The Australian vegetable industry - export opportunities

Strategies and models for success

A report for

By James Terry

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Executive Summary

The Australian vegetable industry is complex and diverse. It is spread over a wide range of geographic locations across the country. Travelling throughout Asia, Europe and the Americas as well as numerous production regions within Australia, has assisted with identifying areas where improvements could be made to the Australian vegetable industry.

Market diversification, especially exporting into Asian markets is extremely important for the Australian vegetable industry's future. To achieve this, Australian producers need to align themselves on a world scale from a packaging, consistency and post-harvest perspective to be competitive in international markets. Australia's main competitors in Asian markets are USA (California), Mexico and New Zealand and many producers visited in those countries already exhibit those important characteristics. In addition, growers need to work closely with supply chain and marketing experts, using transparent models, to identify and supply markets on a regular basis. Chilean growers are supply chain experts, managing to successfully sea-freight highly perishable horticultural produce to the Far East in Asia with consistency each season.

Consumer trends around the world are rapidly changing. Producers need to accept change and adapt their practices to ensure their business remains competitive in an ever-changing global market place. Modern consumers want to buy branded product with options and variations such as diced cauliflower and broccoli, as demonstrated in high end Asian and American supermarkets.

Producers need to support the greater industry in Australia and work with other producers to market together, rather than working individually and competing against their neighbours. Australian growers need to identify opportunities for supply chain efficiency and for value adding of products. Identifying that specialists, external to businesses and appropriate structures within businesses, can assist with ensuring financial stability over time. The modern approach is to allow specialists to undertake tasks and outsource.

This report will summarise the macro and micro challenges facing the vegetable industry now and in the future, discuss major markets and will breakdown and thoroughly address post-harvest issues as well as export opportunities and strategies.

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Foreword

For farmers, the best way to learn is to travel and communicate with other farmers, discussing the major issues affecting each area and how they are trying to address them. Sharing information and conversing with like-minded people is extremely enjoyable and rewarding.

Travelling on the Nuffield Scholarship allowed me to meet with many different people on farms and businesses from developed, undeveloped and developing countries. It was evident early on in the travels that macro issues such as labour, technology, water and government support occur in all areas. What was interesting was the way farmers handled those issues and how they planned for the future. Many examples, good and bad, were observed. The challenge is to now piece it all together in a useable form for the vegetable industry in Australia.

The Nuffield Scholarship journey has been a fantastic learning experience; I have thoroughly enjoyed visiting and conversing with people all over the world. It has expanded my knowledge, broadened my views and made me realise how complex the world of horticultural trade has become. It has also made me realise all of the processes which are required to ensure product gets to consumers' plates on time every time. When reflecting on the best experience, it is really hard to categorise; however, one particular visit in Chile stands out for me. This family company was of a scale that is not seen in Australia, however they had modesty and a hard-working ethic which was apparent on all levels.

The report has a particular emphasis on the Japanese market. This is due to my business involvement with exporting to Japan which meant I already had a knowledge base about the market prior to the Nuffield Scholarship. I have used the Japanese market as a case study which other fruit and vegetable export could be based on. Japanese people are friendly, fun and extremely polite. From a business sense, they act with honesty and integrity and work with growers to benefit all. They have close personal relationships with suppliers which enables the best relationships to have high levels of transparency.

The focus of the travel was on the vegetable sector; however, numerous fruit businesses were visited as the majority of world horticultural trade is currently in the fruit and nut sectors. The aim was to travel to as many different production regions to gain practical knowledge on what is and is not working in companies and countries. In addition to the international travel, for me, it was also important to travel throughout Australia to learn how Australia's vegetable industry is situated from a production, business efficiency and export trade perspective. The ongoing task is to impart the practical knowledge to Australian producers, especially with regard to international trade.

Figure 1. James Terry in an asparagus field, Koo Wee Rup

Acknowledgments

The Nuffield journey has been extremely beneficial and enjoyable. Thank you to everyone who I / we visited for being so generous with information and time.

Thank you to my investor, The William Buckland Foundation and Nuffield Australia for their continued support.

Also to my family, in particular my grandfather, Ned Terry, a 1964 Nuffield Scholar for providing me with the passion for agriculture and an understanding of how beneficial a Nuffield Scholarship can be.

Both Fresh Plaza and Fruit Net Daily information via daily subscriber emails have been great sources information and have broadened my horticultural knowledge about production regions, technology, markets and how influential the weather can be. Both sources assisted greatly with international contacts and meetings abroad.

Our GFP (India) crew were amazing, learning and traveling with like-minded people was an experience I will remember for a long time.

Figure 2. India GFP 2015 group pictured in Wyoming, USA

Left to right: Matt McVeigh (QLD, Australia), Cecília Fialho (Brazil), James Terry (VIC, Australia), Fiona Hall (NSW, Australia), Nathan Free (VIC, Australia), Dan Steele (New Zealand), Abby McKibbon (TAS, Australia)

Abbreviations

ABS	Australian Bureau of Statistics
AUD	Australian Dollars
AUSVEG	Peak industry body for the Australian Vegetable Industry
CA	Controlled atmosphere
CO_2	Carbon dioxide
DoA	Department of Agriculture
FX	Foreign exchange rate
GDP	Gross Domestic Product
HIA	Horticulture Innovation Australia
Japanese MAFF	Japanese Ministry of Agriculture, Forestry and Fisheries
MA	Modified atmosphere
MAP	Modified atmosphere packaging
O_2	Oxygen
PH	Post harvest
POS	Point of sale
SCM	Supply chain management
T&A	Tanimura and Antle
USD	United States Dollars
VCA	Value chain analysis
VCM	Value chain management

Objectives

For many years the Australian vegetable industry has been suffering from increasing costs with stagnating returns, consequently the objectives for this study were to gain knowledge on how other areas of the world are handling similar issues. To do this, three main objectives were investigated:

1. To gain a holistic view of the world of vegetable production, trade and to learn about export markets and competition from other countries.

2. To understand future macro and micro trends for the worldwide vegetable industry.

3. To develop supply chain knowledge and areas for improvement and efficiency gains in the value chain.

Chapter 1: Introduction

The vegetable industry in Australia has seen many changes and advances over the past 100 years. Over time, different cultural backgrounds have dominated areas and regions. The Europeans have had the largest influence, especially the Italians, Greeks and the Dutch (Wells, 2015). The Europeans have brought with them hard work, innovation, an ability to farm more intensively and market their produce using old-fashioned buy and sell relationships on the free market, using supply and demand as the main price driver. In Australia, various vegetable producing regions have developed contract-based processing businesses, such as potatoes and peas in Northern Tasmania and tomatoes in Northern Victoria and Southern NSW. Overall, fresh food accounts for 68% and processed 32% of vegetable production in terms of value in Australia (IBIS World Industry Report 2011).

Throughout history, certain innovations have developed which have changed the way things are commonly done. For example, the invention of canned fruit and vegetables early in the 20th century revolutionised the industry. At that time, canning was thought to be the way of the future. Since then, post-harvest innovations, such as cooling technology and modes of transport have improved and the fresh produce revolution has fully taken over (Fransiska Krauskopf, TrendOne innovation). In the millennial generation of 2016, the dynamic and ever-changing consumer is forcing the vegetable sector to be flexible and to develop an ability to invest and change with the trends of the world. Growers need to have an understanding of consumers. In the long term, consumers need to gain a greater understanding of the producer and of the "*what, where, when and how*" food is produced. Attachment 1 in the Appendix is an excellent illustration of many of the factors influencing modern horticulture now and in the future.

Since 2010, exports of fresh horticultural produce have grown significantly (Figure 3). This growth is from the fruit and nut exports, with vegetable exports remaining steady (ABARES, 2015).

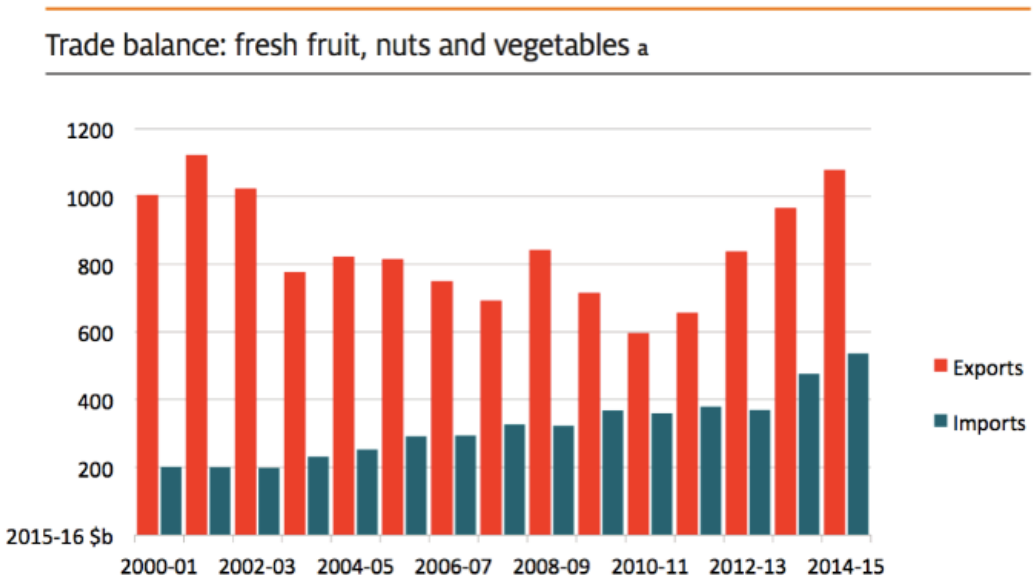

Figure 3: Trade balance of Australian horticultural produce

Source: (HIA factsheet, 2015).

Population forecasters predict global population will exceed nine billion people by 2050. With population increase, arable land availability and natural resources decrease (United Nations, 2015). The concept of *"more food, less earth*" is apparent. Modern consumers' demands are increasing and as a result, trade volumes are increasing to provide the consumer with choice and year-round availability of food. Australia is in the perfect geographic position to capitalise on the Asian development boom, especially the ASEAN countries which have rapidly improving economies. Forecasts predict that world horticultural trade will increase by around 7% per year (IBIS, 2011).

