.

For the first time in the firm's history, GLB2 introduced their own specialised freighter aircraft in order to try and alleviate some of the pressures or limited space on other carriers. The aircraft operated from mid-November through until the week before Christmas in 2017. The carrier flew from Auckland to Sydney and back again every day. Every week on Thursdays and Sundays the carrier flew down to Christchurch before flying out to Sydney. With a hub in Sydney it meant that GLB2 could feed products into Hong Kong and Singapore. Alternatively, they can use the likes of Emirates who will put their freight on GLB2's carrier which flies to Sydney and then Emirates can take the freight on their network from there. The freighter was used to transport GLB2's dry, non-perishable goods, and as well as this, other freight forwarders products including perishable goods. As far as GLB2 were concerned, "as long as the carrier pays its way, our bosses are happy". It also meant that they were able to free up space on commercial carriers in order to export their perishable goods such as seed, animal serums and frozen blood. What this did was release the bottleneck between Christchurch and Sydney. They plan to do this in future years in order to achieve the same outcomes.

The next question asked of the respondent was to discuss GLB2's relationship with the airlines and their handling agents. GLB2 have four main airlines which they interact with and these include: Air New Zealand, Emirates, Qantas and Singapore Airlines. These airlines have been operating out of Christchurch for around 20 years and so the relationship with each of them is very strong. As well as this, because GLB2 is a global air freight provider, they have global relations with these carriers. This can be extremely helpful, especially in circumstances when products have been uplifted from flights for an extended period of time. GLB2 can push issues such as this to their global staff who can put pressure on the airlines from both ends. In terms of issues with airlines and handling agents, the respondent stated that there are always issues, however, with their experienced staff, they understand how to handle conversations in order to get the desired outcomes. It is important for GLB2 to understand that there is only so much space with the carriers and when they are full they are full.

The respondent was asked whether it is harder to get product into certain destinations than others. They stated that it is more challenging in the peak season for any flight considered long haul such as to Europe. When going beyond the hubs for carriers such as Singapore

Airlines going beyond Singapore, or Emirates going beyond Dubai, they are then competing with the rest of the world from those hubs. This becomes a problem for freight forwarders such as GLB2 because pricing is very aggressive. An example given was a flight going from Singapore to India; other global forwarders or exporters will pay significantly more to get the space on a carrier, whereas GLB2 are not competitive enough to pay that amount of money to get the space.

When asked whether there are enough international flights out of Christchurch, the respondent stated that there is not. Although the off-peak season tends to be fine, the peak season over the summer has led to GLB2 bringing in their own freighters in order to help the industry cope with limited space. With Emirates being full with passengers six months of the year and higher baggage allowances for passengers, it means they do not have much space for cargo, especially over the summer. GLB2 stated “we would like to think that airport authorities are working with airlines to try and either attract additional services, or alternatively, new carriers coming into Christchurch.

GLB2 do not have much of a problem with shortages of ULDs. The respondent mentioned that they have 25% market share of inbound ULDs and therefore they generally have a large number of units which can be used for exporting.

The next questions asked of GLB2 was to describe the firm’s relationship with CHC, and whether they have much of an impact on their operations. From a freight perspective they do not have any involvement, however, they have noticed a much more active interest from the airport in terms of awareness in the freight side of operations. Workshops have been run with airlines, freight firms, and other service providers in order to communicate changes being made and future insight. The respondent said that “with prior focus being on passengers, real estate and retail within the terminal, there is now far more attention on how to grow the freight side of operations too which is great”.

The biggest challenges for GLB2 are the lack of airline space, as well as meeting regulatory requirements, both in New Zealand for exports, and also the country which is importing the product. The business believes that they could improve on trying to get better, more regular

space over the summer period rather than relying on bringing in their own aircraft, although it does have its benefits. As well as this, having alternative carriers coming in, and incentives for them to remain in Christchurch all year around is essential. For example, Cathay Pacific come in over the summer period, however, they don't operate over winter because it is not viable for them to operate over that period. By having some sort of incentives where carriers such as Cathay Pacific stay, even if it is on a restricted days of uplift or something such as this, it would be a big positive for the market. The respondent for GLB2 stated that "those sorts of things would help us to grow our business".

When asked whether GLB2 had ever made complaints or offered ideas to improve their process, the respondent made it clear that GLB2 are always having discussions with airlines and service providers, however, they know that they are limited by the type and number of aircraft they are operating. Airlines and service providers understand GLB2's issues and try to work the best they can across the industry. GLB2 often voice their concerns, however, much of the time it is just out of frustration.

4.2.3 Aircraft

The next question asked to the respondent was if GLB2 were aware of any problems on board or in the hold of the aircraft which impacts product quality. The response was clear that they have confidence in the airlines and the handling agents to control the hold, as well as where to put certain products. GLB2 have never had a perishable product that has been impacted by any changes or incorrect temperatures in an aircraft.

4.2.4 Future

GLB2 were asked what they see their future being like in the global logistics industry. The respondent stated that constant changes need to be made because anybody can do what the business do from a point to point process. The firm's challenge is to introduce as much technology and automation into their processes in order to simplify it and remain competitive. Another change is the personnel required within GLB2 and their customers organisations. Everything is now done online and there is no need for the face to face interaction, as long as the booking can be transacted electronically. GLB2 does have the tools for this to happen, however, they admit that it is more about making them smarter

and more effective for their customer's needs. They also stated they want to "remove as much manual handling as possible so that just touching the documentation once is all we are required to do".

Finally, the respondent was asked whether they are seeing a shift in consumers purchasing products directly through the internet. The respondent stated that the shift is huge in the retail side of things, however, GLB2 are not seeing much in the agribusiness side of the market. When questioned on any concerns for the future, the respondent was excited for the growth and said that for the business, the impact will not be so bad. In terms of the role the courier's play, it will become much more difficult for them when delivering to individual customers at residential addresses rather than businesses.

4.3 Case study: Global logistics business 3 (GLB3)

The next GLB is a freight and global logistics provider which has been operating for over 30 years with general freight, and for the past six years they have had a clear focus on the perishable market for forwarding. While the business isn't solely focussed on freighting perishable products, approximately 50% of their freight is classed as a perishable or MPI controlled product. Their main focus is on the export side out of New Zealand, with small operations in importing perishable products such as cheese and processed meats from Italy and Australia.

GLB3 employ 26 full time staff across the two Christchurch sites, and depending on the time of year can employ upwards of 50-60 casual staff in their busy periods leading up to Easter, Chinese New Year and Christmas.

The interviewed respondent from GLB3 is the manager, having worked for the business for almost six years, as well as previous experience in the freight industry.

4.3.1 Perishable agribusiness products

GLB3 air freights a large range of perishable products with the bulk of these being cherries and other stone fruit, milk powder, baby formula, salmon and mussels. The firm export around two million kilograms of milk powder a year, or just under 40 tonnes on average a week; 1.8 million kilograms of cherries a year, or around 35 tonnes on average a week; and also one million kilograms of salmon and mussels a year, or just under 20 tonnes on average a week. GLB3 also export a number of other fruit and vegetables, some vegetable seeds and bulbs, most types of meat including beef, lamb and deer, and other dairy products such as cheese.

The perishable products which GLB3 export via air freight are sourced primarily from the South Island, with about 5% originating from the North Island. These products are exported globally with major markets in Hong Kong, China, Australia and USA, and slightly less products into Europe. Close to 75% of what GLB3 handles is exported into the Asian markets.

The respondent was asked whether GLB3 have any problems with product quality from suppliers. Product quality issues are more common with fresh products such as cherries or other stone fruit which are tied up in the growing season, compared to the likes of milk powder, baby formula, fish and mussels. Although there may be the odd product recall for these products, product quality is always above average. Last year's growing season was a good example of GLB3 experiencing some product quality issues. A very poor growing season started with a very warm winter and spring. The trees had a lot of product on them with a limited amount of water and so the products struggled to grow to normal size, therefore the products ended up having very short shelf lives making it very tough for GLB3, having many products rejected by QAs at the pack house and at their facility.

Next the respondent discussed how difficult the steps were to become a certified exporter of agribusiness products. They stated that they don't think it is hugely difficult, there is a reasonably straightforward process and it is clear as to what they need in place to get the licensing, however, the cost of maintaining it means that they have to be fully committed to what they are doing. It is impracticable to be doing a small amount of product because the cost of maintaining the licenses between audits is costly. In terms of the number and frequency of audits it depends on the site and how the business is tracking. For GLB3, they are at the most developed stage where they now have an MPI audit every six months, or twice every year. This is a sign that things are going well and there are little issues. As well as this audit there are a number of other audits which must take place. A weekly audit with the VET is required due to GLB3 being licensed to export into the European Union (EU). This audit can cost \$200-\$300 a week. There are then audits in regards to cleanliness and rodent control, civil aviation, transitional facility, export system for produce, security export partnership with customs and so on. The respondent made the point that they are not difficult to achieve, and with the knowledge and experience of staff they know what to do, however, there are many audits, and they are costly, so there must be a certain commitment the business.

4.3.2 Export process

The next task for the respondent was to talk through the process from when the products arrive at GLB3, right through to the products being loaded on to the aircraft and being exported out of New Zealand. The respondent made it clear that it depends entirely on the product and the market in which it is going to. They stated that “these two things will dictate what is required from our end”. For example, cherries being exported into the USA have to be pre-cleared because of the spray patterns used during the growing stage. They are required to detail which sprays have been used in order to determine whether they are approved for the US markets. Products will often come into GLB3 and already be approved for the market that they are going to and so GLB3 will be provided with the paperwork or EDs for animal and dairy products from the supplier. These will dictate that the product is cleared for the country and it will meet those requirements for that country.

At the stage where a product has come in and already been cleared for market, GLB3 will check the product off against the documentation and make sure that everything matches. This includes the manufacture and expiry dates, manufactured location, and product descriptions. While these steps are taking place, a weigh and measure and a Regulated Air Cargo Agent (RACA) check are both performed. A RACA check is a Civil Aviation Authority (CAA) requirement which is to determine whether the product is from a known supplier or a new supplier which GLB3 has not worked with before. GLB3 must be approved by Civil Aviation to handle and present cargo, and confirm that they know what the products are, and that they haven't been tampered with. All of this documentation will then go to the office operators who should have a booking with an airline. They compare the documentation to the space allocated on the designated aircraft and make sure that the shapes and sizing of the shipment will fit the trim of the aircraft. The operators then instruct the warehouse the cut-off time for the flight, what the product is to be loaded in, how it will be packaged, if dry ice or temperature recorders are required, and whether any special handling requirements need to be followed. The warehouse then prepare the order for loading, following each of these steps while the operators prepare the documents including the AWB. Again, these documents and packaging are dictated by the country and market in which the product is going to. For example, if cherries are going to Taiwan via Singapore

they require strict pest control for when the aircraft lands in Singapore. The product must be properly sealed so no pests can get into the product, and this is controlled by the final country or destination, in this case Taiwan. Both the documentation and loaded products are then delivered to the airline prior to the cut-off time for the flight which is typically three hours before departure.

The next question asked to the respondent was whether GLB3 have ever had issues around timeframes of getting products out of the New Zealand. The respondent stated that there are always times of the year where capacity issues arise, and getting the space you want, when you want it. Typically in New Zealand these timeframes would be leading up to Easter and Christmas, and the two reasons for this are that there is normally a reasonably large demand for fresh meat out of the South Island at these times. This is most commonly into the USA and Europe. Secondly, the stone fruit season comes along in January and that puts a lot of pressure on the aircraft capacity out of Christchurch, and even New Zealand in some occasions. The respondent went on to say that although there are certain time windows that are more difficult than others to get products out of the country, generally being well planned and organised will get them what they need to achieve timeframes. Sometimes they may try to book for one day and be delayed one or two days, but pre-planning with clients, and knowledge of the programmes into certain markets means that they can make pre-bookings with airlines and then manage it within the way they operate.

When asked if these issues around timeframes ever negatively impact product quality, the respondent of GLB3 stated that they can. Cherries are a product that only have a two day window, and if it must be held for an extra day in Christchurch before reaching the market, ultimately this means that 50% of the products shelf life has gone. This demonstrates a clear negative impact on some specific products. GLB3 stated that “if we are doing our job right it shouldn’t be a problem as we should be ready, prepared and planned”.

GLB3 were not aware of any times where they were not able to export products other than because of incorrect documentation.

The respondent was asked to describe GLB3's relationship with the airlines and their handling agents. The respondent stated that airlines are crucial partners for the business so a strong relationship is required. In the respondent's opinion, GLB3 cannot have strong relationships with every airline because it is difficult to split the business up so much that they are giving some business to everyone. GLB3 have aligned themselves with a four key airlines which are based on strong relationships and these include Emirates, Singapore Airlines, Qantas and Air New Zealand. There are then several other airlines which GLB3 use at certain times in the busy periods, but they support them because they know they will get something back from supporting the seasonal carriers. China Southern is a key example of one of these airlines, and because of one or two certain clients, GLB3 utilises them a lot, and China Southern sees GLB3 as their top agent out of Christchurch. Another key seasonal carrier for GLB3 is Cathay Pacific who was one of the original carriers air freighting GLB3's perishable products when they first commenced perishable operations. The three month window in which they fly to Christchurch is paying off for GLB3 because they have got good space and allocation rates with Cathay Pacific. The relationship with other airlines is minimal but usage of their carrier space may increase in the busier periods around Easter and Christmas time.

Subsequently, the respondent was asked to describe whether any problems existed between them and the airlines. They stated that problems obviously do exist in such a relationship and these can involve mishandling of problems, lost products, or bumping shipments from flights, but GLB3 recognises that it is just a part of the job and they must just move on from such circumstances. In terms of how often these problems occur the respondent stated that in the stone fruit period when it is far busier, there are an increased number of issues with airlines when moving more cargo. GLB3 recognises that just like any business, airlines want to maximise their revenue and so at times they will overbook a flight and bump certain shipments off. Another example is products which get bumped off flights across the Tasman at certain times of the year due to strong head winds and weather conditions. A320s flying to Australia between October to December seem to face seasonal winds which mean that the airline must bump some products off to lighten the plane. The respondent of GLB3 stated "Issues such as this might occur one to two times a week, however, as a percentage of the shipments we are working with, that is probably minor".

The next question asked of the respondent was whether GLB3 have difficulty getting products into certain destinations. The respondent discussed that when air freighting into isolated destinations, there are a lack of wide-bodied services. One example for GLB3 is when they export lactoferrin into Changsha in China; there are no wide-bodied services available so they must rely on A320s. This means they must pack the shipments to a certain level for the aircraft, therefore if they were exporting two tonne of lactoferrin, they would require up to five or six flights to get it into the country, far more than if wide-bodied services were available. Markets in particular that are difficult to get products into again are based on time of year scenarios. If GLB3 are trying to get product into China on a direct service in the middle of January they would definitely struggle, and again if it was a week prior to Chinese New Year they would also struggle because of the lobster demand and other highly demanded products during this time. The respondent went on to say that markets that are generally harder to get into are the uncommon ones as they are less likely to have the services that are required for the product they are trying to send.

Following on from this the respondent of GLB3 was asked whether they believe there are enough international flights out of Christchurch to support their operations. The respondent stated that they would always want more flights. For example, if China Southern were to operate five to seven times a week instead of only three times a week, GLB3 believe they would “fill them about 60%-70% of the time” with what they are currently doing. GLB3 understand that it is a balancing act with the market itself. There is no point in more airlines coming to Christchurch and then disappearing in three months’ time because they couldn’t fill the plane. Again, GLB3 believe they must work with what they have got on offer, and more importantly, support the airlines who are operating into Christchurch, especially those which operate seasonally during the busy periods in order for them to continue to operate into Christchurch.

When asked if GLB3 had problems getting hold of ULDs the respondent replied saying that they only do in certain times of the year. During the middle of January it can be more of a problem but it is not a big issue for them. If planning is in place it shouldn’t be an issue. One conversation GLB3 are going to have with airlines is that they should be able to look at previous records and see how many they shipped last year out of Christchurch in a certain

period and then stockpile units from around October in order to be prepared for the upcoming busy period.

The next question asked to the GLB3 respondent was whether there is enough cool store space at the airline facilities. The respondent stated that there is simply not enough.

Although one airline is in the midst of building a new cool store, it is not actually any bigger than previously. GLB3 did mention that they can see from the perspective of the airline that they do not want to be viewed as a storage option for clients, however, when handling several other airlines products, GLB3 believe that the airline should have facilities that are capable of handling that amount of products. One example is when Singapore Airlines brought in freighters for the past two years in the stone fruit season, GLB3 had to hold product at their store and deliver it to the airline at 2am in order to keep perishable products in the cool stores. GLB3 finds it hard to understand “why it should cost my business to have to run an extra shift and trucks when there should be an airline facility which can handle whatever freight they are going to have”. Furthermore, they said “I don’t expect them to handle everything but they should be able to handle more than they do”. The respondent also described other cool store facilities as having much more space, however, they are contracted out to certain freight forwarders meaning there are restrictions.

When asked to describe GLB3’s relationship with CHC and their involvement in the process, the respondent stated that “in the last five years they have had much more of an involvement, especially when they are trying to promote Christchurch as a gateway for our airlines”. This had led to the likes of Cathay Pacific and China Southern Airlines having more services. CHC have also shown interest in GLB3’s aims and objectives within the industry, so from GLB3’s perspective there has been a big step forward in the last few years. This partnership will allow for both parties to influence more carriers or airlines to operate out of CHC in the future. The respondent of GLB3 was not aware of any problems dealing with them.

The next question asked the respondent to describe their biggest challenge they face. One major challenge for GLB3 was a lack of skilled and experienced staff, not only for them but

within the industry. They stated that “there is a real lack of experienced staff in the perishable market from a forwarding point of view, with documenting and handling skills in the warehouse especially”. For the industry, GLB3 believed that the industry may struggle to find skilled staff who have the “ability to come in and run a forwarding business from day one”.

Following on from this, the respondent of GLB3 was asked whether they have ever made complaints or offered solutions to improve the process. The respondent stated that they do this very often. Several conversations have been exchanged with airlines about their cool stores and the handling of cargo during busy seasons. Each year GLB3 will catch up with airlines prior to the stone fruit season in order to talk about what they need to in order to make their job easier and to get the products to market on time. As well as this, GLB3 have talked to MPI about why some things have to be done including requirements and testing. A prime example mentioned was that GLB3 have their water tested every month due to an EU requirement. The respondent stated “we are a forwarder, we are not washing products, we are not a pack house, everything comes to us packed and sealed ready to go, so why does it cost \$250 a month to get our water tested?”

The respondent believed that the biggest things they could improve on in their process were communication and feedback to their clients, as well as upskilling their staff in order to make sure that any new products, markets, or anything they handle they do correctly.

4.3.3 Aircraft

The next question asked to the respondent of GLB3 was whether they are aware of anything in the hold or on board which affects product quality. They were generally not aware of anything, however, they stated that obviously there is a limit to the amount of dry ice on an aircraft, especially if there are animals on board because dry ice gives off carbon dioxide and saturates the air of oxygen. This example can be a typical thing and it can put restrictions on what GLB3 can do. The respondent stated “the hold will generally be held at 4-5°C typically on an international flight which is not bad for a perishable product unless there are animals on board”. “The temperature will get increased to around 10°C in the hold when animals are on board and I think that would affect some certain products quality”. The respondent also

mentioned that this would be more of a problem on the Australian flights rather than flights going further afield because there are a limited number of live animals going to Asia and to other long distance destinations.

4.3.4 Future

GLB3 were asked how they see the future in the global logistics industry and their operations. The respondent stated that they believe there will always be a need for them in the process. One concern in the New Zealand market is the development of Kotahi which is supported and backed by Fonterra and grabbing a large percentage of the market. The respondent stated that “it is not necessarily a good thing for the market because it dilutes what we are capable of getting”. The commerce commission have recently put limits on what percentage of the market they can have, but GLB3 believe they must keep an eye on it. Some larger exporters such as Synlait are now doing their own in-house documentation, export bookings and shipping. There is now a larger number of these businesses getting to such a size where they look after themselves, however, they still need import roles and air freight roles to support their operations. Like anything the respondent stated that it is always changing but in the long term they believe that there will be a need for GLB3.

The next question asked to GLB3 was whether they are seeing a shift towards consumers purchasing products directly through the internet. The respondent stated that it is obviously a massively growing market all around the world. With the government introducing GST on such products, “it will be interesting to see the affect this has on it”. In terms of its impact on GLB3 there hasn’t really been one as it is more impacting the likes of couriers such as DHL and FedEx. The respondent stated that “obviously it is affecting the retailers and potentially some of our import clients which will not need to import as much because of people buying overseas, and by chance some of that online shopping is coming through our facility with New Zealand Post so it is probably a positive for us”. In regards to this happening in the agribusiness sector there is much less because New Zealand is reasonably strict on paperwork and requirements. Export-wise, the likes of FedEx and DHL will not take perishable or fresh products. Generally, if you have a market established, you are sending larger volumes. Anyone can purchase cartons of baby powder and then send it through New

Zealand Post to their family overseas for example, but in general it is not going to affect the process because of certain restrictions.

4.4 Case study: Global logistics business 4 (GLB4)

GLB4 is a globally operating transport and logistics company which was founded over 120 years ago. The business provides forwarding of sea and air freight, with great success in both areas. Globally the business is one of the largest in air freight. Their operations in air freight have changed radically in the past 12 months over doubling in size. In New Zealand the business strives on sales, and from the point of view of the perishable export market, they sit around the number four spot, with operations in Auckland and Christchurch only.

GLB4 is split into two categories of employees. There are 17 employed in the general operations in Christchurch, and then another 28 in Christchurch who are in charge of their business extension which involves doing documentation, bookings and moving containers.

The interviewed respondent from GLB4 is the National Air Freight Perishable Business Development Manager. They have been with the business for five years and in the industry for 35 years, with experience in perishables since the early 1990s.

4.4.1 Perishable agribusiness products

GLB4 export a range of perishable products via air freight. The business export all types of meat, seafood and dairy products, a wide range of horticultural products including many types of fruits, vegetables and other horticultural products such as flowers, plants and seeds. Furthermore, GLB4 export honey and perishable ingredients for pharmaceutical products.

The respondent was asked to detail where these products are sourced from. All products exported out of CHC are sourced solely from the South Island, from Nelson to Bluff. Some products even come out of the Chatham Islands, but only very little. None of the products GLB4 export out of Christchurch are sourced from the North Island as that is all exported out of Auckland.

The products are exported globally by GLB4, with large produce markets in China and East from that point of view. Much of the fresh fish that they export goes to Australia, the USA

and China, while 90% of the meat goes into Europe. The remaining products go all over the world, with other big markets in Japan, Taiwan and other parts of Asia especially.

When asked if GLB4 had a problem with product quality from their suppliers, the respondent stated that they generally don't have these sort of problems because their suppliers tend to believe that they have the best quality products in the world. The respondent went on to say "I think particularly in the produce game we have got the best products in the world, and also our fresh fish and meat are second to none, there is no one else who produces what we produce, and of the quality we produce". Another thing which the respondent believed New Zealand does better than most is the speed at which products get on the shelves, and because of the distance from overseas markets, nearly everything is air freighted so New Zealand are considered a boutique market with small operations. The respondent gave an example of the Mexican avocado air freighting programme to demonstrate the small size of New Zealand exports. This programme in Mexico is larger than the whole of New Zealand's exports combined. Programmes such as this rely on 747 air freighters operating all day every day carrying products out of the country. Another example is cherries which New Zealand is passionate about. In 2017, the USA exported approximately 194 million kilograms of cherries, Chile exported around 169 million kilograms, and New Zealand only exported 4.5 million kilograms. The difference is that New Zealand is totally boutique in quality. The cherry quality from New Zealand compared to the US or Chile is far larger and juicier, and therefore "quality drives what New Zealand exporters sell". Cherries exported out of the USA average a price of \$2/kg USD while New Zealand cherries average a price of around \$11/kg USD which demonstrates this high quality from suppliers. One goal for GLB4 is being quick to market. Chilean cherries are up to 30 days to market from the day they are picked, while GLB4 are getting them into the market on the shelves in Asia 72 hours after they are picked.

The respondent was then asked whether quality checks or assurance is completed by them or their suppliers. They replied that both do it at certain times of the year. It is a big part of the meat, fish and produce operations. GLB4 have quality assurance technicians in their facilities during the perishable produce season doing final checks of the products before they are exported. It is happening in the factories and pack houses too. The meat and fish

products have to follow certain protocols that no other suppliers do in the world. The MPI and risk management protocols are unique to New Zealand products.

Following this, the respondent of GLB4 was asked how difficult the steps taken in order to become a certified exporter of agribusiness products were. The respondent stated that it is very expensive and facilities have to be of a certain standard. As well as this it can take up to six months because they have to be approved. This isn't only in New Zealand but also the firm has to be approved by the EU and be put on the registrar. GLB4 have also had a problem with Chinese meat requirements. After waiting 18 months from the time of applying, the firm have still not been approved and therefore they are unable to export meat products to China. Audits are carried out quarterly with all of these requirements, but obviously with the produce side of the business, the firms are audited throughout the produce season so it can be weekly during this time. Travelling VETs will carry out spot checks to make sure that GLB4 are handling the products as said in the risk management programmes.

4.4.2 Export process

When asked to talk through the process from when the products arrived with GLB4, through to when the product is exported out of New Zealand, the respondent said it starts with GLB4 receiving documents from the producer to say that the product is coming. Another word for this is a pre-alert, but in the case of MPI, if an ED is created then the producer will move it to GLB4 so they know the product is coming. From this point operators will create an inward document and notify the store that the products are coming in. This has to be done to keep the protocol and risk management programme going. The products arrive at GLB4's contracted facility which they lease which has four chillers, a freezer, and a loading area. This facility is very much considered transitional with all products passing through and nothing being stored. Over 90% of the products are in there for less than 24 hours. Every box has to be ticked, and GLB4 are audited on this very often. By this point the operators would have made the bookings with appropriate airlines and load out plans will have been created. They will then create the necessary documentation for health certifications, phytosanitary certifications and so forth, and all of this documentation will be created in conjunction with the customs export entry and AWB that are needed to get the product to

its final destination. The product will then be loaded into certain ULDs which will then be lodged with the airline and taken to the aircraft to be loaded prior to departure.

Next the respondent was asked to discuss any issues they have experienced with timeframes of getting these products out of the country. The respondent of GLB4 stated that during the peak season they do experience these issues. "We find ourselves having to fly products up to Auckland via domestic air freight, via truck, or by any means possible". GLB4 use the New Zealand Post courier plane which is a 737 freighter, especially during the cherry season in January get products up to Auckland to be exported from there. The plane operates during the night so it runs up and down five nights a week doing the post run. There is a lot less going back to Auckland than there is coming into Christchurch so most of the time it is filled up with freight. They also charter the DHL 767 aircraft which sits on the runway at Auckland so that is occasionally brought down empty in the peak season. These issues are caused from volume coming into Christchurch meaning that everyone is having to find ways to get some products up to Auckland. The big thing that is going to happen in the next few years is more freight is going to be directly trucked from Central Otago for example, straight up to Auckland. Other capacity issues are related to salmon out of Nelson which will be sent directly on small aircraft up to Auckland and exported from there because Christchurch has limited space and timings don't work well there.