World trade and demand for more products is increasing. Food trend studies highlight the growing demand from consumers to have access to a wider range of foods, especially in developing and developed countries.

This report will summarise the macro and micro-economic issues facing the Australian vegetable industry as well as focusing on post-harvest issues and supply chain and export opportunities, all of which are targeted to produce a more sustainable model for vegetable farmers to successfully produce vegetables for the ever-changing consumer.

Chapter 2: Australian vegetable industry

The profitability of the Australian vegetable sector has been stagnant for several years (ABARES Vegetable growers' survey 2014). As a whole, the quality of Australian vegetables is very good, however opportunities exist within the supply and value chain to gain efficiencies which will increase farm gate returns.

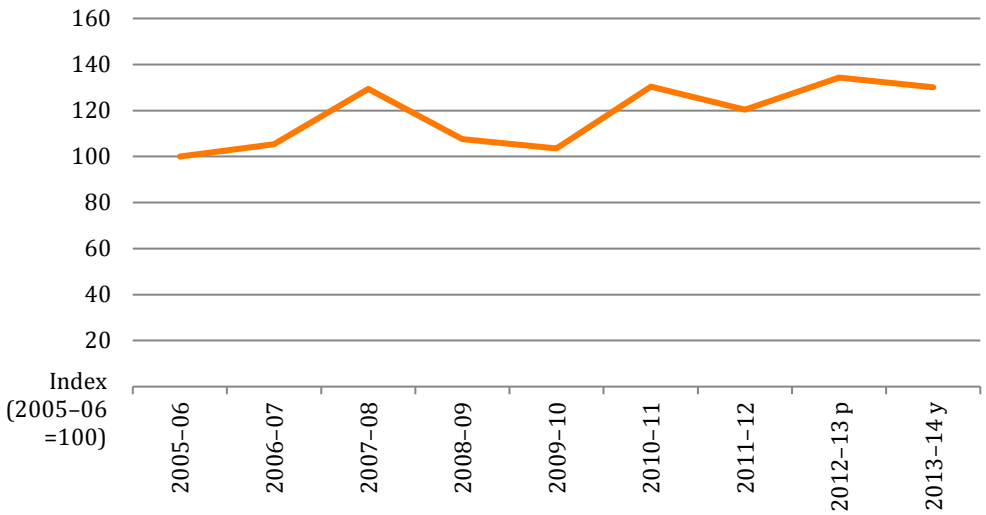

Figure 4: Farm gate price index from 2005 – 2014

Source: (ABARES Australian vegetable growing farms survey).

Figure 4 shows that farm gate prices have only increased at a rate of 2.5% compounded per year since 2005. More significantly, farm gate prices have not changed from 2010 to 2014. Figure 5 and Figure 6 show both fruit and vegetable production respectively in terms of annual tonnages. Both fruits and vegetables have yearly (seasonal) fluctuations, however fruit production is showing a rising trend, while vegetables showed a declining trend until 2010 and have been stable since. With a strategic approach, opportunities exist to grow the total vegetable production in Australia, focussing on the export markets in Asia.

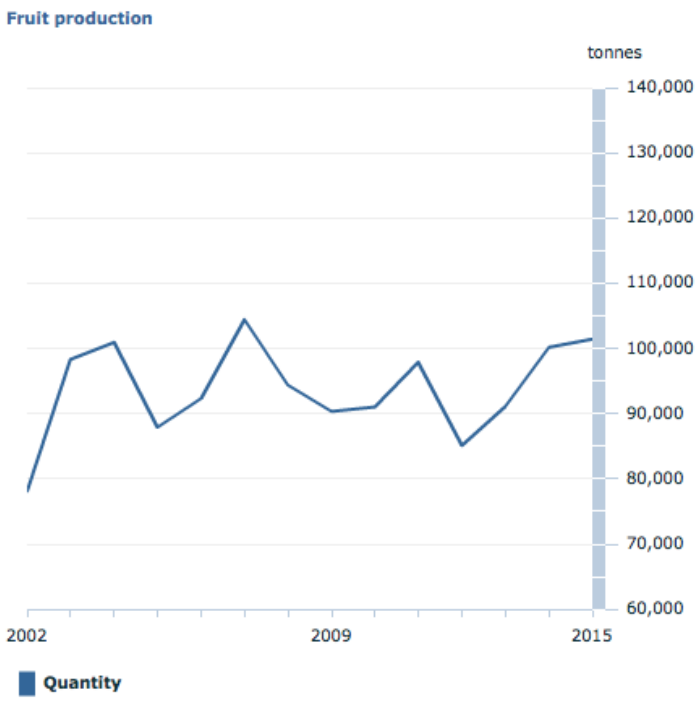

Figure 5: Total fruit tonnage grown in Australia 2002 - 2015

Source: (ABARES, 2015).

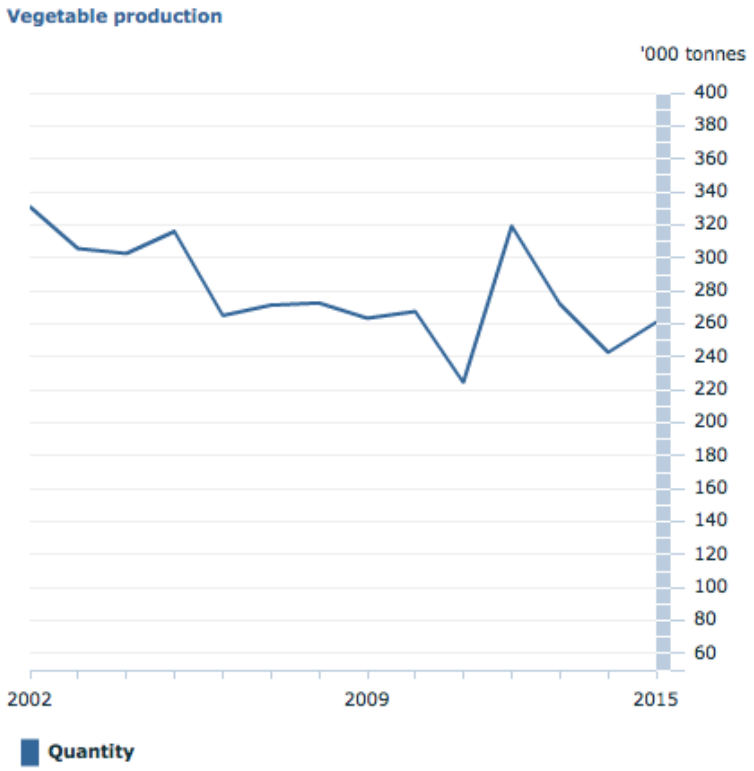

Figure 6: Total vegetable tonnage grown in Australia 2002 - 2015

Source: (ABARES, 2015).

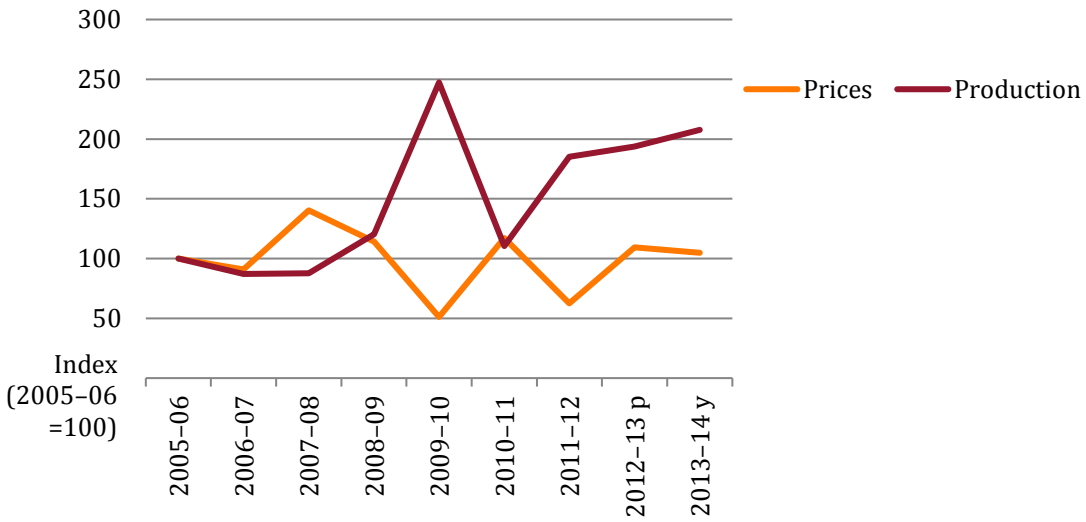

Figure 7: Farm gate price and total production index in relation to production for onions

Source: (ABARES Australian vegetable growing farms survey).

Figure 7 shows onion pricing over the same period as Figure 5. Onion marketing is challenging, as price changes do not necessarily result in increased or decreased demand, creating extreme prices during short supply and oversupply production years. Each vegetable product has different trends and pricing / production influences which need to be addressed to fully understand and assess were opportunities exist.