When asked if these problems negatively impact product quality the respondent from GLB4 said that in their opinion they don't. Having said that the produce industry is extremely concerned about it. The respondent believes that some exporters have suffered quality issues as a result of timing. GLB4's clients haven't experienced this, but occasionally they will have poor quality products due to bad seasons for example and it may or may not get to market, however, it is out of GLB4's control because they transport it as fast as physically possible to get it there. The respondent was aware of other exporters in the industry who are unhappy with the time delays because of space problems. This seems to happen especially in the peak season from August through to Easter.

The next question asked to the respondent was whether GLB4 have ever had product they haven't been able to export. They stated that there was a bit of product in 2017, however,

that was quality driven rather than due to GLB4's operations. "Last year the fruit got too hot on the trees and ripened too fast, it was the worst it has ever been". Furthermore, the respondent went on to say that some products will be rejected by quality control and the products end up going to local market most of the time still as A-grade product. One example was a client who had 34 pallets of stone fruit waiting in storage for Chinese New Year and quality control took one look and rejected it for export. Many products didn't last but that was a quality issue from the field rather than from the process. The season of 2017 was "fantastic in terms of volumes, however, there were two main problems: They couldn't pick the produce fast enough due to the quick ripening, and secondly, when they did pick the produce, it went off very fast". Within hours of being picked, some of the produce looked weeks old according to the respondent. These examples are very much based on stone fruit and cherries specifically, however, meat, fish and seafood go far more smoothly and do not get hit with the same problems to the same degree. The only problems with these such products was if the cooler on a truck or in a cool store was to stop working or lose temperature. Trucking and mishandling is where temperature may get abused but it is very rare because the cool chain in New Zealand is very tight.

Following this, the respondent from GLB4 was asked to discuss their relationship with airlines and their handling agents. Although they lease space in an agent's facility, they do not have any problems because they have staff operating there. In terms of the airlines the respondent stated that "We have a great relationship with the airlines, and we have to, we are their clients and we need them, so it is a two way street; we have close relationships with all of the major carriers into New Zealand". They stated that with one airline there are ongoing issues, especially due to their cool store space which ultimately means GLB4 have to operate their store extra hours to cover what the airline should be doing for them. GLB4 drop a lot of cargo off with Air New Zealand because of the Qantas freighters which run every morning, as well as Air New Zealand to Auckland or across the Tasman. Many more problems do occur in the peak season for GLB4 but nothing really impacts product quality. They have had instances where Cargo Terminal Operators (CTOs) leave freight out on the tarmac if it gets offloaded, but these happen very rarely. One example was of a container which was lost for 32 hours by the baggage area, and in cases like this GLB4 would hope that

the products are wrapped well enough to cope, however 32 hours is far too long to sit in the sunshine.

Some destinations are harder to get products into according to the respondent of GLB4. China is an example of a country where the documentation is difficult to get right, so there are issues around documentation for GLB4. As well as this, the respondent stated that there will always be certain destinations that are hard to get product into, but generally speaking they will find a way. Whether the country accepts the product is another story. They must check the product against the international registrar to make sure they can accept the product and there are import permits in place. This is known as the Importing Country's Phytosanitary Requirements (ICPR) in produce terms.

The respondent for GLB4 was asked whether they had any problems with getting hold of ULDs and they replied that they do especially in the peak season; however, there is only so much they can do about it. As well as this, they stated there are simply not enough international flights to support volumes of freight and more wide-bodied services are required in order to resolve this.

In terms of cool store space the respondent stated that the main shortage of cool store space lies with one airline, but there may be a little bit of a lack with their agent's facility at the moment but nothing serious that would ever cause issues.

Next the respondent was asked to describe GLB4's dealings with CHC and their involvement in the process. The respondent previously had a lot to do with them in a previous job and generally speaking they were very good. "They have a lot of money and they are prepared to spend it for the right cause". They don't have an involvement in the process as such but they do control the security side of the airport and GLB4 are tied into the Aviation Security (AVSEC) in association with the airport company. The respondent made it clear there are no problems dealing with them, and generally they have strict rules so if you have a problem it won't get very far.

When asked what the biggest problems GLB4 faces, the respondent replied saying that it comes back to the airlines, the number of international flights and wide-bodied services operating in Christchurch. Another problem is the distance from exporters or fresh product sources. For example, fresh fish is coming from Nelson which is an eight hour trip by truck every day. The same goes for cherries from Central Otago which can be a six to eight hour trip.

The respondent was then asked if GLB4 have ever made complaints or offered ideas to solve certain problems. The respondent stated that they have been talking to Air New Zealand to let them know that they need wide-bodied services down into Christchurch from Auckland so GLB4 can get product to Auckland and in turn, more volume will pick up out of Auckland.

Finally, the respondent was asked what could be improved on, if anything in GLB4's process. The respondent stated that their process is limited by the mechanical ways things are done because it is not automated or streamlined. They stated "Our systems are clunky and old, we need to be a paperless world, which is what is hindering us in the produce side". The respondent went on to say that the meat and fish side is basically underway, and could work in a paperless world with a secure cool chain. The biggest thing around what they do is keeping everything in the cool chain as a part of their risk management programme, making sure products come in at the right temperatures, keeping products at those correct temperatures, and going out at those temperatures too. They stated "We are the ambulance at the bottom of the cliff, we fix what others do wrong, we get into trouble if we don't pick it up, and they get into trouble if we do".

4.4.3 Aircraft

The respondent of GLB4 was asked whether they are aware of any problems on board or in the hold which affect product quality. Over the years they have had difficulties with the hull temperatures, especially with some cheaper Asian carriers which do not have adjustable hull temperatures. Out of Auckland GLB4 do a lot of live bees and if they were to have incorrect temperatures then the bees wouldn't survive. They stated that it all depends on the airline because Singapore Airlines for example have an automatic setting for their temperature for as low as it goes because they always have meat on board. The respondent

did say that poor hull temperature control could affect product quality because New Zealand is a long way from the rest of the world and so products are going to fly ten hours or more, and it is a long time for products to sit at 20°C rather than around 5-7°C.

4.4.4 Future

When asked how the respondent saw GLB4's future in the global logistics industry and their business operations, the respondent stated that they need to become much more mechanised and technology based. One example made was that some exporters still do not use barcoding even though it is a simple process which has been around for over 20 years. Having said that the respondent said that they haven't pushed exporters to do it either. As well as this the GLB4 respondent stated "We need to be bigger in New Zealand, we need to cope with the mass, but our passenger loading will never cope with that because of the size we are". The respondent believes that the story of the industry will be based on the passenger loading of the aircraft. "90% of what New Zealand does is export and this is because of producing far more than we need".

Next the respondent was asked whether GLB4's role in the process would still be needed. The respondent said that they don't see the process being automated from the pack house or grower so they believe GLB4 will play a role. In the likes of America they believe it could happen because they can load straight from the pack house into units and truck it to the airport. According to the respondent, "This is because in countries like America they have pure volume, whereas New Zealand has not got enough volume, there are too many pack houses, and it therefore has to be consolidated".

The respondent for GLB4 stated there is clearly a shift towards consumers purchasing directly from the internet, and they are beginning to also do this in the agribusiness and perishable market too. "They are starting to roll out in Asia, and how it will affect us I don't know, but the likes of operations similar to My Food Bag in China and Hong Kong for example are huge already". The respondent went on to say that they have been in contact with Alibaba and it is possible that there could be New Zealand meat for sale online which could change the whole face of how GLB4 and other global logistics businesses operate. The respondent stated that it will have an impact on GLB4 because they think it will "grow

exponentially and people of the new generation want products instantly and they want it of the best quality". They believe that it is going to impact what they do because New Zealand has the capability of providing to very wealthy Asian markets, and they are very wealthy compared to other parts of the world so they have the money to buy such products at such extremes.

4.5 Case study: Airline 1 (Air1)

Air1 employs four operational staff as their Sky Cargo team, and are also contracted with another firm for the use of their cool stores which have another dozen staff who manage the store goods and loading on to the aircraft. This airline exports approximately 150-160 tonnes per week, or up to 21-22 tonnes a day in the peak season during the summer months, while in the off-peak they export around 125 tonnes a week, or 14-16 tonnes per day on average.

The respondent from Air1 is the Cargo Manager for the Christchurch branch which involves facilitating with the freight forwarders and their contracted agents who own the cool store facility in order to get the products on the aircraft and exported out of New Zealand. The respondent has been an employee for Air1 for around 15 years, and has been in the industry for over 30 years.

4.5.1 Export process

The respondent for Air1 was asked to talk through the process from when the products arrive with them, through to getting them exported out of New Zealand. Firstly the products must arrive at Air1's contracted site two hours prior to the daily scheduled flight. Some products do come in earlier than this, sometimes up to 24 hours before the flight. The majority of the shipments will be pre-wrapped before arriving with the handling agents, however, in the case where it is not, the agents can wrap the specific shipment to its specifications at a cost. Once the product has arrived it must be weighed and documentation must be completed. This information is then sent two hours before departure to Dubai in order to be cleared. Following this the products are transported to the aircraft where they are then loaded very specifically according to the loading plans. These have been developed based on the dimensions of the units including the weights and shapes. The plane is loaded at least an hour prior to the flight.

Next, the respondent was asked whether they had experienced any issues around timeframes of getting products out of New Zealand. Air1 is lenient towards forwarders delivering late as they believe that there is always a good reason for the delay, and each

person in that supply chain shouldn't be punished, however, there are issues as there is only so much Air1 can do. Much of these issues are caused from forwarders delivering products late prior to flights which means that sometimes products are offloaded from the flight. Although they pride themselves on being lenient, if they do wait too long it means that people have to rush, and that is where they believe mistakes can happen. This is far more common in the peak season when volumes of freight are higher. In terms of how often these problems arise, the respondent stated that it depends but on average probably about once or twice a month. Furthermore, they stated that it doesn't negatively impact the product quality because all products are sealed and well looked after. Some products can have 48-72 hour delays and still maintain themselves.

When asked on their view of the number of international flights flying out of Christchurch and whether it is enough, the respondent of Air1 stated that they are full and most wide-bodied services are full out of Christchurch from late October through to mid-April. Furthermore they said that a lot of product is moving to Auckland because there isn't enough capacity in Christchurch, however, seasonal capacity does increase with seasonal carriers through the likes of Cathay Pacific and China Southern Airways, but still nowhere enough to cope with the supply of freight. The respondent state that "Ball park figure we lose about 30-40% of product up to Auckland due to not enough capacity in Christchurch".

The respondent of Air1 was asked whether they ever have problems providing enough ULDs to their customers. They replied saying that they do because New Zealand is at the end of the world so there is no west-east flow like a lot of other countries have, therefore the units all come from the west. The respondent stated that they don't have the ability to get units from both sides which does make it challenging. They believe that they manage it really well by getting a report every day at 9am to tell them what units they have got where in order to give them the ability to plan 36 hours out. They can then plan to get units back from Dubai or Sydney in advance.

The next question asked the respondent whether certain destinations are more difficult to get products into than others. The respondent of Air1 stated that different airlines are really strong into different markets compared to others. Air1 for example is very strong into

Sydney and Dubai as well as the Middle East and Europe, however, they struggle getting product into Asia as they have to back haul and are competing with Singapore Airlines and China Southern Airways. Some agents do use Air1 into Asia in the peak season during the summer when capacity is hard to come by and they are desperate, but it is much more expensive due to the distance of travel required. Destinations are also very seasonal, for example, Amsterdam is very hard to get into for about six months of the year according to the respondent.

When asked to explain dealings with CHC, the respondent of Air1 stated that they have become really strong over the last few years with a management change. They are now very proactive and see air freight as a really important part of the airport. As well as this “they are now looking at the plan for the future rather than just being focussed on the present which they have been in the past”. Air1 have had no problems dealing with them at all.

The respondent was asked whether they think there is a lack of cool store space with handling agents in Christchurch. Air1’s contractual relationship with the cool store agent was because of the lack of size of other cool stores. Being contracted to use their agent’s cool store allows for Air1 to be independent and not have any problems with a lack of space.

The biggest challenges Air1 face in their operations is over forecasting according to the respondent. For example, they look at passenger numbers a few days in advance of the flight and if there are a low number of passengers and luggage, and more space available in the cargo holds for freight, they may forecast for more products and available space in the holds. However, in some cases there are changes in the passenger numbers at the last minute meaning that luggage space could take up forecasted space for freight and therefore payloads can be cut as a result.

The next question asked to the respondent was whether the process Air1 follow to export perishable agribusiness products is as good as it can be. The respondent stated that with the equipment that they have got, yes it is as good as it can be. Furthermore they said “products especially in the summer are held in the cool stores as long as possible before the flight in order for them to spend a limited amount of time on the tarmac in the sun”. Also, they

mentioned it is easy for products to start heating up and once that happens it is very hard to get them to a suitable temperature again. "We are really on to the handlers of perishable products about keeping them in the chillers for an extra 45 minutes before the flight in order to reduce spoilage". Air1 haven't had a perishable claim for well over 18 months.

Following on from this, the respondent was asked to explain what a perishable claim is and what it involves. They stated that a product may turn up hot at the destination, and generally every shipment has a temperature sensor in it, so they can track the shipment throughout the whole journey to make sure that the temperature hasn't spiked or gone outside the tolerance levels of chilled or frozen products. A perishable claim may arise if a product has arrived too hot at the destination or throughout the process. Generally, the cool chain from New Zealand to Dubai is very good, they use refrigerator trailers on the tarmac in Dubai so that products remain at a stable temperature. If they do receive a claim, they investigate what has happened. Their reporting systems in Dubai are also very good, and tell Air1 when the products have been put in the cool stores and other steps along the process. The respondent mentioned that they can get a lot of information out of the system without having to go to Dubai or whichever country it is in. "It is all in real time to, so when it gets put into the cool stores it will then get noted in the system and therefore we will know a bit more about the process including how long it has been on the tarmac for example.

During the tour of Air1's facility, many products were covered with black wrapping and the respondent stated that some global logistics businesses do not supply details to the airline around the exact products being handled or loaded onto the aircraft. The question asked to the respondent was how this can pass through strict airport security requirements, and also whether it would ever be done for perishable products, as airlines must require details for temperature control in the hold. The respondent stated that these products covered in black wrapping have already acquired security clearance before reaching the airline.

Because every freight forwarder is a RACA, they are a known customers, so from a security point of view, whatever the agent presents to the airline, the airline has to take it as being secure.

In terms of the perishable products, the agent will present the AWB and when they make a booking they will also say that the product is perishable. When an agent presents the cargo,

Air1 will therefore already know that it is a perishable shipment, and normally the perishable shipments will be agent loaded and it will have perishable stickers on the AWB and the shipment itself. It will remind the handlers to keep the product cool wherever possible in transit and it will also state the temperature variance which is between 2-8°C for chilled products and under -18°C for frozen products. If the global logistics businesses present loose perishable cargo, it is generally in polystyrene bins or wrapped in a thermo-blanket, as well as the use of dry ice in order to keep the products at the desired temperature.

4.5.2 Aircraft

The respondent of Air1 was asked whether they are aware of any problems on board or in the hold which affects the product quality. Air1 weren't aware of such problems, and stated that more commonly nowadays, the pilot has the ability to cool the cargo holds down when they are required. "We notify the captain what he is actually carrying on board, not just dangerous goods, but also perishable cargo, and so, what this does is it alerts the pilot that they may need to cool the cargo down to a certain degree so there aren't any issues in the cargo hold itself". Prior to loading the products on the aircraft, especially in the Christchurch facility in the summer, Air1 holds the product in the cool stores for an extra hour prior to departure if it is perishable. Two hours prior to departure, Air1 normally load the cargo in the aircraft. In winter, because the temperatures are generally cool, they will take it out on to the tarmac and it will sit there for 20 minutes while it is being loaded because the temperature of the products are less likely to fluctuate, however, in the summer period when there are strong North Westerly winds and it can be over 30°C, they will hold the products in the cool store for an extra hour. This means the products will come out of the cool stores at Air1's facility and be loaded directly on to the aircraft. Once the products are in the aircraft the temperatures will stay fairly stable, whereas if they are left on the tarmac it can affect the product quality.

4.5.3 Future

When asked if Air1 are seeing a shift towards consumers purchasing directly through the internet, the respondent stated they are not seeing it but they realise that it is going to happen. Furthermore, they discussed Alibaba looking into buying their own aircraft in order

to cope with their demand which is a big move in the industry. "It is going to be the biggest shift in what we do". Air1 are not seeing it in the agribusiness sector as of yet and it is not having an impact on their operations, however, they recognise that it will at some stage. Lastly the respondent was asked whether Air1 had any concerns for the future impact on their business. They stated that the facilities required to deal with it will be very different to what they are now. Rather than bulk goods it will be far more individualised meaning the supply chain will be far more complex and make it far more difficult for airlines and global logistics businesses.

4.6 Case study: Airline 2 (Air2)

Air2 employs four operational staff in Christchurch and outsources their freight handling to another agent. During 2017 the airline exported approximately 3000 tonnes of freight. On average Air2 export around 10-14 tonnes of freight per day during off-peak, while during the peak season from October to March they export about 19-21 tonnes per day.

The respondent is the Sales Representative for Air2 and operates a small team which also have the task of filling the aircraft. They do not have a direct relationship or deal with the exporter, but rather the global logistics businesses who work on behalf of the exporters. The respondent has worked for Air2 for over 20 years.

4.6.1 Export process

The respondent was asked to talk through the process from when the perishable product arrives with the handling agents, right through to when the product is exported out of New Zealand. The products arrive to the warehouse from the global logistics businesses and then Air2's contracted handling agent does the work from there on behalf of Air2. While this is happening, the airline's biggest task is to liaise with the freight forwarders in order to get space for them.

When asked whether Air2 have ever had products they haven't been able to export, the respondent stated that they haven't, however, one disadvantage is that South Korea see Singapore as an infected port so when a large amount of products are going into South Korea, Air2 must make sure that their handling agents are tightly sealing the shipments in order for the products to be accepted into the country. This goes for many other countries with stringent requirements.

Next the respondent was asked to describe Air2's relationship with the freight forwarders. "Freight forwarders act as agents for airlines, they are our customers, they act on behalf of the exporters". Furthermore the respondent went to on discuss that freight forwarders products can be offloaded from flights for price differences as small as 3-4c per/kg. Both airlines and freight forwarders are trying to make a profit at the end of the day so there can

definitely be problems around this. The respondent stated that “There is finite space in the aircraft and so we try to fairly proportion and allocate space for freight”. Obviously profit can be a driving factor for Air2 but they try to be as fair as possible to their customers in terms of the allocation of space and the profit they make. Sometimes they will accept the more profitable freight and other times they will take less profitable freight to keep the faith with other exporters.

The next question asked the respondent of Air2 what their view is on the number of international flights out of CHC and whether it is enough. They believe that there is an under capacity of flights out of Christchurch, with operations far smaller than that in Auckland. In the peak season there are a lot of flights from Christchurch to Auckland carrying freight due to the under capacity. Air2 is operating three more flights from November to January which helps capacity problems, but also seasonal flights such as those offered by Cathay Pacific and China Southern.

Following this the respondent was asked whether Air2 ever have problems providing ULDs to global logistics businesses or handling agents. The respondent stated that there are times where they have to truck ULDs down to Christchurch from Auckland because there are sometimes problems supplying them, especially in the peak season during the summer, but this is just the reality of business for them.

Air2 find that some destinations are harder to get products into than others but it is always driven by demand. Cherries to China or Taiwan is always a tough task in the peak season for Air2. The hubs also determine a lot about where airlines can get into easily too. Air2 thrive in Asia, however, find it harder to get into the Middle East and other countries far away from their hub.

Next the respondent was asked to discuss the relationship between Air2 and CHC. The respondent stated that CHC has done well to introduce more freighters in order to deal with the peak season including Cathay Pacific. They are also very willing to help and understand the airline’s objectives. Air2 have no problems dealing with the airport.

The respondent was then asked whether they believe there is enough cool store space with their handling agents. They stated that there is not enough, however, there are two sides to it. Air2’s agent wants their cool store facility to be a transitional facility that doesn’t

accommodate products for a long period of time. They want products to come in prior to a flight for a few hours before being loaded on to the aircraft. Freight forwarders want to have a facility where they can deliver their products a day before a morning flight, or a larger number of hours before the flight which doesn't fit with the agent's transitional facility. This means it is not the ideal cool chain that is expected but it is something they have to work around. Temperature recorders are now becoming more common as exporters want to know details around the temperatures of their product throughout the process. This puts more pressure on handlers who must make sure they are insulating the products properly and not allowing products to go over certain temperatures.

Air2's respondent then discussed the biggest challenge they face as being capacity in the peak season. It is obviously a seasonal challenge, and if they don't have enough space for freight forwarders products then it means business for another airline which is not ideal for Air2. Air2 plans on upgrading to larger aircraft in 2019 but ultimately, tourist demands control the capacity and number of aircraft operating.

4.6.2 Aircraft

When asked if there are any problems on board or in the hold which affects product quality the respondent stated that "everyone must understand an aircraft's hold is not a refrigerator". The hold is between 4-10°C for perishables. If animals are in the hold this temperature will rise. There is a lot to manage including the even weighting of each hold, the separation of animals and perishables, and dry ice for perishable products.

4.6.3 Future

The respondent was then asked how they see the future for Air2 in the industry and their business operations. They stated that the South Island is strong in producing perishable products and this will remain the same for a long time, as well as exporting them out of Christchurch. Furthermore they said that "Cherry production is expected to triple in production in the coming years and it could be difficult to find the capacity and space to handle this supply".

Following this the respondent was asked if they are seeing a shift towards consumers purchasing directly through the internet. The respondent stated that it is huge, and an

example of this is Amazon who are starting up their own airline in order to handle the demand in freight. This isn't being seen in the agribusiness area as of yet by Air2.

Lastly, the respondent from Air2 stated that electronic AWBs would make a huge difference in the process. This would mean sending health certifications electronically rather than sending them attached on the products like how it is currently being done. This would reduce the chance of them being lost and ultimately could be the future of the industry.

4.7 Case study: Christchurch International Airport (CHC)

The respondent from Christchurch Airport is the Airline Development Manager: this has a few different components associated to it. One of these is the airline and network development in the passenger and air freight side of the business. Another is having an oversight in the other aviation movements outside of this, which includes the Antarctica Military operations, general aviation, and the corporate jet facility that Christchurch Airport have in conjunction with Garden City Hill Aviation and Helicopters. The main aim is keeping the business abreast of how the aviation industry is changing and how that affects Christchurch, especially considering Christchurch is at the bottom of most airlines route networks. They must be open to opportunities, and build new network models in order to get new airlines to come to Christchurch, or work with existing airlines to grow capacity.

Christchurch Airport employ around 230 people but that covers everything within the airport. There are about 85 employees in the corporate offices. Within aviation development there are 4 employees, and that is the respondent and a colleague who look after aviation business development, as well as two analysts. The respondent has been with the business for 3 years, dedicated to the roles mentioned above.

4.7.1 Freight

When asked what responsibilities the respondent had when it came to freight, they stated that it is an area that CHC have put a lot more energy and resources into over the last 2-3 years and that coincides with the role that the respondent came into the business to do. The respondent mentioned that personally they have an airline background based over their whole career before coming to Christchurch for the role. They saw it as an opportunity for CHC to become far more involved with freight and general cargo, especially considering they act as the landlord for many of the global logistics providers on site at the airport. One of the areas which the respondent thought needed improvement was forming relationships with global logistics firms in order to learn where the industry is moving, and hopefully provide some knowledge that is useful for global logistics firms also. They are now sharing an increased amount of information compared to what they have been in the past. As well

as this, CHC have been talking to exporters, either directly or through the Chamber of Commerce who are also a great partner to the airport in that environment.

The majority of global logistics firms or freight forwarders are asking for more capacity by air. The respondent's job is to try and grow that in one of two ways. The first is through dedicated freighter aircraft which is the smaller part of the business. The other is through optimising the passenger aircraft and making sure that they increase the number of wide-bodied services due to the capacity that they offer which is really significant. How CHC have gone about that so far is very much based on relationships and then transforming them into partnerships. According to the respondent it is about feeding the hubs, so the likes of Auckland, Sydney and Melbourne, and then also the long-haul networks and hubs, especially in Asia such as Singapore, Hong Kong and China. CHC have a very clear mandate to make sure that freight is a part of the conversation with all the airlines, and if the existing airlines operating out of CHC are not delivering the capacity needed then that also gives a mandate to go and talk to dedicated freight operators, which at CHC include Tasman Cargo Airlines and the Parcel Air operation which do express deliveries. There is a lot of growth on that side because there are still constraints in existing airline capacity, especially during the peak summer period.

The respondent was then asked what the primary objectives or aims of CHC are, or what their mission is. For CHC, at a top line level it is very much about "Gateway New Zealand" which is for passengers as well as for goods including imports and exports. The gateway basically represents the ability to get to and from global markets, and the respondent stated that it "shapes the way we do everything". This way they then get the economic contribution into Christchurch but also into the wider South Island. This is shown by passengers arriving from foreign markets into Nelson, Dunedin, Queenstown and the West Coast at growing rates. Where it also relates is the regional footprint of freight. The CHC are doing a lot more activity just by cooperating and collaborating with exporters as far as Southland, Nelson and Marlborough in order to bring all of that product through Christchurch and then out to international markets.

The Gateway South Island was no doubt in its first instance thinking about passengers and that was the right way to go about it according to the respondent, but what has been really positive is that the CHC in recent years have been involved. They have actually been able to make it relative to, or in context of freight businesses as well. The reason they have put that in the conversation is in regards to the huge amount of high quality products that the South Island is producing which the global economy wants, and they believe that they are losing too much of it to Auckland. "That to us seems like the wrong way of taking the products to the market, and it is one of the challenges that we continue to identify". They have decided to put the "Gateway South Island" message into the mix from an export and import perspective, especially when it comes to the perishable products that exporters are producing from the salmon farms in Marlborough, all the way down to Stuart Island and everywhere in between. That is where it has come really relevant to CHC and they believe that the industry starts to understand it a bit better. The position which CHC occupy in this space is to create relationships in order to make doing business with exporters and airlines much easier.