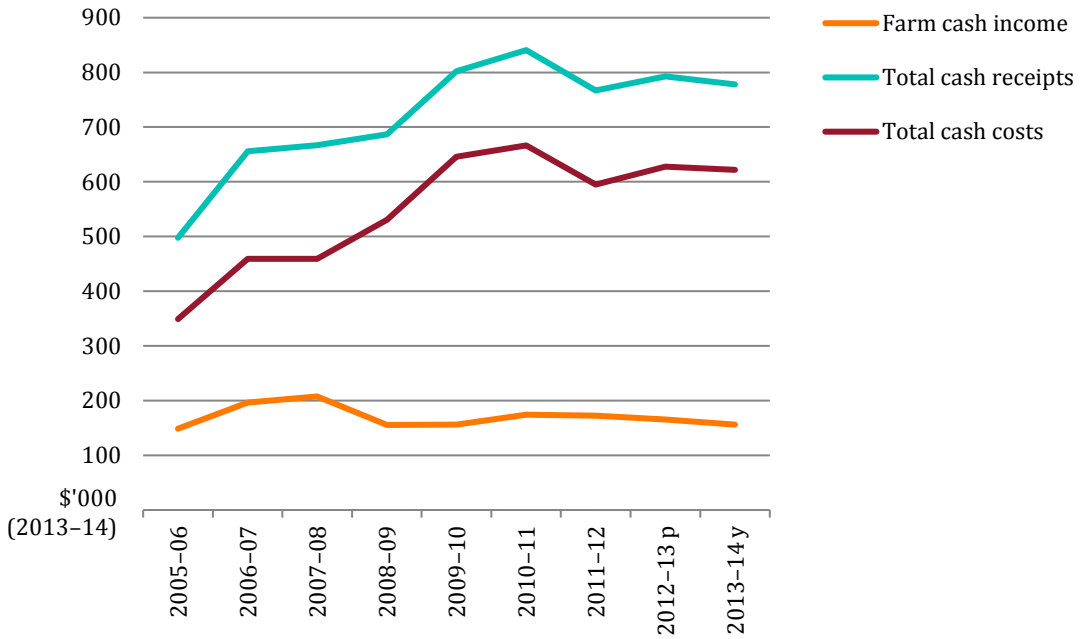

Figure 8: Financial performance farm cash income for the Australian horticulture industry.

Source: (ABARES Australian vegetable growing farms survey).

Figure 8 reveals that, while farm cash income for the whole Australian horticulture industry has increased, farm expenses have increased at the same rate. This means that farm cash income has remained stable for the past ten years. Labour and packaging cost increases have been the main reasons farm costs have increased over the past ten years. This issue highlights the importance of understanding the industry's productivity in terms of the returns earned from each dollar spent on production resources.

Currently the Australian vegetable industry's total sales are valued at $3,364 million with exports accounting for approximately 5% (Figure 9). Both tonnes and value have been relatively stable over the past three years for total vegetable production and exports (Fresh logic, 2015). The three leading destinations for our vegetable exports are Japan, Singapore and New Zealand.

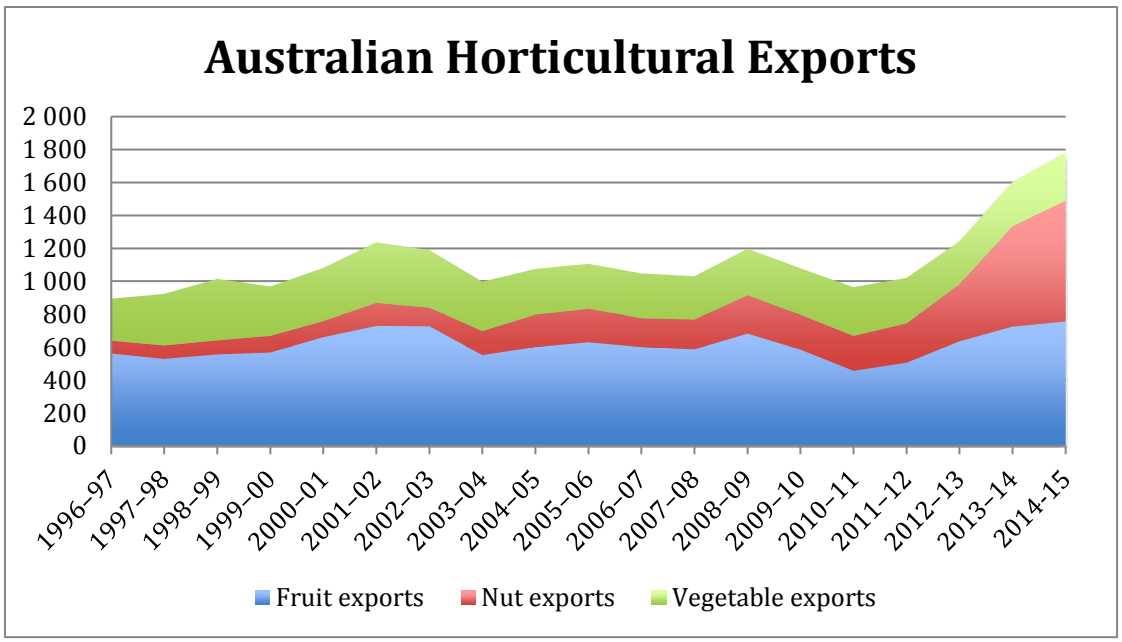

Figure 9: Annual fruit, nut and vegetable export from Australia $million

Source: (AUSVEG industry statistics).

Australia's horticultural exports are predicted to rise between 10 – 35% over the next five years (IBIS World calculation) and much of the growth is expected to come from new free trade agreements in China, Korea and Japan. The challenge for the vegetable industry is to grow exports to match the growth achieved by the fruit and nut industry over the past five years.

2.1 Australian retailers

The Australian retail landscape has undergone significant change in the past 30 years. Consumers have driven changes to supermarkets, increasing the number of stores, longer opening hours, increased product choice, improved shopping experience and enabled online shopping. Currently Coles and Woolworths dominate fresh produce sales in Australia with a

combined market share of over 60%. Non-supermarket sales account for less than 20% of the retail sales (Figure 10). The challenge for producers is to supply the full range of domestic sales options to reduce risk.

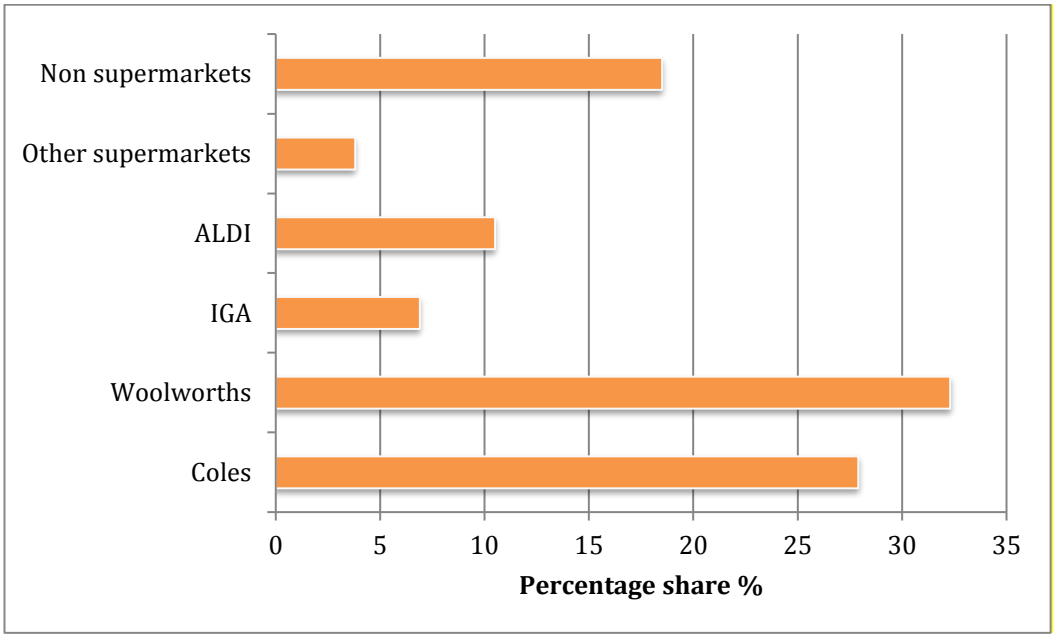

Figure 10: Australian retailer share for each major produce retail sector

Source: (Nielsen Homescan, 2015).

2.2 Sustainability

The sustainable farming model can be summarised as shown in (Figure 11). A sustainable farm must demonstrate:

1. The ability to consistently produce safe food in a stable manner – *social sustainability*
2. The ability to secure stable profits as a business – *economic sustainability*
3. The preservation of global resources and the environment – *environmental sustainability.*