Next the respondent of CHC was asked their thoughts on the number of international flights from CHC, and whether it is enough to support current volumes of freight. They stated they gauge their airline capacity in seat terms a lot of the time so in the last couple of years they have had quite significant increases in international seat capacities, sometimes up to double digit increases. In their fiscal year of 2017 they were up over 15% on the previous year and so where they have continued to see opportunities is that their load factors are still being pushed higher and higher. That is in terms of passenger load factor, but also in terms of cargo booked load factor. This does however lead to constraints, and the respondent stated that CHC is going to be more constrained this coming summer because they haven't been able to continue to grow capacity, not due to commercial performance at CHC because of demand, but actually because of the supply side of the business due to two main reasons. Airlines are under a lot of pressure operationally with various engine problems such as Air New Zealand's Dreamliners for example. The other is a general tightening and increase in fuel costs. Airlines are reporting up to 50% year on year increases in fuel prices. Being at the bottom of the world, these overheads play a much higher proportion than they do in some of the Asian countries which are obviously one of the big drivers for CHC in terms of

demand. This is not only in Asia, but it also applies to North America and Europe, so CHC are starting to see some pinch points because of this.

The next question asked to the respondent was whether CHC make money directly or indirectly from freight being exported. The majority of it is indirectly through the commercial property business. CHC's freight revenue comes from the dedicated freighters only because they don't charge based on aircraft weight for passenger aircraft, they charge per passenger, so a passenger aircraft can carry freight for free when it comes to CHC's charging methodology. For the dedicated freighters themselves, that represents around \$3m of an approximate total revenue of \$75m. The ratio is tiny but it is again the economic value because of CHC's time, effort and energy that has gone into promoting the capacity. It is also useful for the South Island and for the freight forwarders, but it is also useful for the airlines to get high quality product coming through.

4.7.2 Action plan

When asked whether CHC have an action plan to cope with increasing freight volumes the respondent mentioned that ongoing the work that CHC are doing, what they have determined is Christchurch is going to be short on international passenger capacity growth during the 2018 summer or possibly even for the next 12 months; but then they expect that with a couple of new routes and expansions of existing ones being introduced, this shortage will likely disappear. How that gives CHC a mandate in the freight business and the action point is to really grow short term capacity wins, so for the next 9-12 months they will have an opportunity to get dedicated freighters into the market. One freighter which will help considerably is the Tasman Air Cargo (DHL) aircraft with a 50 tonne capacity. This aircraft has recently been confirmed to operate a one day a week service between Christchurch and Sydney from November 2018 through to February 2019. This is only an example of a little project in isolation, but it is putting more capacity at times of the year when it is required.

In terms of forward action, CHC need to expand the operations of a particular airline and they need a second carrier or an existing airline to come in with a specialised freighter to supplement passenger services. One of the challenges that they face is when they fill the passenger seats there is an offset where they are reducing freight capacity, and an aircraft

like the A380 is a good example of this because when it has 500 passengers on board, there is a direct impact on the freight capacity, or an equal-opposite reaction for cargo. They look at it market by market, but if you look at an airline such as Qantas flying to Australia, it can connect into South East Asia tremendously well, so it is in Christchurch Airport's best interest to try and grow and get larger passenger aircraft as well as their specialised freight operations. Keeping a close eye on where the products are coming and going is key for CHC, but also understanding the perishable seasonality. They also need to watch the market to understand what they need to do when high growth rates are expected in the 2019 and 2020 summer periods.

When asked whether the airport invests in any campaigns to promote the South Island to potential tourists, the respondent stated that there is a lot. Many of these are multi-million dollar investments each year. The key markets that they are investing in currently include Australia, China, Japan and the UK, but as well as this, if a new service or route starts up then they will go and put marketing support into that market as well. Many of these campaigns don't generally look like CHC marketing, but they are often alongside airlines or tourism partners such as Christchurch Tourism or Tourism New Zealand. Of the campaigns which CHC are involved in, 80% of these would be in partnership with another organisation, while the remaining 20% would be individual campaigns. One programme, "South Initiative", is an airport led initiative which has 13 regional tourism organisations from all around the South Island as a part of it. This South umbrella goes up to Australia and China marketing the wider South Island with the overarching "Gateway South Island" message. Christchurch Airport benefits from this in increasing demand for the region and hopefully that comes in through increased air traffic.

Following this, the respondent was asked whether there is a relationship between increasing tourist numbers and the number of flights coming into Christchurch. The respondent answered saying there is certainly a relationship. Christchurch in terms of international visitor arrivals from key markets is actually ahead of the national average in growth. For the fiscal year 2018, New Zealand's Chinese visitors arriving in Christchurch was 24% against the national average of 12%, whereas Australian international visitor arrivals,

although slightly lower, had a similar ratio. The South programme has got a lot of credit generating these results.

4.7.3 Relationships

The respondent was then asked to discuss CHC's relationship with freight forwarders. Initially the airport didn't have much of a relationship with freight forwarders at all, however, "there is now a conscious effort to create a strong relationship with them". CHC are keeping them more in the loop with updates including new routes or aircraft operating out of Christchurch. One new initiative is focus groups which were designed by CHC in order to discuss and generate ideas. These were designed for general market updates, to share information and give freight forwarders a view of what airlines, what capacity, or what parts of the network the airport are chasing, and also for the CHC to understand from forwarders what markets are important to them. One of the things CHC found out a few years ago was two new destinations on forwarders wish lists, Hong Kong and Los Angeles. CHC have achieved Hong Kong, and are now working on services to Los Angeles. These focus groups are something that the respondent believes should have been happening sooner.

Following this, when asked if forwarders provide feedback about problems or potential solutions, the respondent stated that it is very common. "A lack of capacity would be the one that keeps coming up". Also, something the respondent thought was interesting is that there are discussions that there is now a shortage of air capacity into Christchurch, or in other words, a lack of import capacity, something which the respondent has never heard of before. In regards to this they stated "What that says to me is that we are actually starting to solve that traditional directional imbalance because that is one of the other challenges that airlines to and from Christchurch have always faced". New Zealand have never normally had enough local population to fill the cargo holds of the aircraft coming in until now. It is easy to fill them outbound because New Zealand have products which are demanded globally. This is likely caused by the rise of e-commerce and the express delivery, but it also goes to the manufacturing sector that has really grown in the South Island. Componentry is now being imported into Christchurch and we are exporting the finished products out. The respondent of CHC believes that it is really positive. Airlines always want to know that they

can fill the aircraft in both directions, and although it seems like a simple thing, it needs quite a lot of detailed analysis to balance passenger and freight demand and supply.

Next the respondent of CHC was asked to discuss their relationship with the airlines. They stated that their relationship is very strong and probably at the best point it has been in the recent history of the airport. One of the things CHC backs themselves to do is understand all of the airline's strategies at the level at which the airline understands their own. This includes knowing what their fleet strategy is, what their commercial network strategy is, and how their yield mix looks in terms of Christchurch positions against all of the other airports, therefore allowing CHC to build up revenue models for each of them. CHC must be narrowly focused on each of the airlines but then they also must have a very top line view of the whole market. What CHC have tried to do with airline relationships is involve them more in decisions surrounding airport upgrades or other important decisions. For example, CHC had ideas of how they were going to expand Christchurch International Airport and previous airfield infrastructure. The CHC started to deliberately engage with the airlines early in this process, communicating ideas, and asking for the airline's opinions or alternative ideas. These discussions were not particularly difficult, but they were very consultative discussions that were really important to have. The respondent was also complimentary to the developers of the airport who planned for room to grow. It has meant CHC is "not going through the growing pains that some other airports are going through such as Wellington who don't have enough runway space, Queenstown who don't have enough terminal and gate space, or Auckland who have many issues throughout the airport".

Furthermore, the respondent was asked whether CHC get any feedback from the airlines. They mentioned that they are starting to get feedback in regards to freight, but this is likely due to CHC starting to put freight more regularly into the conversation in terms of network planning. The dialogue with airlines such as Air New Zealand or Qantas have really elevated at the network planning level, and CHC are doing a lot more forecasting for freight revenue, and estimating the success of aircraft and freight potential in certain markets for certain airlines. Airlines feature significant opportunity costs, so there is a direct opportunity cost of bringing in new carriers of airlines into Christchurch when it could be going somewhere else,

and this is something that CHC have to face. The growth is sometimes slower than what CHC would like but the airlines are quite transparent in their reasons for that as well.

The next question asked to the respondent was whether CHC has a role to play around the facilities including cool stores due to being the landlord for many of the buildings in the vicinity. The respondent stated that if a facility is operated by the operator they will leave the tenant to their own devices. What CHC are considering doing, and this probably relates to their action plan, is building their own cool store facility within the airport. There are many opportunities opening up, particularly with the shortage of cool store capacity for perishable products and all other chilled products, and the CHC understand they may need to take the lead on developing a project such as this themselves. Although this project may still be some years away from either the ground being broken on it, having a firm plan, or deciding on who pays for it and having access to funding, it is another example of a big opportunity for CHC. It also aggregates the supply chain process, being able to bring in all of that product by road from all around the South Island through a centralised gate terminal, unitising it, putting it into the units for the airlines, and then being loaded into the hold.

The respondent made note that CHC didn't have much of a role to play in the Air New Zealand rebuild and it was largely led by Air New Zealand. Air New Zealand plays a very important role because they do cargo make-up for a lot of different carriers for different operators, and they cannot expand a huge amount according to the respondent.

Lastly, the respondent of CHC was asked whether they are aware of any times when products are waiting on the tarmac for their flights because there is a lack of cool store space. The respondent was personally not aware of it being an issue at CHC, however, for some of the airlines they don't take their fair share of chilled perishables because of the perception of the handling quality at the other end of the supply chain, rather than at CHC. One example is China Southern which are seeing a rapid increase in uptake in their cargo capacity to Guangzhou, China. One of the challenges over the last couple of years in growing that is the perception of the freight forwarders and exporters needing more confidence around when their units are getting unloaded in Guangzhou and it is 32°C and 90% humidity, how is it being handled is the biggest consideration. Obviously there is a lot of

work going on in industry, and Air New Zealand are in the process of purchasing units that have temperature control and sensors. Many are reporting massive rates of temperature control and virtually zero temperature change through the process which is fantastic in the respondents opinion because at the rate of growth, keeping the value at its highest point is essential, so the value chain has to be at its peak, especially considering New Zealand will never have the volume of products that many other countries do, so value is crucial in order to remain competitive.

Once products are made up and are transported to the tarmac, there is a layover time between it coming inside the fence and getting on the aircraft for departure. CHC probably do see a need in the next few years, especially when volumes increase, to have a centralised holding point. The respondent of CHC stated that this may be where the integrated cargo terminal might have to play a part in the fullness of time, but again it is too early in the conversation to lock anything in. Furthermore, they stated they don't think the problem is in Christchurch, however, they believe the airlines have a responsibility to market themselves to prove the quality of handling once it has left Christchurch. It is something that Cathay Pacific were instantly successful with because they had a global reputation already, and a prior customer base. It is the airlines coming into the market for the first time with no reputation such as China Southern who have had to build that from scratch and so they are now growing, doubling or even tripling freight operations every year.

4.7.4 Future

Christchurch Airport are quite optimistic about what the future will look like. The respondent believes they are going to see 1-2 additional dedicated freight aircraft servicing Christchurch in the next 12 months. As well as this they think a flight from North America will start up in the next 12-18 months, and that will be a passenger service, but it will also give a good capacity to serve that market. Furthermore, the respondent stated that there will likely be an expansion of their key markets including Australia, China and Hong Kong. They believe a second route to both China and Singapore will be introduced in that same period. How this all translates to freight is all incredibly positive according to the respondent because dedicated freighters will increase, but then also passenger wide-bodied services

will start to increase at about the same rate. The respondent stated that work is to be done in order to continue bringing perishable products including dairy, fresh fish, and other products through CHC that are sourced from all of the regions in the South Island. "It is crucial that our freight forwarders are playing a part in the process and unitising that freight, keeping it fresh, keeping it at its top quality, grading and getting it out as quickly and as efficiently as possible, which is why the frequency of the flights becomes really important". Furthermore, the respondent stated that flights once a week is great but if they could get more frequent flights that are 3-4 times a week instead it means suppliers can produce and pick every day, or bring catches in everyday and it can be exported. Rather than having wide-bodied services such as 747 aircraft coming in at low frequency, CHC would rather medium sized freighters at a higher frequency. One other point the respondent mentioned was that CHC keep a close eye on the continued growth of e-commerce. They expect that there will be more to come in that environment, and that is going to require growth, both in terms of property requirement, but also in terms of ramp requirements for additional aircraft.

5 Discussion

5.1 The air freight export process

The air freight export process for perishable products (see Figure 5.1), begins with the exporter growing or producing a specific product for one or a number of specific international markets. Table 1.1 lists these products that are exported from New Zealand. Once the products are prepared and ready for export, the exporter will advise a GLB of the specific product they are going to export as well as information around the quantity of the product, and determine who will load the products into the ULDs. Once these have been established, the booking will then be made with the global logistics business. The GLB will then book space with a specific airline depending on the exporters intended market in which the product is going to. As well as this, ULDs will be arranged with the same airline and organised to arrive either with the GLB or the airline/handling agent. The exporter will then complete an export certification for their product which may either be an ED or a DOC depending on the type of product. Once this has been completed it will go with the product and they will both be transported to the GLB.

Following on from this the global logistics business will receive the exporter's product and documentation. The GLB will then perform visual checks in order to look for any potential damages or tampering which may have occurred during the transporting or handling stages. There will also be temperature check for perishable goods. The products are then counted, measured and weighed to match with the documentation and create load plans for when the products are loaded into the ULDs. Next, the products are kept in the cool store and the GLB completes further documentation including the AWB, customs entry and health certificates. Once this is complete the products are removed from the cool store and then either loaded into ULDs by the GLB depending on prior arrangement, or delivered to the airline handling agents at least three hours prior to departure.

The products arrive with the airline and if the GLB have not yet loaded the products into the ULDs then the airline handling agents are appointed to load them for a specific price. The products are then stored airline's in the cool stores if any space is available. In some cases documentation will then be sent to the specific destination for it to be cleared by

international authorities. Next the aircraft load plan is designed which involves taking all of the ULD and cargo dimensions into account including passenger baggage, and then designing a plan in order to fit all of the cargo in the aircraft holds. Products are then transported over to the aircraft one hour prior to departure and loaded on to the aircraft based on the load plan which has already been created. Finally, the products are exported out of Christchurch.

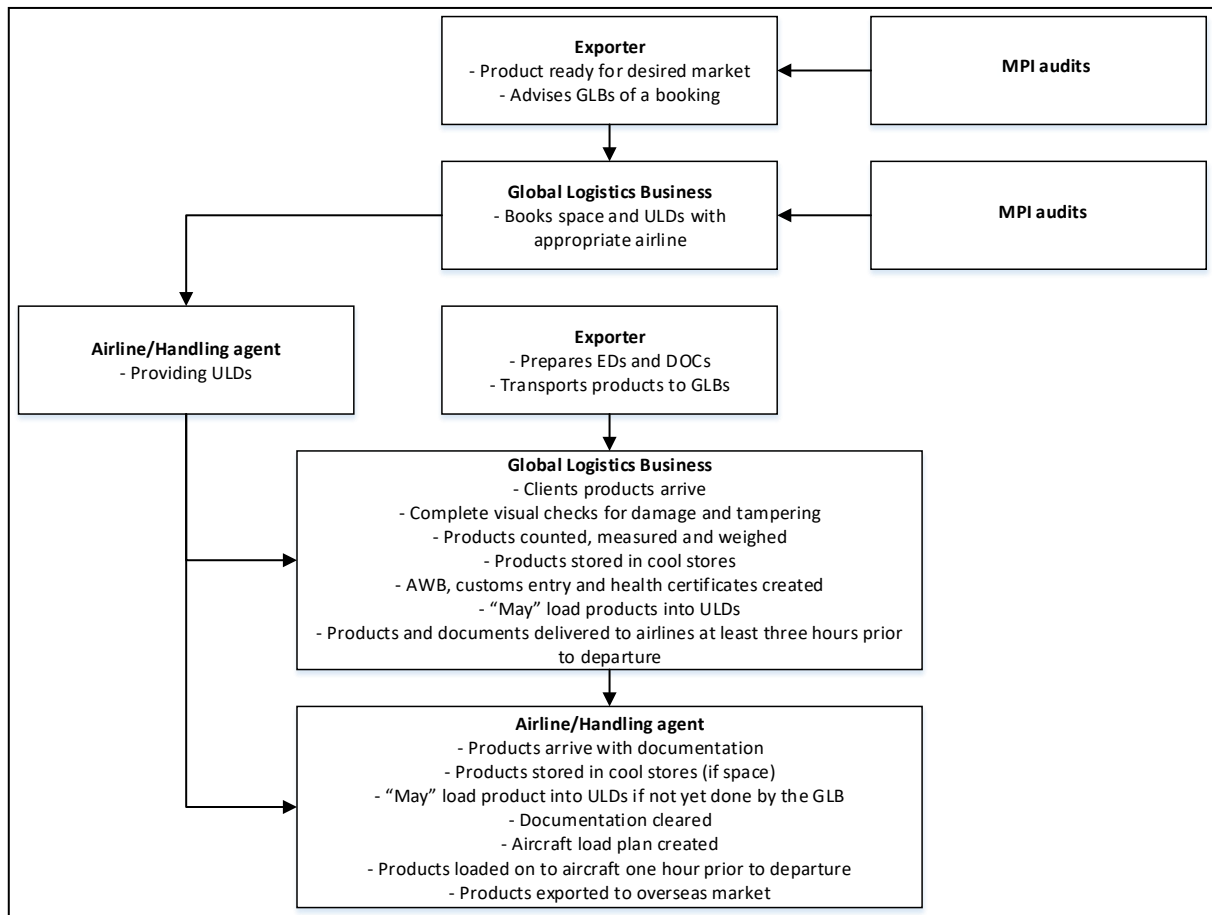


Figure 5.1: Supply chain process of air freighting perishable agribusiness products out of Christchurch International Airport

Comparing this process of exporting perishable products via air freight out of CHC with other processes featured in the literature review, there are a number of significant differences that are notable. Firstly, the process illustrated by Dodd (2014), gives insight into a fresh fruit supply chain in South Africa. This process displays a process in a different country and solely focusses on sea freight. Furthermore, it lacks any specific detail into the process and it does not relate in full to this study. MBIE (2017a; 2017b; 2017c) illustrated three different models of supply chain processes for produce, seafood and meat products

within New Zealand. It focusses on both air and sea freight, but also looks into domestic and international markets. Although there are similarities in terms of the process being based in New Zealand and exporting via air freight, there are other focusses on domestic markets and sea freight rather than specific detail into air freight. Due to this, it does not compare to this study in full. Lastly, Bez (2016) depicts a supply chain of exporting Kiwi berries out of New Zealand via air freight. This prior research is the most relevant to this study as it has a primary focus on exporting produce out of New Zealand via air freight, however, again it lacks the specific details involved in the process compared to this study.

5.2 Issues with the air freight export process

5.2.1 Capacity shortages

The most common issue mentioned by the global logistics businesses and airlines operating in Christchurch was the lack of transport capacity for freight on outbound flights from CHC. Every respondent made it clear that there is a shortage of wide-bodied aircraft, flights and overall capacity for freight, ultimately having an impact on each of their air freight processes, especially when handling perishable agribusiness products. All of the respondents stated that the shortage of capacity occurs most frequently during the peak season which can be from as early as August through until late April. This is directly linked to the fruiting season in the summer months where a large proportion of horticultural products are grown. Because New Zealand yield far more produce than required for local consumption, there is a large supply of produce that is exported to international markets. These markets are also very demanding during Christmas, Chinese New Year and Easter for New Zealand meat and seafood products which also drives the shortage of capacity or space on aircraft operating out of CHC.

As well as the large supply of perishable cargo causing a lack of space on aircraft, the respondent from CHC mentioned that there is also an equal-opposite reaction between the freight capacity and passenger numbers. When passenger seats are filled, the freight capacity decreases due to the passenger baggage. This also has an impact on the shortage of freight capacity on aircraft operating out of Christchurch.

Two of the four global logistics businesses that were interviewed stated that they do have to transport their products to Auckland on some occasions when there is a shortage of capacity at CHC. This can involve flying products domestically or trucking them from Christchurch to Auckland. Obviously these businesses would prefer not to have to do this as it requires far more handling of the products and incurs extra costs, but they find that they do not have any other options. Air1 said that approximately 30-40% of product is lost to Auckland as a result of the lack of capacity at CHC.

Operating more aircraft into Christchurch to cope with the capacity shortage would seem to be one solution; however, ultimately this is passenger driven. Airlines can realistically only operate carriers if they can fill the plane both inbound and outbound. As mentioned, from August to April there is more than enough cargo, especially in the form of perishable products such as meat or horticulture, and passenger numbers are high in both directions; however, during the remaining months of the year, especially during the winter, there is a lack of passenger numbers both inbound and outbound at CHC. Some carriers operate seasonally during the summer period including China Southern Airlines and Cathay Pacific which does aid the shortage of freight capacity; however, due to the passenger shortage off-peak, it means that they cannot operate year round like the global logistics businesses and exporters would like them to.

In terms of the impact on perishable product quality, one respondent stated that a shortage of capacity can have an impact on some products, especially products with very short shelf lives that may get offloaded from a flight due to there not being enough space. Another respondent wasn't aware of it happening within their business but stated that the produce industry was concerned that with a lack of capacity, their products may suffer as a result of having to be transported to Auckland to be exported to international markets. Based on this, anything that lengthens the transportation phase will ultimately shorten the shelf life of the certain perishable product.

A shortage of capacity was one key finding in the prior research featured in the literature review. The Ministry of Transport (2016) discussed how a fairly stable level of air freight transported out of New Zealand may imply certain limitations. Following on from this, Innes

(2009) found that South Australian exporters of perishable products were also struggling to find enough space on aircraft when exporting their products to overseas markets. This has significant relevance to this study as all of the respondents are finding that there is a lack of freight capacity out of CHC. Although the study by Innes (2009) was based in South Australia, it still demonstrates that this is not an isolated case and is in fact occurring outside of Christchurch. IATA (2016) stated that moving perishable products through the supply chain as quickly as possible is crucial in order to retain the highest possible product quality. As well as this, Tozi et al., (2006) discussed how perishable products have limited shelf life, and therefore, their quality will deteriorate with any delay in the final delivery to the final customer. Furthermore, Beilock (1988) discussed how these type of products are highly sensitive to time, handling and climatic conditions. All of this prior research directly links to the findings within this research. When problems such as a shortage of freight capacity occurring in Christchurch, it can have a negative impact on perishable products because they require prompt transportation through the supply chain to the final customers, and with delay will come deterioration of products.

5.2.2 Excessive licensing and auditing

Several of the respondents discussed the steps to become a certified exporter of agribusiness products as being costly, timely and in some cases unnecessary. The respondent from GLB2 stated that the costs involved include annual inspections and auditing fees as well as non-conformances which also sometimes incur a cost. These continue to increase as a result of MPI being under pressure due to a lack of resources. GLB4 also described the process as being expensive but furthermore mentioned that it can also be very time consuming. Approval can take up to six months or longer in some cases, not only within New Zealand, but also by the EU before being put on the registrar. Audits can take place quarterly for GLB4 and during the peak season it can be daily with many products transitioning through the facility. GLB3 made mention that the costs of maintaining licenses between audits means that they must be fully committed to their operations because it is very expensive and handling only a small amount of product would not be profitable enough to afford them. GLB3 mentioned that they have questioned MPI as to why some audits are required. One of these audits involves GLB3 having their water tested every month due to an EU requirement, costing them \$250 each audit. GLB3 stated

that all of the products coming through their facility are tightly sealed and packaged and do not require or come in contact with any water on site, therefore they do not understand why the audit is necessary. This and a number of other audits are questioned by global logistics business as to whether they are actually required. An increase in the number of audits is costing GLBs, who in turn are passing the costs on to exporters. This reduces the profit margin for exporters and is likely to have flow on effects on expenditure such as research development. This is stifling the future growth of exporters who could in fact be spending their profits on the development of their products and business operations, but instead are having to spend large amounts of money on licenses and auditing. This directly impacts the New Zealand economy as exporters lack the ability to develop and grow their business operations.

5.2.3 Cool store capacity

There was a common theme in regards to respondents experiencing a lack of cool store space at CHC. This cool store space is provided by the airlines at the airport and not by the airport itself. GLB1 stated that although cargo is required to be with the airline three hours prior to departure, much of the time airlines don't have enough cool store space to accommodate chilled or frozen perishable products at their facility. Global logistics businesses must decide whether to move the products to the specific airline ahead of time which can be difficult and still no guarantee of space, or alternatively, they can hold products until the three hour cut-off time and then rely on their insulation and weatherproofing of the products when delivering the products on to the airline handling agents as they will likely not have enough space to store the products in cool stores prior to the flight. The respondent from GLB3 stated that there is simply not enough cool store space offered by one certain airline. From the perspective of the particular airline, GLB3 understands that this airline does not want to be a storage option for global logistics businesses. However, because this particular airline handles freight for several other airlines, GLB3 expects that they should have significantly more cool store space for perishable products. GLB3 were having to deliver products to the airline at 2am in some cases in order to keep products in their own cool stores before making the three hour cut-off time for the flight. Ultimately, operating extra shifts and trucks leads to more costs for GLB3 which are all passed down through the supply chain to exporters. GLB4 also

responded saying that they are having ongoing issues with the same airline who lacks the cool store capacity to meet the demand of GLBs. Like GLB3, they are also having to run their store extra hours in order to cover what the airline could be doing on behalf of them.

5.2.4 Shortage of unit load devices

A number of the respondents discussed problems distributing or getting hold of ULDs. GLB1, GLB3 and GLB4 discussed how during the peak season, airlines tend to have a shortage of ULDs and therefore they rely on some being trucked or flown down to Christchurch from Auckland. They also stated that they must communicate with airlines prior to this in order for them to stockpile enough ULDs to supply all of the exporters. Air1 stated that they do have issues providing enough ULDs to their clients because New Zealand is located so far from the rest of the world and there is no west-east flow like many other countries have, therefore, all of the units come from the west which makes it challenging. The respondent from Air2 also had the same issue with supplying enough ULDs in the peak season and at times has had to transport them down to Christchurch from Auckland. This shortage could have the ability to affect the product quality of perishables if GLBs are having to wait for ULDs to arrive before being loaded into them.

5.3 Strengths in the air freight export process

5.3.1 Seasonal operations and alternative carriers

One strength of the air freighting process out of Christchurch is the growth in seasonal operations, carriers and new routes. Although it still isn't enough to cope with the outbound products, China Southern Airlines and Cathay Pacific's seasonal flights have contributed greatly to the capacity available in the peak season. Furthermore, the New Zealand courier post aircraft has been utilised in busy periods when required domestically, as well as GLB2 making the decision to introduce their own aircraft in 2017 to cope with the freight capacity problems. These have been found to be very successful and will continue to be operated in the future according to the respondents from CHC and GLB2. GLB1 also mentioned that there are more routes being introduced by Air New Zealand which is illustrating the growth in the industry and is a huge positive for exporters and global logistics businesses trying to find space on aircraft out of CHC.