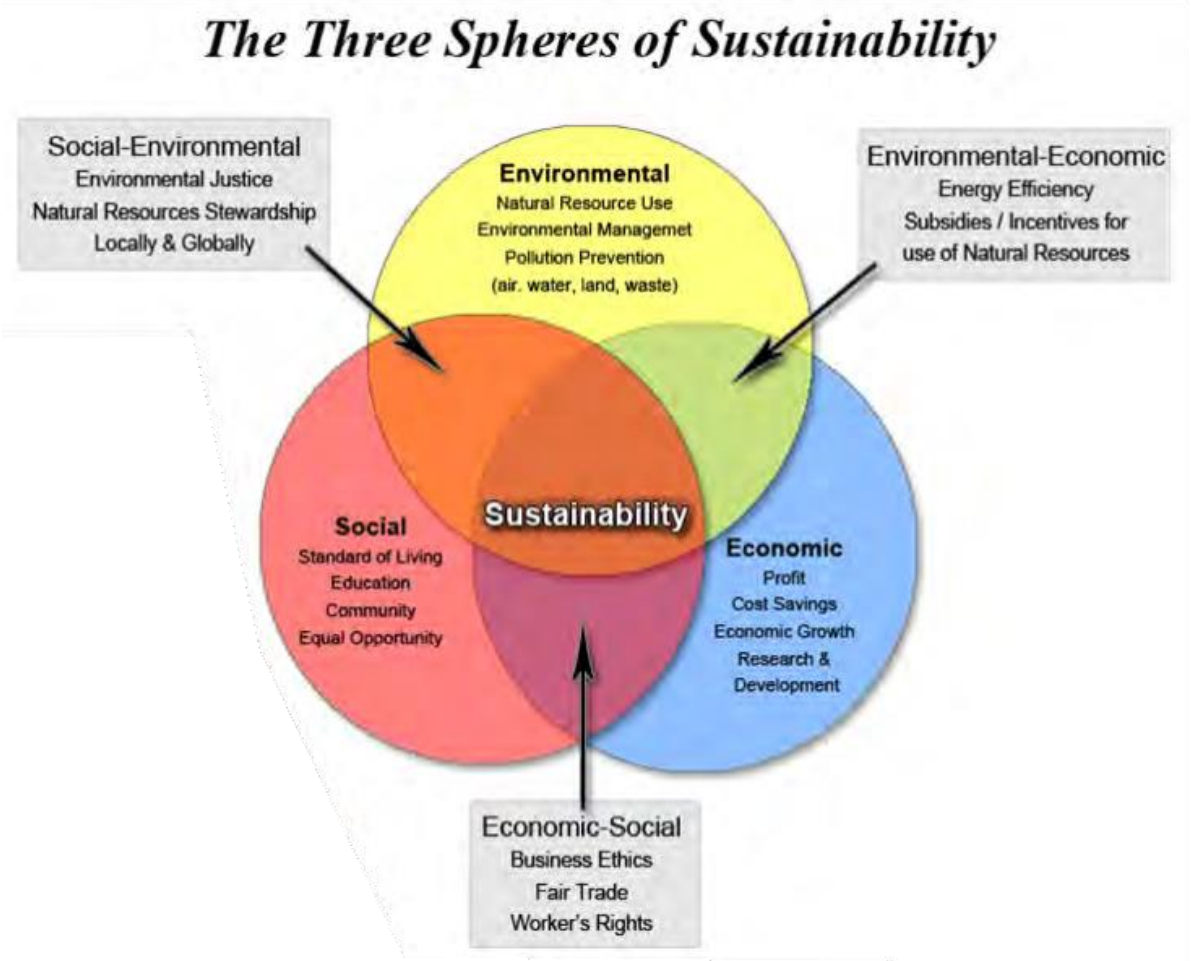

Figure 11: Three spheres of horticultural sustainability

For sustainable vegetable farming into the future, producers need to adopt new technology which brings the consumer closer to the food source. Producers need to start branding their products, developing new markets and securing themselves with sales programs of consistent supply and quality (Carlo Ratti, Australian Food and Grocery Council conference 2016).

2.3 Economic sustainability

Return on investment needs to be closely monitored and more than just the variable costs need to be covered. A common misconception of Australian growers who have no debt on their land is that they are making money when in reality their return on investment is very low. 'Smart farmers' use technology and data to help increase efficiency and economic sustainability. For long-term economic sustainability, farmers need to operate in the sustainable 'sweet spot' as demonstrated in Figure 11, considering social and environmental as well as economic responsibility.

Overall the Australian vegetable industry is currently stagnating, growers need to become pro-active to search for alternatives to current beyond farm gate practices. The Australian fruit and nut industries have increased their exports, the vegetable sector needs to follow to achieve greater economic sustainability.

Chapter 3: Macro challenges for vegetable producers

3.1. Weather

The weather is becoming more unpredictable. Farmers are now preparing for droughts, floods, wind, rain and hail. Growers can reduce risk by farming in different geographic locations, with different microclimates and soil types, to avoid major supply interruptions. For example, Californian vegetable producers such as Tanimura and Antle are spreading risk by growing in three different regions, Yuma (South), Fresno (central) and Salinas (north). This enables them to have a more reliable supply with fewer breaks in production. On a world scale, often one area's misfortune is another area's good fortune, as supply gaps open to growers ready and able to fill them. For example, a typhoon hit Japan in September 2016, affecting vegetable production throughout the country. This enabled increased imports of vegetables from other parts of the world at higher than normal pricing due to the shortages in the markets.

3.2. Government

Government regulation gives the growers the ability to address issues such as market access, free trade agreements and support programs for education and other export-related questions. Pro-active governments can assist growers entering new markets and have a huge influence on the success of targeted industries. Expertise and knowledge are potentially the scarcest resource worldwide.

Agricultural education is vital for long-term sustainability of industries. Government assistance with agricultural postgraduate education is very important. The Chilean government has established free trade agreements and market access to almost all markets which could be accessible for growers. They have excellent peak industry bodies and as a result, grower uptake and grower support is strong.

3.3. Capital resources

Many growers struggle to fully utilise their capital resources, due to seasonal production and supply variability. Double and triple shifts can overcome some of the cost, however staffing for extra shifts is difficult. Growers can also grow counter-seasonal produce, which utilises the same resources to assist with cost of expensive packing and cooling equipment. Numerous examples, where external financing and additional capital is required, are occurring around the world. External financing assists growers to set up facilities which ensure produce is of the highest standard at lower costs. For growers looking to be export-ready and competitive, it is important that the right infrastructure and machinery is in place to grow a high-quality product which is value-added and with a long shelf life.

3.4. Labour

Horticulture is heavily dependent on labour input. Each country has different rules and regulations surrounding hourly wages, piece-rate requirements and from the source of labourers. In all countries, managing people is key. This highlights the need for management and government support on labour policies. Management practices and policies heavily influence a grower's ability to get the maximum benefit from all staff members. Government support for workers, such as the Seasonal Worker Program in Australia (Figure 12) and the RSE scheme in New Zealand are both highly effective programs assisting the horticultural industries in host countries.

Various examples of labour sourcing were viewed throughout the world. Each scenario is unique, however the best examples clearly identified that staff were the biggest risk for the business. Producers therefore invest heavily in staff training, facilities, holidays, doctors and family support. GreenVic in Chile demonstrated the highest standard for staff facilities, providing staff holidays for permanent packing staff. The annual holiday is funded through the packing facility, with canteen and management staff contributing from their salary towards the holiday. It allows people who otherwise would not have had the opportunity to travel, to spend time in other countries and learn about different cultures abroad. Staff cohesion was extremely strong at GreenVic and efficiencies from staff retention over several seasons was occurring.

Figure 12. Workers from Vanuatu in Australia from the Seasonal Worker Program

3.5. Global and Domestic markets

Horticultural trade around the world is increasing each year. Both domestic markets and markets in overseas countries need to be monitored. For example, over-supply of onions from the Netherlands has an influence on onion markets all over the world. Onions have a shelf life of up to ten months, hence they can be sea freighted to all markets around the world. Vegetable growers need to understand the markets and what is happening in other production regions now and into the future. Decisions need to be based on quantitative information which is slowly becoming more available.

In the United States, the USDA has a price summary from all major horticultural crops in all of the markets around America. It is an excellent reference point for all producers to assist with marketing. This forms part transparency and creates indirect communication between producers which is beneficial for all in the industry. This information can be sourced from the following site:
(https://www.marketnews.usda.gov/mnp/fv-nav-byCom?navClass=VEGETABLES&navType=byComm).

Market price reports exist in Australia. However, the accuracy of the information is questionable at times and hence uptake and use of the reports are low. As time goes on and accuracy improves, this information could be extremely beneficial for growers and marketers of vegetables.

3.6. Urban farms

Around the world, urban farms and the concept of food mile reduction is rapidly growing. In America "*on average, food travels 1400 miles (2250km) before ending up on the shelves"* (Danielle Horton Urban Produce grower). The USDA estimates that the total sales of 'local food', which includes urban farms, was US$12 billion in 2014, up from $5 billion in 2008. Experts predict it will be up to US$20 billion by 2019. The urban farm revolution is also increasing consumer awareness of food, helping drive job growth, increasing entrepreneurship, expanding food choice and assisting small producers. (Tom Vilsack, USDA Urban agriculture tool kit, which can be accessed at:
https://www.nal.usda.gov/afsic/urban-agriculture

These are some of the major macro-economic trends which are starting to influence the world of vegetable production. The other major such issue is consumer research and alignment (which is discussed in Chapter 7). Successful businesses need to adjust to these trends to remain competitive. Throughout my travels, it was evident that young people working in businesses, especially young people who have had experience outside of the agricultural industry in large cities, were able to impart knowledge about consumer needs. They could explain how other industries are coping with external events such as extreme weather or government policy, which are beyond the control of individual businesses.

Chapter 4: Strategies and models for success

4.1. Organizational structure

There is no one formula that can be applied to all, however there are trends which are evident in many successful horticultural businesses. Defined roles and responsibilities for each area of the business and vertical integration capturing many areas along the value chain are important.

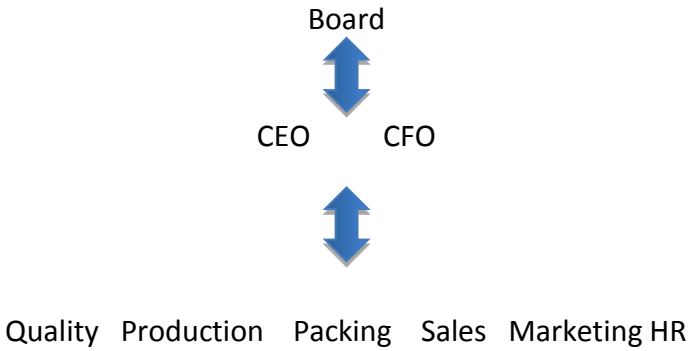

Figure 13: Idealistic management structure for horticultural businesses

A structured Board of Management, with defined responsibilities and an external chairman is necessary for a growing company to maximise growth. The structure in Figure 13 can work for small and large operations. In small operations one person may have multiple roles, however they are still defined.

Successful supply and value chains rely on good business policies and procedures. Below are four key areas for horticultural business governance:

1. Leadership and direction
2. Managing and delivering quality
3. Marketing
4. Systems, strategies and long-term growth.

Business planning and forecasting is essential for business sustainability. Policies and procedures need to be implemented. Horticulture needs to move towards the modern working world, where flexible hours, time-off and holidays are more common; hence the need for policies and structures to incorporate these working conditions.

Each person is unique and needs to be managed individually. Ben Allomes (New Zealand 2015 Scholar) describes everyone needing to understand themselves before being able to achieve

greater goals. Everyone is unique and has their own techniques and qualities. Modern management is about allowing the person to undertake the job functions in their own way.

4.2 Case Studies of Successful Businesses

4.2.1. Case Study – Tanimura and Antle

Tanimura & Antle (T&A) farms is a large and progressive vegetable farming company based in the United States of America. They have farms throughout Arizona, in three growing regions in California and they have a newly constructed glasshouse to their ten-year old hydroponic facility in Tennessee. Multiple growing locations gives them twelve months supply of their major vegetable product lines with no gaps in production.

Lettuce, romaine hearts, broccoli and cauliflowers are the core items, however T&A grows more than 30 different product lines in total. T&A supplies nationwide and worldwide to major retailers and wholesale markets as well as specialty markets using exclusive branding and marketing arrangements. T&A has an export division of their sales team that focuses on distributing products throughout the Asian markets, mainly into Taiwan and Japan, as well as throughout various parts of the European markets.

T&A has used a combination of innovation, technology and supply chain efficiency to become one of the most efficient and versatile vegetable producers in the world. The many generations of success can be attributed to variables such as scale, management structures, policies and innovation, however most importantly the staff behind T&A and their loyalty and teamwork to achieve together is the company's biggest asset.

T&A handles the whole supply chain from farm to market. With management teams on all levels of the supply chain and full traceability. Their marketing team successfully market produce, with knowledge that their product is of the highest quality and that there is always a consistent supply for 12 months of the year. T&A have crop forecasters who further advance their supply chain efficiencies and minimize costs using techniques, such as field harvesting, robotic weeding and automatic transplant machines.

T&A is the perfect model for vegetable companies in Australia to follow. Almost all their product is packed in the field (Figure 14). They have supply chain efficiency, sustainable farming methods, full traceability and a large and diverse market in which to sell their produce. They also have excellent relationships with their customers and are at the forefront of staff management from field staff right through to key management personnel.

Figure 14. Harvesting and field packing lettuce at T and A in Salinas, California

4.2.2 Case Study – Greenvic Chile

GreenVic Chile is a large fruit company. The company grows, packs and distributes apples, pears, kiwifruit, peaches, nectarines and cherries from Chile to the world. In addition to growing their own fruit, Greenvic have growers in various regions throughout Chile, who grow fruit for Greenvic to pack and distribute.

Utilising contract growers enables Greenvic to reduce risk by having product growing in various production regions, while also extending packing season. Greenvic works closely with their growers, providing all of the agronomic advice regarding crops, from planting to post harvest. Viewing their business first hand, it appeared the growers and Greenvic were in mutually beneficial relationships with had existed over many years.

Greenvic's main packing and distribution centre is located at Maipu, just south of Santiago. It is centrally located for fruit crops, to limit time and cost from field to packing. It is also very close to the town centre of Maipu where most of their permanent and casual staff live. Greenvic has very strong policies with regard to staff retention and worker welfare. Permanent staff are treated extremely well and are offered an international trip each year to gain exposure into other cultures and the world. Permanent staff all contribute out of their salary and the in-house canteen adds to the funds to support this trip. The vacation provides the workers with added motivation to work hard during the season and gives them an opportunity to travel, which may not exist if Greenvic were not organising it.

Greenvic is adopting the latest packing and post-harvest treatments in their packing shed, ensuring maximum shelf life and the longest time to market produce. Greenvic manage some of their own marketing of fruit, while also using third party exporters to gain access to some smaller markets to ensure their fruit is distributed all over the world.

4.3 Branding and promotion

Perishable produce marketing is dynamic, fast paced and demanding. The only constant in the marketing world is change (Trent De Paoli, Nuffield 2013). What worked one year or ten years ago will not necessarily work now. Produce marketers need to be adaptable and able to withstand challenges thrown at them. Successful horticultural companies are value-adding their produce and creating multiple sizes and packages to suit consumers' requirements. Figures 15 and 16 are various examples of branding and promotion seen throughout the world.

Figure 15: Weekly tomato basket in the USA

Source**:** (Bullier, 2016).

Figure 16. Dig me potatoes in New Zealand

The innovative idea in Figure 15 is to supply a week's worth of tomatoes in one container, with a number of different varieties in one basket. Tomatoes keep better at room temperature so the idea of the bowl is to remind consumers that ambient temperatures are best for tomatoes. In Figure 16 the "Dig Me" potatoes are small, previously underutilized potatoes which are now packaged and have attractive labeling and are selling extremely well.

It is also important for growers to recognise consumer preferences and how they are influenced. Millennials gather information from tablets and apps and purchase produce that is fresh, natural and local as they like to cook from scratch, highlighting the need for consumer research and the benefits it can have on marketing strategies (Bryan Silbermann, CEO PMA).

The marketing plan for the business needs to be designed to meet the demands and specific needs of the modern-day consumer in each market. Marketing will drive consumption in the future and helps reframe fruit and vegetables in the minds of consumers (Bryan Silbermann, CEO PMA).

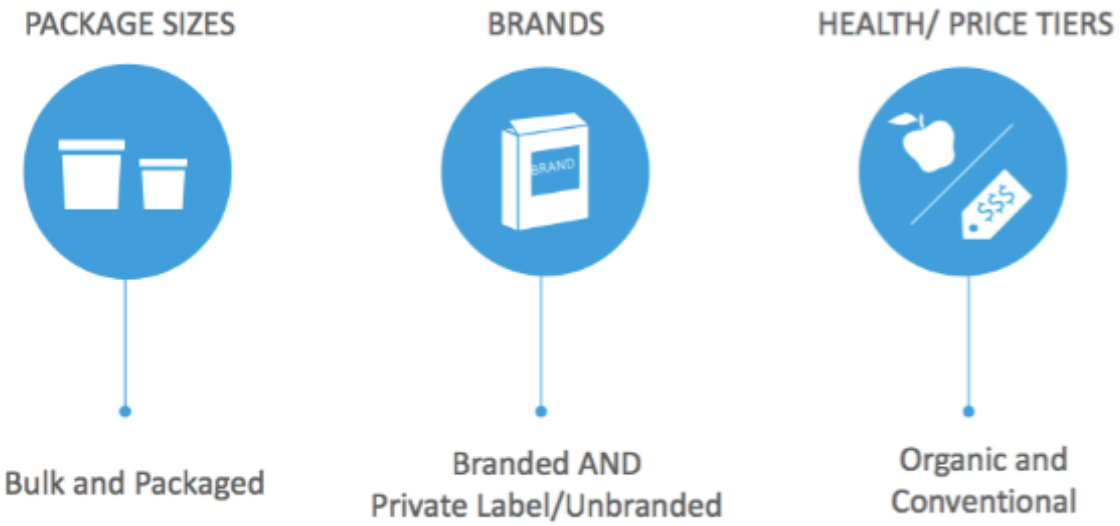

Figure 17: Producer options for innovation, trends and branding

Carefully branded product can educate consumers about health benefits, production, quality assurance, recipes and other product information such as origin and shelf life (Figure 17). Branding gives producers an opportunity to compete beyond just price. Consumers gradually develop brand trust and eventually search for brands rather than specific commodities.

One major opportunity is for branded product in a range of commodities. Brand consistency develops consumer trust, opportunities to grow brands into different commodities exist both domestically and internationally. Transparency of information on packaging is important to accurately communicate to consumers about the product, especially with international sales. FOXY produce in California (Figure 18) has a simple brand which is now recognised in a range of products all over the world. Modern consumers choose brands and products for lifestyle and to show affluence, especially in Asian countries.

Figure 18. Foxy brand on fruit and vegetables

Another trend is for younger consumers to look holistically at the health of products in terms of both product health for consumption and the impact that the production and distribution has on the health of the planet. This is leading changes in their diets (Bryan Silbermann, CEO PMA).

In the past two years, one of the trends considered most remarkable, and which was started by Intermarché in France, has been the sale of less than perfect produce, which is rebranded and sold to consumers at a reduced retail price. This trend is slowly being adopted all over the world and creates opportunities for producers to market everything that they grow, rather than just the premium product (Bryan Silbermann, CEO PMA).

4.4 Supply and value chain principles

Supply chains can be complex and are fundamental to the success of all vegetable industries. The vegetable supply chain varies depending on product, farm location, market location, customer, packaging requirements, quality assurance, produce requirements etc. Many of the links are driven by customer needs.

Professional supply chain management with transparency from start to finish is the key for good fruit and vegetable quality and marketing. Everyone in a supply chain needs to have product knowledge and know their role in providing a high-quality product to the final consumers.

In California, The Netherlands and Chile, the leading horticultural businesses were using many growers to grow product as well as growing their own product. This enables scale for one business to control the rest of the supply chain, in order to get product to consumer as quickly and efficiently as possible. This system is extremely effective as less people are making smarter decisions about marketing the product and it enables professionalism throughout the chain. It also enables the packers and processors to invest in the best packing technology in the world to lower the cost of the processing. Many examples of this occur where it is often a win-win relationship for growers and packers. The one constant in all examples seen is effective communication up and down the chain.

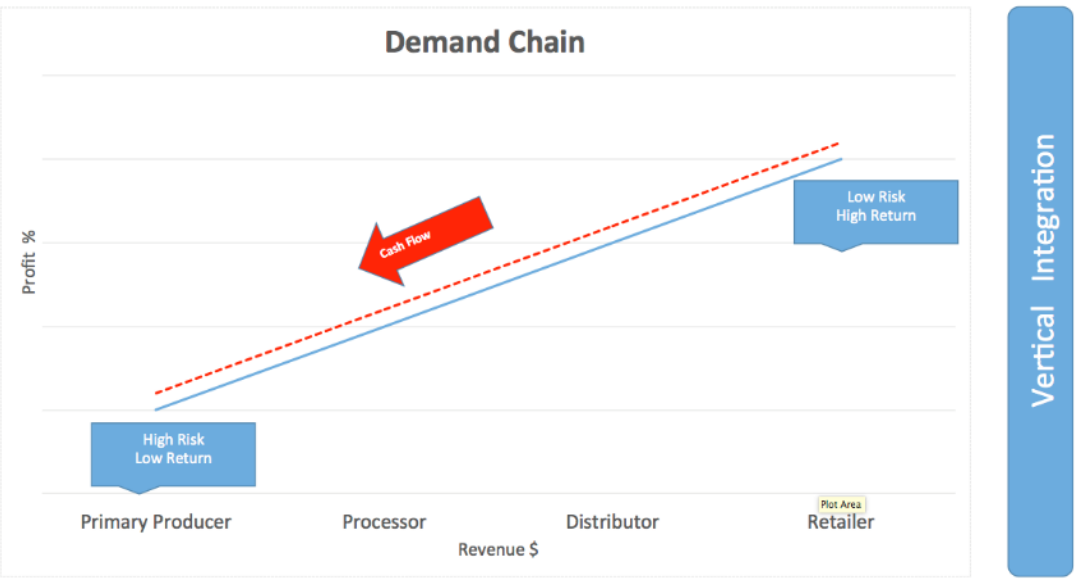

Figure 19: The demand chain for vegetable producers

Source: (Trent De Paoli, 2013).