5.3.2 Tourism campaigns

In order to obtain more aircraft capacity outbound from CHC, it requires more carriers coming inbound to Christchurch. Passenger numbers are key in order for more carriers to be coming inbound and therefore, CHC are heavily involved in tourism campaigns in order to promote the South Island, and increase the number of passengers coming in through Christchurch. This will then lead to more aircraft with capacity outbound from CHC. The respondent from CHC stated that they are making multi-million dollar investments into key markets such as Australia, China, Japan and the UK. Almost all of these campaigns link in with tourism partners such as Christchurch or New Zealand Tourism, promoting the South Island. CHC has had huge benefits from this, resulting in increased air traffic and inbound passengers and ultimately, the campaigns will continue to be utilised so long as it brings in more carriers which exporters and GLBs can fill with outbound products.

5.3.3 Import capacity

The respondent from CHC discussed a recent claim that there is now a shortage of import capacity on aircraft coming into Christchurch. New Zealand have up until now, never had enough population or demand for international goods to fill the inbound aircraft cargo holds. Obviously there is a problem with outbound capacity due to the large production of agribusiness products in New Zealand that are exported to global markets, however, there have never been shortages of import capacity until now. The respondent mentioned that it is a huge positive for the industry because it suggests that the directional imbalance has been solved between imports and exports. Two factors are likely to have caused this capacity shortage inbound and they include: a rise in e-commerce and a large growth in the manufacturing sector in the South Island. In terms of e-commerce, people are now buying many more products direct, online and having them delivered to their door from international markets. This has meant that more and more products are now being transported via air freight, filling the cargo holds of inbound carriers. The manufacturing sector on the other hand has meant that far more componentry is being imported in through CHC, the manufacturing takes place and then the finished products are exported out of CHC. The shortage of capacity for imports is a real positive because if airlines know

that they can fill the aircraft in both directions it means that they may have the incentive to increase the number of flights and the capacity to meet the needs of the industry.

5.3.4 Christchurch International Airport initiative

All of the respondents had similar feedback in regards to their relationship with CHC. It was made clear that CHC do not have any involvement in the air freighting export process as such; however, they have shown far more interest in the process in the last five years or so. CHC were known to have solely focussed on passengers and terminal retail in previous years, but each of the respondents mentioned the airport shifting its focus more towards freight. CHC have initiated workshops in the last few years with airlines, global logistics businesses and other service providers in order to keep key stakeholders in the loop with potential changes and future objectives that CHC may have. This has also helped build relationships with airlines in order to initiate new routes and carriers, ultimately helping to increase the capacity out of Christchurch. None of the respondents had experienced any problems dealing with CHC.

The respondent did mention that they are also considering building their own cool store facility based at the CHC. CHC believe they may have to take the lead on addressing the lack of cool store space at CHC. They did state that this is very much still in discussion and not guaranteed, however, they do believe it is a big opportunity that will help the industry and the exporting process for global logistics businesses and airlines who are currently having extensive issues with cool store shortages.

5.4 Future of the air freight export process

All of the respondents had differing opinions about what the future would look like in the industry and how their roles would change within the air freighting process. The respondent from GLB1 was excited to see the growth within the industry in terms of an increasing amount of products being exported, and also the destinations in which they are currently being exported. Furthermore they believe that the process will become increasingly advanced and complex as time goes on. The respondent from GLB2 agreed that automation and technology will advance the air freighting process dramatically; it will also result in less manual handling and personnel required. GLB3 discussed how there will always be a need in

the industry for global logistics businesses, but in saying that, some larger exporters are beginning to do their own documentation, export bookings and shipping. This could have a huge impact on GLBs and the process as a whole because GLBs could at some stage be disintermediated, or in other words, removed from the supply chain. The respondent from GLB4 again discussed the need for a mechanised, technology based process. As well as this, they stated that passenger loading will always hinder the potential of New Zealand exports due to the huge quantity of produce being produced for export.

The respondent from CHC stated that there is an increase in the number of global logistics businesses asking for more air freight capacity or carriers coming into Christchurch. The CHC is going to be more constrained from at least November 2018 through until February 2019 due to the increasing fuel prices and operational pressures on the airlines. Air2 made the comment that cherry production is expected to triple in New Zealand in the next year or so which will be a huge test for the industry. These are short terms issues that are expected however, CHC stated that they are very positive about what the long term future of the air freight process will look like. They believe that they will see another one or two additional freight aircraft operating in Christchurch in the next 12 months, as well as a new flight to North America which will be a passenger service but contribute further capacity to the freight market. Key markets are also expected to expand, including new routes into China and Singapore which will all help significantly in regards to freight capacity for exporters. Both passenger and freight carriers are set to increase in a similar period of time over the next 12-18 months which will benefit greatly to the need for freight capacity outbound from CHC.

Each respondent was asked if they are seeing a shift towards consumers purchasing directly through the internet and whether it is having an impact on their businesses operations. GLB1 mentioned that they have worked with a number of clients with prepared meals and consumer packs, especially into Asian countries and although it doesn't impact the difficulty of GLB1's operations, it does impact exporters due to stringent regulations controlled by MPI. The respondent from GLB1 went on to say that these sorts of products will be demanded on a much larger scale in the future. GLB3 stated that in terms of retail, it is a massively growing market all over the world, but in the agribusiness sector there isn't as

much due to the paperwork and requirements involved. They stated that the impact hasn't been on them but more on exporters and couriers such as DHL and FedEx. GLB4 agreed that there is clearly a shift towards consumers purchasing directly through the internet and it is also starting to happen in the agribusiness and perishable market too. They are seeing this in the Asian markets such as China and Hong Kong with operations similar to My Food Bag where fresh ingredients and meal kits are delivered to consumers and it is already operating on a much larger scale. They also had been in contact with Alibaba who are potentially looking at selling New Zealand meat products online in China. In their opinion, this could completely change the operations of global logistics businesses because wealthy Asian markets have the ability to purchase premium New Zealand products and it has the potential to grow exponentially. This will impact GLBs because they will have to handle individual products purchased online by overseas buyers and go through stringent processes to get them exported internationally. Furthermore, Air1 and Air2 stated that Alibaba and Amazon are looking to start operating their own aircraft in order to cope with demand which demonstrates the growth of e-commerce. Although they are not seeing it as of yet in the agribusiness industry, they recognise that it is only a matter of time before it happens. They also stated that it will require very different facilities as rather than being bulk goods, it will be far more individualised products, also making the supply chain far more complex for all of the stakeholders involved.

6 Conclusions

6.1 Theoretical implications

Prior to this study there was a lack of corresponding research and theory. Many of the authors featured in the literature review discussed air freight and perishable agribusiness products but lacked the core objectives of this research which were to depict the process of air freighting perishable agribusiness products from CHC and to identify any issues within the process. A small amount of previous literature did illustrate specific processes of exporting perishable products, however, they lacked any detailed information around what the process steps involve and the issues that are experienced within the process. As well as this, many focussed on exporting via sea freight or provided processes based in other countries rather than in New Zealand, therefore having little relevance to this research.

This research has therefore achieved a distinction and advanced knowledge in this field of study by depicting and illustrating a definite process for exporting perishable agribusiness products out of CHC, and identifying issues that are associated to the process.

6.2 Practical implications / Recommendations

From this research there are a number of practical implications or recommendations which present themselves. The most obvious would be for CHC and other tourism partners such as Christchurch and New Zealand Tourism to put bigger investments into promoting tourists and international visitors to come to Christchurch or the South Island. Accommodating more visitors flying into Christchurch will mean that an increasing number of carriers will be required inbound and outbound, therefore increasing the outbound transport capacity and helping with the current capacity shortages that the industry is facing.

One recommendation for future tourism campaigns could be to promote New Zealand agritourism to international markets. Agritourism links agricultural production or processing with tourism in order to attract visitors on to a farm or other agricultural business, entertain and educate visitors, and boost productivity and profit for the farm or business (Bertone, 2014). Promoting agritourism, specifically in the South Island, would result in tourists

contributing labour to operations within the process including agricultural production, picking, processing, pack house operations and so forth. This would benefit, not only for local agricultural businesses and operations, but also it would help solve the capacity issues when exporting many of these agricultural products out of CHC. Exporters may feel as though they can do nothing to help address the air freight capacity issues, but they do have a role to play.

In terms of the shortage of cool store capacity, with CHC having discussions about building a new cool store for the perishable freight market. If it would go ahead, it will deliver huge benefits and significantly reduce many of the issues that global logistics businesses are currently facing.

Increased support from the government could significantly improve the process of exporting perishable products out of CHC. Firstly, they could look to streamline the documentation process that exporters, global logistics businesses and airlines currently must comply with. The majority of the regulations that dictate this process are established through MPI, a government entity. Air2 made suggestions towards introducing electronic AWBs which would drastically improve the process, increase efficiency and make it far more straightforward for each of the stakeholders involved. Furthermore, the government also controls licensing and audits through MPI. Some of which global logistics have found to be excessive or unnecessary. Through MPI, the government may find that some of these licenses and audits can be removed or reduced; this would make the exporters' products more competitive and increase the exporter's ability to develop and grow, which also directly affects the New Zealand economy.

Regarding the issues around a shortage of ULDs in Christchurch, especially in the peak season, the airlines do have a role to play in improving this. One recommendation would be to achieve better forecasting in order to have enough ULDs where and when they are needed. Air1 stated that every morning they get a report to tell them where their ULDs are and plan 36 hours out before flights. It may be in all of the airline's best interest to forecast further in advance to reduce this problem. Furthermore, GLB3 stated that their plan going forward is to communicate with airlines and look back at previous records so that they can

stockpile ULDs in advance of the busy period. The airlines may need to look to purchase more ULDs to serve the market if these changes do not resolve the current shortages.

6.3 Limitations

This research, although the research objectives were achieved, was facing a number of limitations. Firstly, a population of only six GLBs that are licensed and handle perishable products in Christchurch meant that a high percentage of the population would be required to be sampled in order to increase generalisability of the results. Four of the six global logistics businesses took part in the research, which although was a small number of respondents, was 66% of the total population. As for the airlines, out of the nine international airlines which export perishable agribusiness products out of CHC, only two took part in the research. This was a considerably low percentage of the population, at only 22%. The reasoning for this is due to a number of the airlines being seasonal, therefore, during the period of conducting interviews and collecting data, many of the airlines had no available respondents. These seasonal airlines included Cathay Pacific and China Southern Airlines which only operate into Christchurch over the summer period. Other airlines either had very small dealings with perishable products including Fiji Airways, or alternatively they were not willing to share confidential information such as Qantas and Air New Zealand. Although having such a small sample of the population may have limited the research, having both airlines and global logistics businesses taking part in the research gave the perspective from two key stakeholders and their roles in the exporting process. This allowed for the research to illustrate the similarities and differences of the different stakeholder's perspectives relating to the exporting process.

Another limitation was the responses of some of the interviewees. Some of the questions asked in the interviews were about their relationships with other stakeholders including airlines, global logistics businesses, or CHC. In some cases the respondents were passive or had restrictions around what they said about another stakeholder in the interview. This may have been because the information was confidential or they didn't want it to impact their current relationships with these stakeholders by saying negative things about them in the research. This may have caused some inconsistencies in the research as some respondents withheld information while others did not.

6.4 Future research

Based on the final results and implications of this research dissertation, several areas of future research would be recommended. This research primarily focussed on two key stakeholders which were the GLBs and the airlines as well as their handling agents which are involved in exporting the perishable products out of CHC. Two alternative methods of research in this process could be to:

- a) Investigate the steps further up the process at the source of the perishable products such as the producers, growers, processors or packers. Similar to this research, it could evaluate the issues and strengths of the process and relationships between each of the stakeholders involved. This would help to understand the earlier stages of the process and how products are prepared for the whole exporting process.
- b) Alternatively, another method of research could be to examine the opposite end of the process when the product arrives overseas and is delivered to certain markets before being purchased by the consumer. This research has found that many exporters and global logistics businesses are increasingly concerned about the handling and transportation of their products once arriving in international markets. Therefore, further research evaluating the final steps of the process when products arrive to international markets would be highly beneficial. Especially in terms of understanding if product quality is compromised further along the supply chain.

Another future research proposal could be to investigate the same process of exporting perishable agribusiness products out of Auckland International Airport instead of Christchurch as done in this research. The operations in Auckland are at a much larger scale compared to Christchurch with far more global logistics businesses handling perishable products and a vast number of international airlines exporting products overseas. In 2017, almost 87,000 tonnes of cargo was exported from Auckland International Airport compared to approximately 22,000 tonnes from CHC ("Gross weight of cargo exported from New Zealand in 2016/17 by airport in tons", 2017). Further research in Auckland would help compare the issues and successes of the process in Christchurch and develop an

understanding of the overall exporting process for perishable agribusiness products in New Zealand. Having larger populations of global logistics businesses and airlines based in Auckland would allow for more respondents and therefore, a wide range of perspectives and opinions on the process.

According to KPMG (2017), consumers are becoming more and more demanding of products when it comes to ticking all the boxes to fit into their lifestyle. These products must be “functional, nutritious and convenient”, and these are now not just demanded, but expected by consumers. There is a future potential for more operations such as My Food Bag where individualised ingredients or meals will be delivered directly to consumers. Amazon are now leasing and operating up to 32 Prime Air freight aircraft in order to cope with the customer demand for e-commerce products (Hammerand, 2017). Several of the respondents in this research were aware of such changes within the industry and expect growth in this space as a result of customers purchasing through e-commerce. Although this growth is primarily of non-perishable products, the potential for this to change is enormous. One possibility for future research could be to investigate the growth in consumers purchasing perishable agribusiness products via e-commerce, and how it has the ability to impact each of the stakeholders involved in the supply chain process such as the exporters, global logistics businesses, airlines and couriers.