Nuffield Scholar Trent De Paoli, (2013) communicates the need for growers to address and look for opportunities along the supply chain to value-add, highlighting the cash flow down the demand chain and shows that risk is lower and returns are higher at the top end of the chain. Growers can get access to this position through vertical integration (Figure 19).

The concept of the value chain was first introduced by Michael Porter to gain a competitive advantage (Porter 1985). The value chain, as the name implies, represents a linked set of value-added activities. The concept of value chain management (VCM) emerged from the realization that system improvements that give continuous improvements in system design and performance can only occur when businesses seek closer coordination and integration with suppliers and customers than traditional, transactional buyer-seller relationships allow. Developing closer strategic relationships with customers and suppliers enables businesses to learn and adapt more effectively to changing conditions than occur in old-style relationships that currently exist in many vegetable producers' supply chains.

Figure 20 shows that producers need to shift from a supply-push situation to a demand-pull situation. This demonstrates that the consumer is placed first in every business decision made.

Vegetable farming in Australia has traditionally been a supply push chain with limited communication, understanding and transparency, however this should change for greater efficiency and to create opportunities with export markets.

Figure 1. Supply chain thinking

Figure 2. Value chain thinking

Figure 20: Supply and value chain illustration

Source: (Berembeim, 2009).

The key areas and business framework for developing value chains and transparency are outlined below:

1. **Strategic alignment** – collaboration is not feasible unless all parties are pulling in the same direction with a common goal.
2. **Transparency** – efficient and timely flow of information along the value chain. Policies need to be in place to avoid wrong decisions in the process.
3. **Relationship integrity** – trust and commitment are key success factors. This changes the way people interact; without trust, buyers and suppliers have to trade on the open traditional style market.
4. **Consumer insight** – customers determine the future direction for the business. These insights need to be frequently reviewed and adjusted.

Once established, information flow and relationships become the key driver of sustainable businesses. Value chain thinking requires companies to embrace the principles of collaboration, which in turn demands aligned objectives, open communication and sharing of resources, and the resulting risks and rewards. Most importantly, sustainable value chains are more in tune with the needs of their customers and the wants of final consumers now and in the future. As the author witnessed when travelling, businesses that use management staff from different industries and staff who have travelled and lived in large population centres are better placed to understand the environment in which the modern consumer operates (Figure 21).

Figure 21: Co-innovation Roadmap showing transparency and relationships in chain required

Figure 22 gives some simple examples of how Australian vegetable producers have the opportunity to improve their business profitability. Generally, on farm production is the least profitable area of the value chain; hence through building careful relationships along the supply chain, producers can access a greater share of the profits and enable sustainable growth for businesses. Using value chains, producers can compete beyond price, through innovative value-chain efficiencies and changes, targeting marketing strategies and through embracing the evolution of retail channels in the Asian region. It is important for companies to understand price sensitivities of individual product lines and brands and the supply and demand balances for each product.

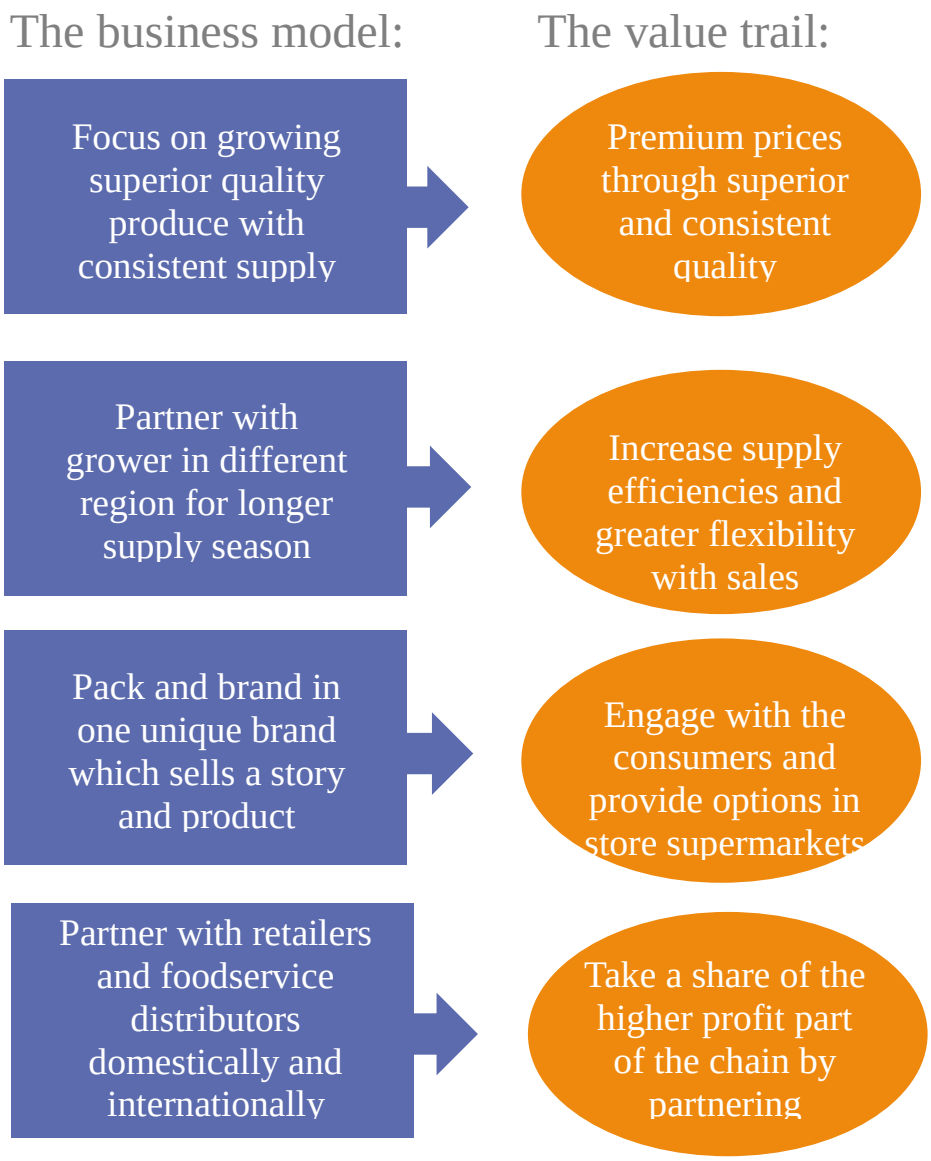

Figure 22: Business model and value chain flow for the vegetable industry

Many vegetable producers in Australia could benefit from taking time to analyse and identify where improvements could be made in their current supply and value chains. The key message Is that all evaluation should be undertaken with a view that there is always room for improvement.

4.5 Product differentiation

A large part of product differentiation in the vegetable industry is to have consistency. It is extremely important that accurate crop forecasts are provided for informed marketing. As robotic technology and weather forecasting improves, the marketing teams at vegetable companies will have greater knowledge of their production for the weeks to come. Consistency of supply and quality are very important for minimising over-supply situations. Supply consistency enables more stable shelf prices in retail stores, which normally results in more sustainable returns for growers over a long period. Crop forecasts should be provided

for as long as possible. Crops should be planted to avoid supply gaps for consistency. T&A in California have a dedicated crop forecasting team which assists with supply chain transparency, because their marketing team has accurate forecasts of their future production.

4.6 Post harvest advances

Longer shelf life gives growers and marketers consistent supply for a longer period. Consequently, brands can always be seen, without production gaps. Storing product can take out field supply fluctuations without compromising quality. Many Australian vegetable producers harvest and pack daily production, rather than assessing markets and future supply, to make informed decisions about future sales. Many producers are limited by the size of their cool room infrastructure and are hesitant to hold product before selling based on previous experiences.

Some international fruit and vegetable businesses visited during the studies are utilising modified atmosphere (MA) and controlled atmosphere (CA) storage, to assist with prolonging shelf life. These technologies can assist the producer to remove production fluctuations due to weather, or any other growing related problems.

Controlled atmosphere storage (CA)
CA works by controlling the concentration of a combination of oxygen ($O_{2)}$ and carbon dioxide ($CO_{2)}$, with nitrogen ($N_{2),}$ making up the balance of the store-house atmosphere. The low oxygen levels in controlled atmosphere storage reduce the synthesis of ethylene in ethylene producing fruit and vegetables, which promotes the ripening of fruit and vegetables and adversely effects shelf life (Saltveit, 2002).

Modified atmosphere storage (MA)
MA implies a lower degree of controlled gas concentrations. Many producers are using modified atmosphere packaging (MAP) to extend shelf life and incorporate branding into their marketing. The packaging provides a dual purpose of shelf-life stability and branding.

The six primary environmental variables usually controlled in CA, MA and MAP are storage duration, temperature, relative humidity, and the concentrations of O2, CO2, and ethylene.

The ‘optimum’ storage environment for each product is designed to maintain these variables within a set of limits that produces the maximum storage life for most of the individual members of the product. There are many product variables; location of production, harvest technique, size of product, variety and production techniques which all influence what the optimal storage conditions may be. As such, it is difficult to have tight guidelines on the perfect scenario, rather a range is used as a guide for a product regardless of variables in product.

Overall, Australian vegetable producers can implement many post-harvest advances; even simple techniques such as better hydrocooling to ensure field heat is removed as soon as possible after harvest will greatly improve shelf life.

4.6.1. Case study: Broccoli shelf life extension

Nutrition
Adequate calcium and boron levels available to plants while growing is important for maintaining post-harvest quality (O' Hare, 2010).

Temperature and controlled atmosphere
Relative humidity – broccoli and brassicas should be stored in relative humidity higher than 90%.

Temperature – low temperature is important to achieve shelf-life in broccoli. Hydrocooling and forced- air cooling can be used to quickly remove field heat. A temperature of zero degrees Celsius is required to optimize broccoli storage life (Figure 23).

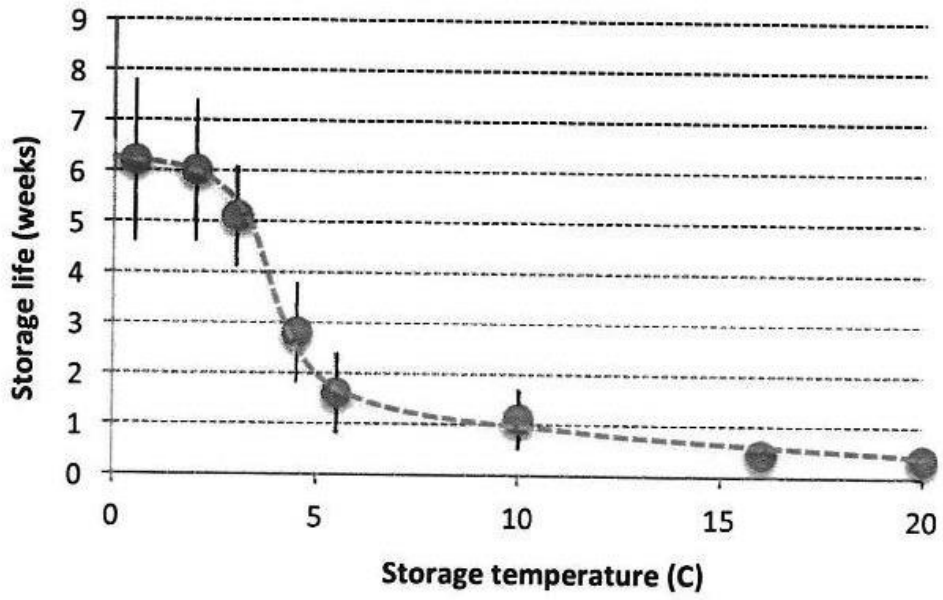

Figure 23: Broccoli shelf life at different temperatures over time

Packaging - modified atmosphere packaging, using sealed polyethylene bags or individual film wrapping, slows the ageing and deterioration process. Ethylene-absorbing sachets can be added to the packaging, which limits the availability of oxygen and builds up the level of carbon dioxide, while absorbing the ethylene.

4.6 Research and future products

Varietal intellectual property (IP) is a major consideration for the future; new vegetables with health benefits such as Japanese Kale, which can be eaten fresh, are becoming available. These suit millennial consumers, who are seeking new products and constant change. Consequently, vegetable seed producers need to continually innovate to give producers options and should aim to produce varieties which produce more consistently, to avoid supply fluctuations.

Sydney University is developing a robotic machine, 'the ladybug', to assist with field planning, mapping, yield monitoring and weeding. Robotic aids involved with harvest and packing,

immediately reduces labour and improves harvest quality, as supervisors are monitoring the harvest rather than driving a machine. Robotics also allows for much more field harvest and packing in one process to increase efficiencies in the supply chain.

Overall, many opportunities exist for Australian vegetable producers from the paddock through until the consumer. Each business is unique and areas for improvement will exist, especially in supply chains and value adding to assist marketing and business sustainability.

Chapter 5: Export opportunities

5.1 Competition from other countries

Many countries compete with product into the same international markets as Australia. The following countries offer some of the strongest competition.

5.1.1. New Zealand

New Zealand's agriculture is focussed on export. Over 80% of NZ horticultural produce is exported, with major trading partners being similar to Australian countries, especially China, Korea and Japan. New Zealand has a higher reliance upon sea freight as it is well serviced into the South East Asian and North Asian regions. Australia's main point of difference is frequency of international flights, reducing costs of air freight and improving speed to market.

5.1.2. Chile

Agriculture is the second largest driver of Chile's economy. Chile has excellent climatic conditions, good water and soil resources and a supportive government, which has negotiated free trade agreements with most countries accessible for trade. Chile's disadvantage is geographic isolation from large population centres. Access to east coast USA and Europe are through the Panama Canal and the Far East is more than 40 days sailing away. Airfreight cost prohibits airfreight for low and medium value products. Select, high value products travel via airfreight at the start and end of seasons. Often exporters will work together to charter planes from Chile with high value fruit and vegetables from a range of growers, when they are trying to remain competitive and supply markets at the right time.

5.1.3. Argentina

Argentina has huge potential; however, realisation of that potential will take time to develop. Water, soil and technology resources are available; however, political instability and taxes have prohibited horticultural export development. Like Chile, geographic isolation influences trade, however sailing times to East coast USA and Europe are much shorter than Chile, which is a cost saving. Argentina has greater access to labour and the cost of labour is also cheaper than Chile.

5.1.4. Africa

Africa is a huge continent with excellent natural resources. Until now, poverty, political instability and technology have limited growth. Huge opportunities for horticultural exports to the Gulf States and Europe exist over time. Many European producers are developing farms in countries in Africa, especially Kenya.

5.1.5. United States of America

Californian agriculture is a major competitor for Australian and New Zealand produce. California has similar climate to the southern regions of Australia, with hot, dry summers and cool winters. Water resources are scarce; however, growing techniques and efficiencies are extremely high. Most vegetable growers utilise in-field packing processes and large cooling plants (Figure 24) to quickly and efficiently manage product. Supply chains are extremely well developed and post-harvest handling and storage are world-leading.

Figure 24. Twelve pallets of field packed broccoli for rapid cooling

5.2. Major export markets

Over 60% of the world's population lives in Asia. Australia is ideally located geographically to take advantage of this population, with short-transit air and sea freight available. In addition, seasonal differences between the North and South Hemispheres creates opportunity. Australia's time zone in relation to Asia is also ideal when compared to competition in the Americas and Africa which enables faster and easier communication during regular work hours from farms to importers. In summary, our competitive advantage is time zone, quality, reputation and proximity to major international airports and volume of flights. For example, Melbourne to Singapore has seven flights daily. That provides flexibility and relatively low-cost airfreight options.

Globalization and expanding international markets, as well as the fast-growing middle and high-income classes in many developing countries, offer opportunities for producers to operate in these markets.

5.2.1. China

Market access, Chinese domestic production and trade difficulties have restricted Australia's vegetable exports to China. Peak industry bodies need to develop a strategy to enter the market with larger quantities and a larger range of products. Opportunities exist in the major cities on the east coast, especially with niche, high-end retailers, however research and a strategic and unified industry approach must exist before success will occur.

5.2.2. Hong Kong

Chinese domestic production floods the non-seasonal products with cheap alternatives. Opportunities exist for direct sales to supermarkets, airlines and food service exist for many producers. It is important to have good relationships with Hong Kong importers, who trust and understand the product they are selling.

5.2.3. Singapore

Singapore imports over 95% of its food. Geographically it is well placed to buy produce from the world. Airfreight rates from Australia to Singapore are relatively cheap, which means Singapore is effectively a sixth wholesale market for many of Australia's vegetables. Singaporean people are traders and it is a very competitive market.

5.2.4. ASEAN Countries

Counties such as Malaysia, Thailand and Vietnam have the potential to drive and shape Australia's vegetable trade. Not only are they going to produce far more produce of their own in the future, they will also need to rely on other countries to supplement their food.

5.2.5. Gulf Countries

Opportunities exist for many products, especially from Western Australia, where location and logistics make trade easier. The Australian meat industry has had good success in the Gulf countries; as a result, the Australian brand has a very good image which could benefit future fruit and vegetables exports.

5.3. Case Study – Japanese Market Overview

The Japanese market is a very interesting case study. Australia has a long history exporting vegetables to Japan, with large volumes of trade already existing for asparagus, onions and carrots. In 2015, broccoli exports recommenced, largely through the work of Trade and Investment Queensland, HIA and the Export of Broccoli to Japan Committee. Japan grows many of its own vegetables, however lack of land and cold winters limit supply of some products, which creates opportunity.

Opportunities to develop these products and additional product sales in Japan exist. Information on market access and quarantine requirements for Japan is freely available and for all countries and products at the following site:
(http://micor.agriculture.gov.au/Plants/Pages/Japan_JP/Japan_JP.aspx)

Figure 25. Produce trade locations to Japan

Figure 25 illustrates that fruit and vegetables come from all over the world to Japan, a country of 120 million people with limited arable land.

Quarantine

Product for export to Japan needs to be inspected in registered establishments in Australia. A phytosanitary certificate issued by the DoA will be issued once an authorised officer or department inspector has cleared the consignment. When product arrives in Japan (Figure 26), the Japanese MAFF inspect the goods and check for chemical residues before clearing the product. A positive identification of a quarantine pest will require either return of product of fumigation treatment.

Figure 26. Product arriving to Haneda airport, Tokyo. Photo taken from Haneda airport inspection area.

Importers

Importers still dominate the incoming fruit and vegetable trade. Over half of the imported fruit and vegetables are sold in traditional-style wholesale auction markets. Tokyo has numerous wholesale markets in key regions; the largest market is Ohta market and the major market for imported produce is Tsukiji market. The rest of the product is sold directly to food service and retailers. Many people have strong friendship based relationships in the Japanese markets (Figure 27).