7 References

- Agarwal, R., Ergun, Ö., Houghtalen, L., & Ozener, O. O. (2009). Collaboration in cargo transportation. In *Optimization and Logistics Challenges in the Enterprise* (pp. 373-409). Springer, Boston, MA.
- Beilock, R. (1988). Losses in logistical system: The case of perishables. *Journal of Food Distribution Research*. Retrieved from <https://ageconsearch.umn.edu/bitstream/26958/1/19020020.pdf>
- Bertone, R. (2014). What is Agritourism?. Retrieved from <https://www.farmflavor.com/at-home/agritourism/>
- Bez, E. (2016). *Logistic and distribution strategies in the fresh fruit supply chain: The case of Kiwiberry from New Zealand* (Ph.D.). Wageningen University.
- Broderick, S. (2014). Ocean shipping technology improvements battering air freight. Retrieved from <http://aviationweek.com/awin-only/ocean-shipping-technology-improvements-battering-air-freight>
- Chetty, S. (1996). The Case Study Method for Research in Small-and Medium-Sized Firms. *International Small Business Journal*, 15(1), 73-85. doi: 10.1177/0266242696151005
- Claypool, L., & Morris, L. (1952). Air transit of perishables. *California Agriculture*. Retrieved from <http://calag.ucanr.edu/archive/?type=pdf&article=ca.v006n06p6>
- Davis, J., & Goldberg, R. (1957). *A Concept of agribusiness*. Boston: Division of Research.
- Dodd, M. (2014). *Follow the fruit, find the answers*. Cape Town. Retrieved from <http://postharvestinnovation.org.za/wp-content/uploads/2017/06/Follow-the-fruit-find-the-answers-PHI-Supply-Chain-Project-2014.pdf>
- Export certification. (2018). Retrieved from <https://www.mpi.govt.nz/exporting/overview/export-certification/>
- Forbes, B. (2018, March 3). Personal interview.
- Freshfacts New Zealand Horticulture. (2016). Retrieved from <http://www.freshfacts.co.nz/files/freshfacts-2016.pdf>
- Gross weight of cargo exported from New Zealand in 2016/17 by airport in tons. (2017). Retrieved from <https://www.statista.com/statistics/732994/new-zealand-gross-weight-of-exported-cargo-by-airport/>
- Hammerand, J. (2017). Amazon's Prime Air cargo jet fleet is bigger than ever and has a new name. Retrieved from

<https://www.bizjournals.com/seattle/news/2017/12/26/amazon-prime-air-cargo-jet-fleet-boeing-767.html>

Hernández, S., & Peeta, S. (2013). A carrier collaboration problem for less-than-truckload carriers: characteristics and carrier collaboration model. *Transportmetrica A: Transport Science*, 10(4), 327-349. doi: 10.1080/23249935.2013.766279

KPMG. (2017). *Agribusiness Agenda 2017*. New Zealand. Retrieved from <https://assets.kpmg.com/content/dam/kpmg/nz/pdf/June/agri-agenda-2017-kpmg-nz.pdf>

IATA. (2016). *Value of air cargo: Air transport and global value chains*. Retrieved from <https://www.iata.org/publications/economic-briefings/value-of-air-cargo-2016-report.pdf>

Innes, S. (2009). Less air space for exports. *The Advertiser*, p. 41. Retrieved from <https://search-proquest-com.ezproxy.lincoln.ac.nz/abicomplete/docview/354812831/fulltext/1AB0FB80DED646EAPQ/1?accountid=27890>

MBIE. (2017a). *The investor's guide to the New Zealand produce industry*. Retrieved from <http://www.mbie.govt.nz/info-services/sectors-industries/food-beverage/documents-image-library/folder-2017-investors-guides/investors-guide-to-the-new-zealand-produce-industry-2017.pdf>

MBIE. (2017b). *The investor's guide to the New Zealand meat industry*. Retrieved from <http://www.mbie.govt.nz/info-services/sectors-industries/food-beverage/documents-image-library/folder-2017-investors-guides/investors-guide-to-the-new-zealand-meat-industry-2017.pdf>

MBIE. (2017c). *The investor's guide to the New Zealand Seafood industry*. Retrieved from <http://www.mbie.govt.nz/info-services/sectors-industries/food-beverage/documents-image-library/folder-2017-investors-guides/investors-guide-to-the-new-zealand-seafood-industry-2017.pdf>

Ministry of Transport. (2016). *New Zealand international air freight*. Retrieved from <http://www.transport.govt.nz/assets/Uploads/Research/Documents/Airfreight-Research-Final-Report-23-March.pdf>

MPI. (2018). *Situation and outlook for primary industry*. Retrieved from <https://www.mpi.govt.nz/news-and-resources/open-data-and-forecasting/situation-and-outlook-for-primary-industries-data/>

New Zealand Productivity Commission. (2011). *International freight transport services*. Retrieved from

<https://www.productivity.govt.nz/sites/default/files/International%20Freight%20Transport%20Issues%20Paper.pdf>

Ortmann, F. (2005). *Modelling the South African fresh fruit export supply chain* (Ph.D.). University of Stellenbosch.

Pozar, J. (2001). Perishable foodstuffs within the system of supply logistics. *Traffic Engineering Review*, 13(6), 411.

Reich-Weiser, C., & Dornfeld, D. (2009). A discussion of greenhouse gas emission tradeoffs and water scarcity within the supply chain. *Journal of Manufacturing Systems*, 28(1), 23-27. doi: 10.1016/j.jmsy.2009.04.002

Sekaran, U., & Bougie, R. (2016). *Research methods for business* (6th ed.). West Sussex: Wiley.

StatsNZ. (2017). *Goods and services trade by country: Year ended December 2017*. Retrieved 2 April 2018, from <https://www.stats.govt.nz/information-releases/goods-and-services-trade-by-country-year-ended-december-2017>

Thompson, J., Bishop, C., & Brecht, P. (2004). *Air transport of perishable products*. California.

Tozi, L., & Muller, C. (2006). The viability of air transportation for perishable agricultural produce. *Journal of The Brazilian Air Transportation Research Society*, 2(2), 84-88. doi: 10.1.1.511.5316

Yin, R. (1986). Case Study Research. *Organization Studies*, 5(2), 95. doi: 10.1177/017084068600700114

8 List of appendices

Appendix 1- Semi structured questionnaire for global logistics businesses

General/Business

1. Can you tell me a little bit about the business?
2. How many employees do you have working here?
3. What is your role with the business and what does this involve?
 - a. Is your expertise in air or sea freight?
4. How long have you been with the business?
5. How many tonnes of air freight are you exporting?
 - a. How much of this is perishable?

Perishable agribusiness products

6. Could you list the perishable products you are exporting out of New Zealand on air freight?
7. Where do these products come from?
8. Where do you export these products to?
9. Do you have problems with product quality from suppliers?
 - a. Do you/or they do any quality checks/quality assurance?
10. How difficult were the steps taken in order to be certified to export agribusiness products?
 - a. Were these steps costly in terms of time and money?
 - b. Were these steps a one off or required annually?

Process of exporting products

11. Could you talk me through the process, from when these products arrive with you, to getting them exported out of NZ?
12. Have you ever experienced any issues around the timeframes of getting products out of New Zealand?
 - a. If yes, what has caused these problems to arise and how does it impact you?
 - b. How often do these problems arise?
 - c. Do these problems negatively impact the product quality?

- d. Do these arise at certain time periods of the year?
13. Have you ever had products that you have not been able to export?
- a. If yes, what happened that meant you could not export these product?
 - b. How often does this situation arise?
 - c. Do these arise at certain time periods of the year?
 - d. What happens to the products that cannot be exported?
14. Can you discuss your relationship with the airlines and their handling agents?
- a. Have you ever had any issues with airlines or their handling agents?
 - b. Can you describe the issues you have had and how they impact you?
 - c. How often do these issues arise?
 - d. Do these arise at certain time periods of the year?
 - e. Are certain destinations more difficult to get products into than others?
 - f. What is your view on the number of international flights flying out of Christchurch? Is it enough?
 - g. Do you have any problems getting a hold of ULDs?
 - h. Do you think there is a lack of cool store space at the airlines facilities?
15. Can you tell me about your dealings with Christchurch Airport?
- a. What is their involvement in the process?
 - b. Are there any problems dealing with them?
 - c. What are the problems and what is the impact of them?
 - d. How often do these issues arise?
 - e. Do these issues arise at certain time periods of the year?
 - f. If yes, what is the impact of this on you?
16. What are the biggest challenges you face in your operations, or what impacts your ability to do your job?
- a. Have you ever made complaints or offered ideas in order to improve the process. If so, who to?
17. What do you think you could you could improve on, if anything, in terms of the process you follow to export perishable agribusiness products via air freight?

Aircraft

18. Are you aware of any problems on board or in the hold which affect product quality?

- a. Do these problems have the ability to change the quality of the products before they reach their destination?

Future

19. How do you see the future for the global logistics industry and your business operations?
20. Are you seeing a shift towards consumers purchasing products directly through the internet?
 - a. Are you seeing this in the agribusiness sector?
 - b. Is this having an impact on your current operations?
 - c. Do you have any concerns on the future impact on your business?

Appendix 2- Semi structured questionnaire for airlines

General/Business

1. What is your role with the business and what does this involve?
2. How long have you been with the business?
3. How many employees do you have working here in Christchurch?
4. How many tonnes of air freight are you exporting on average each day?
 - a. What about perishables?

Process of exporting products

5. Could you talk me through the process, from when perishable products arrive with you, to getting them exported out of NZ?
6. Have you ever experienced any issues around the timeframes of getting products out of New Zealand?
 - a. If yes, what has caused these problems to arise and how does it impact you?
 - b. How often do these problems arise?
 - c. Do these problems negatively impact the product quality?
 - d. Do these arise at certain time periods of the year?
7. Have you ever had products that you have not been able to export?
 - a. If yes, what happened that meant you could not export these product?
 - b. How often does this situation arise?
 - c. Do these arise at certain time periods of the year?
 - d. What happens to the products that cannot be exported?
8. Can you discuss your relationship with the freight forwarders (or GLBs) you work with?
 - a. Have you ever had any issues with the freight forwarders (or GLBs)?
 - b. Can you describe the issues you have had and how they impact you?
 - c. How often do these issues arise?
 - d. Do these arise at certain time periods of the year?
9. What is your view on the number of international flights flying out of Christchurch?
Is it enough?
10. Do you ever have problems with providing enough ULDs to your suppliers?

11. Are certain destinations more difficult to get products into than others?
12. Can you tell me about your dealings with Christchurch Airport?
 - a. Are there any problems dealing with them?
 - b. What are the problems and what is the impact of them?
 - c. How often do these issues arise?
 - d. Do these issues arise at certain time periods of the year?
 - e. Do you think there is a lack of cool store space at Christchurch Airport?
 - f. If yes, what is the impact of this on you?
13. What are the biggest challenges you face in your operations, or what impacts your ability to do your job?
 - a. Have you ever made complaints or offered ideas in order to improve the process. If so, who to?
14. Do you think the process you follow to export perishable agribusiness products is as good as it could be?
 - a. What changes in the process would you make if you could?

Aircraft

15. Are there any problems on board or in the hold which affect product quality?
 - a. Do these problems have the ability to change the quality of the products before they reach their destination?

Future

16. How do you see the future for the airline industry and your business operations?
17. Are you seeing a shift towards consumers purchasing products directly through the internet?
 - a. Are you seeing this in the agribusiness sector?
 - b. Is this having an impact on your current operations?
 - c. Do you have any concerns on the future impact on your business?

Appendix 3- Semi structured questionnaire for Christchurch International Airport

1. What is your role with the business and what does this involve?
 - a. What are your responsibilities when it comes to freight? Do you have much of a role to play? Airline development manager? What does this mean?
2. How long have you been with the business?
3. How many employees do you have working here in Christchurch?
4. Mission of airport, what are the primary aims of airport?
 - a. What is the airports role in terms of freight?
5. In terms of freight, what are your thoughts on the number of international flights?
Do you think there are enough flights to support current volumes of freight?
 - a. Have you noticed an increasing demand for getting freight on international flights?
 - b. If yes, is there an action plan for how to deal with the increasing freight volume?
 - c. If yes, what is this action plan?
 - i. Do you think there will be enough flights to support future volumes of freight?
 - d. Are there possibilities of seasonal carriers extending their flights?
 - e. Bigger holds/freight capacity? Specialist freight planes?
6. What is your relationship with freight forwarders?
 - a. Do you get feedback from them about any issues or suggestions to do with exporting freight?
7. What is your relationship with the airlines or their handling agents?
 - a. Do you get feedback from them about any issues or suggestions to do with exporting freight?
8. As the landlord for many of the buildings in the vicinity of the airport, does the airport have a role to place around the facilities such as cool stores?
 - a. Are you aware of any issues relating to the amount of cool storage available at the airport/airline facilities?
 - b. Are there occasions when products sit on the tarmac in the sun because cool storage space is limited during the peak season?

- c. With the Air NZ cool storage rebuild, what role did the airport have in the decision to build to the same size?
- 9. What value do you attribute to the freight being exported/imported at Christchurch Airport?
 - a. Does the airport directly or indirectly make money from the freight being exported out through the airport?
- 10. Does the airport invest in campaigns to promote the South Island to potential tourists?
 - a. Are there any joint campaigns with Tourism NZ or the CCC, or any other organisations to increase tourist numbers?
 - b. Does the airport have any other roles in attracting visitors?
 - c. Is there a relationship between increasing tourist numbers and the number of flights coming into Christchurch?
- 11. How do you see the future in terms of freight going through the airport?