Figure 27. Relationships with importers is extremely important

Wholesale markets

The Japanese marketing system is dominated by traditional markets, especially in regional areas with over 50% of produce moving through market systems. Auction markets still exist for fruit and vegetables in most markets (Figure 28); as a result, there is large fluctuation in daily prices. Each day, every market has a price summary produced for each product. The majority of the product is sold to retailers or to secondary and middle traders (Figure 29) who sell to restaurants and food service customers. Japanese people eat out for many meals per week, which explains why such a large volume of trade still happens in wholesale markets.

Figure 28. Leeks being auctioned in Tsukiji market

Figure 29. Japanese middle trader selling produce

Retailers

There are three main categories within the retail sector in Japan. Conventional and large-scale supermarkets, convenience stores and department stores. Like other areas of the world, all three categories are growing in annual sales volumes and number of stores. Recently, convenience stores have shown the strongest growth in terms of both sales revenue and number of stores. Costco Japan has been a huge success, with 22 stores and two distribution warehouses currently open and plans for a further six stores in the next five years (USDA 2016).

Rank	Company Name	Total (JPY Mil)	Food (JPY Mil)	Ratio of Food Sales	Number of Outlets	Location of HQ & Stores
1	AEON Retail	2,117,231	1,088,100	51.3%	563	Chiba
2	Seven & I Holdings	1,285,942	592,913	46.1%	181	Tokyo
3	Uny	745,647	484,962	65.0%	226	Aichi
4	Daiei	*	*	*	468	Osaka-Kobe
5	Izumi	557,074	185,984	21.7%	103	Hiroshima
6	Life	585,770	476,927	81.4%	245	Tokyo
7	Arcs	470,310	421,565	89.6%	319	Hokkaido
8	York Benimaru	396,930	298,136	75.1%	200	Fukushima
9	Heiwado	347,835	231,722	66.6%	142	Shiga
10	Kasumi	250,098	232,231	92.9%	159	Tsukuba

Table 1: Top 10 supermarkets in Japan by total sales, 2014

Convenience stores and vending machines are frequent in Japan (Table 2). Convenience stores have a wide range of products available and their density of stores means they are generally close and create a sense of community for the consumer. Convenience stores sell basic fruit and vegetables, as well as many pre-prepared salads and meals. Opportunities exist for Australian exports to supply some of the ingredients used in pre-prepared foods, which are carefully labeled. Figure 30 highlights the packaging requirements required by Japanese retailer. This creates opportunities for Australian producers to value-add.

Rank	Company Name	Food Sales (JPY Mil)	Number of Outlets	Location
1	Seven & I Holdings	2,737,641	17,491	Nationwide
2	Lawson	1,581,100	11,900	Nationwide
3	Family Mart	1,093,790	10,514	Nationwide
4	Circle K Sunkus	517,936	5,990	Nationwide
5	Mini Stop	217,184	2,151	Nationwide
6	Three-F	50,643	558	Tokyo Area
7	Poplar	42,606	525	Nationwide

Table 2: Top seven convenience stores in Japan by total sales, 2014

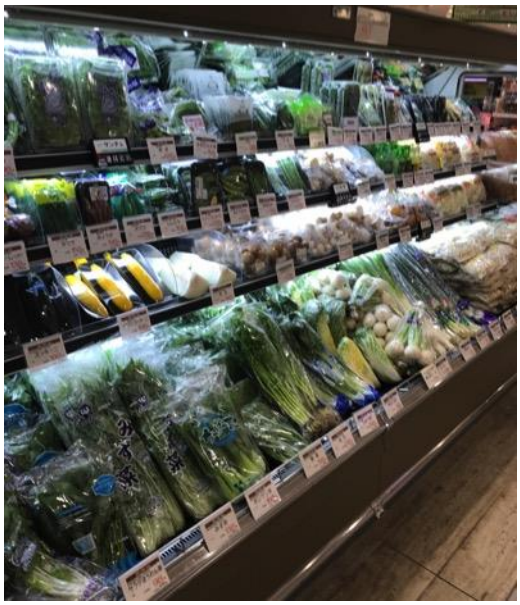

Figure 30. Vegetable packaging in Japanese retail stores

Many opportunities exist for Australian producers in the Japanese market and other markets throughout the Asian and Middle East region. Producers and marketers need to understand competition from other countries and then spend time in markets undertaking specific market research to identify small opportunities as they arise. Small steps are required to establish brands and reputation.

Chapter 6: Export processes

The quality of the export product must be of a very high standard.

"We can have all the niceties and relationships with the customers, but it is the product that counts. While the Australian dollar is low we have a fantastic opportunity to create export business relationships and consolidate our position in the global market."
(Jim Trandos, Trandos Farms).

This quote summarizes Australia's position. The Australian vegetable industry needs exports to increase the economic sustainability of vegetable production and alleviate over supplied domestic markets.

6.1. Export supply chain

As outlined in supply and value chains, it is important that effective and efficient supply chains exist for export. A typical and simple supply chain model from field to consumer for Australian vegetables for the airfreight to Japan:

Field → packing → hydrocooler → cool room / storage → dispatch → truck → freight forwarder loading → flight to central Asian hub → flight to Japan → customs → importer warehouse → truck to market → market or retailer → second wholesaler → consumer.

Transparency and communication on all links are required for effective export. For all of this to typically happen within 48 - 72 hours and on every day of the week highlights the need for close relationships, planning, policies and processes.

For sea freight, export broccoli from California to Asia and export of cherries from Chile are two examples of highly effective exports. Both are perishable item; however, through excellent cold chain management and supply chain procedures, they can access markets using sea freight resulting in a consistent supply to markets.

6.2. Exchange rate

Exchange rate is a major consideration for exporters. Grower returns and export volumes are highly sensitive to exchange rates. Figure 31 highlights the variability in the Japanese yen against the Australian dollar.

Figure 31: JPY / AUD FX rate from 2012 – 2016

Source: (XE Currency, 2016).

As an example, when trading in Japanese yen against the low and high of Figure 35/
Low – 74.7 based off 500 yen / kg sales = AUD$6.69
High – 103.4 based off 500 yen / kg sales = AUD$4.85

The difference between the high and low points in exchange rates is AUD$1.84 per kg of product.

It is also important to monitor the exchange rates in competing countries such as New Zealand, USA and Peru. Exchange rate can create or limit export opportunities. With price sensitive commodities, growers need to have access to multiple markets, including the domestic market, to reduce the risk of the exchange rate affecting profitability.

6.4. Cultural Sensitivities and Differences

Export in the Asian markets is driven by relationships. A level of transparency and trust with both importer and exporter is vital. Asian morals are very important; they are hard-working and dedicated to their work. They work in teams extremely well and communicate all information back to exporters. The best relationships are flexible and will shift to the daily needs along the perishable supply chain. Business will not develop overnight; at times, it will take several years before anything will emerge.

6.5. Export spot

Opportunities exist when supply becomes very short for a small period in a country normally producing its own produce. For example, in Japan, typhoons are common in the late summer period. Typhoons often lead to damaged vegetable crops and sudden shortages in markets. During these times, opportunities for airfreight exist on all vegetable lines. It is important that it is acted on quickly and that there is some level of planning and program put in place to avoid oversupply of imported produce into the country.

6.6. Export seasonality

Australia has a wide range of production regions and has good availability of almost all vegetables for twelve months of the year. This creates opportunity and a point of difference against competing countries such as New Zealand which does not have the geographic diversity. Most Asian producing countries have product available for periods of the year, however lack of arable land and less diversity in production areas creates opportunity for Australia to supply niche markets at certain times of the year.

6.7. Export contracts

Most vegetable exports are coordinated with a program and a plan to supply for the season. In some instances, price will be variable, depending on supply and demand. In other instances, price will be fixed for a season's program. For airfreight, it is often easier to set price on a supply-demand basis.

A good example of this is the Chilean cherry industry, through grower cooperation and technology investment, large grower exporters are able to program sales ahead of the season for a percentage of their crop. This helps take out some market fluctuation and growers are assured of a fixed return on that fruit (assuming good quality upon arrival).

6.8. Market Access and Bio-security

Government support and assistance with bio-security, overtime, weekend inspections and clearances and protocols for new markets is vital. Governments, in conjunction with industry stakeholders, should undertake cost benefit analysis on potential countries where trade could develop.

The New Zealand onion industry is a good example of one country with a large industry and a very small domestic market. They have market access and free trade agreements with many northern hemisphere countries enabling them to sell different sizes and quality to many markets. This gives them a competitive advantage over Australian onions and enables them to maintain their annual production.

Chapter 7: Consumer research and alignment and the retailers

7.1 Consumer research and alignment

Suppliers need to understand their consumer and their needs, preferences, trends, cultures and barriers to consumption. Consumers need to be educated on the products that they are purchasing. There is a trend in the developed world for many people aged less than 40 to understand what they are eating and where it has come from (Neilsen, 2015). Many food trends, such as organic, GMO, healthy and super foods are driving consumers' interests into what they are buying. The more understanding there is of a consumers' needs, the more the growers will benefit. Growers can then plan to grow exactly what the consumers require and supply in a form that they are looking for.

Australian consumers, on average, grocery shop two to three times a week and on average consumers purchase around 17 vegetables of the approximately 100 types available in stores. Many Australian consumers are surprised by the value for money when buying fresh vegetables. Most consumers consider vegetables to be dinnertime food; this creates an opportunity for vegetables to be consumed as snacks, with lunch and breakfast (AUSVEG consumer segmentation report 2015).

Convenience, quality / value, health and versatility are the current consumer drivers when shopping. Food without additives or modification are currently in the highest demand by global households. GMO free and organic are part of the "food without additives" campaign (Nielsen, 2015).

7.2 Retailers

A common trend for retailers in developed countries is to offer hypermarkets, supermarkets and convenience stores. This enables a range of products to be sold to the consumers at different price levels. Each retail alternative offers a different experience for the consumer. As affluence continues to grow in Asian regions, increased amounts of product will be sold through retail markets rather than the traditional wet markets.

Retailers are often criticised for selling fruit and vegetables out of season, however this is driven by consumers. Out of season items are sales opportunities for Australian producers. Longer hours of operation for retailers and online purchasing for home delivery are areas of expansion for major retailers.

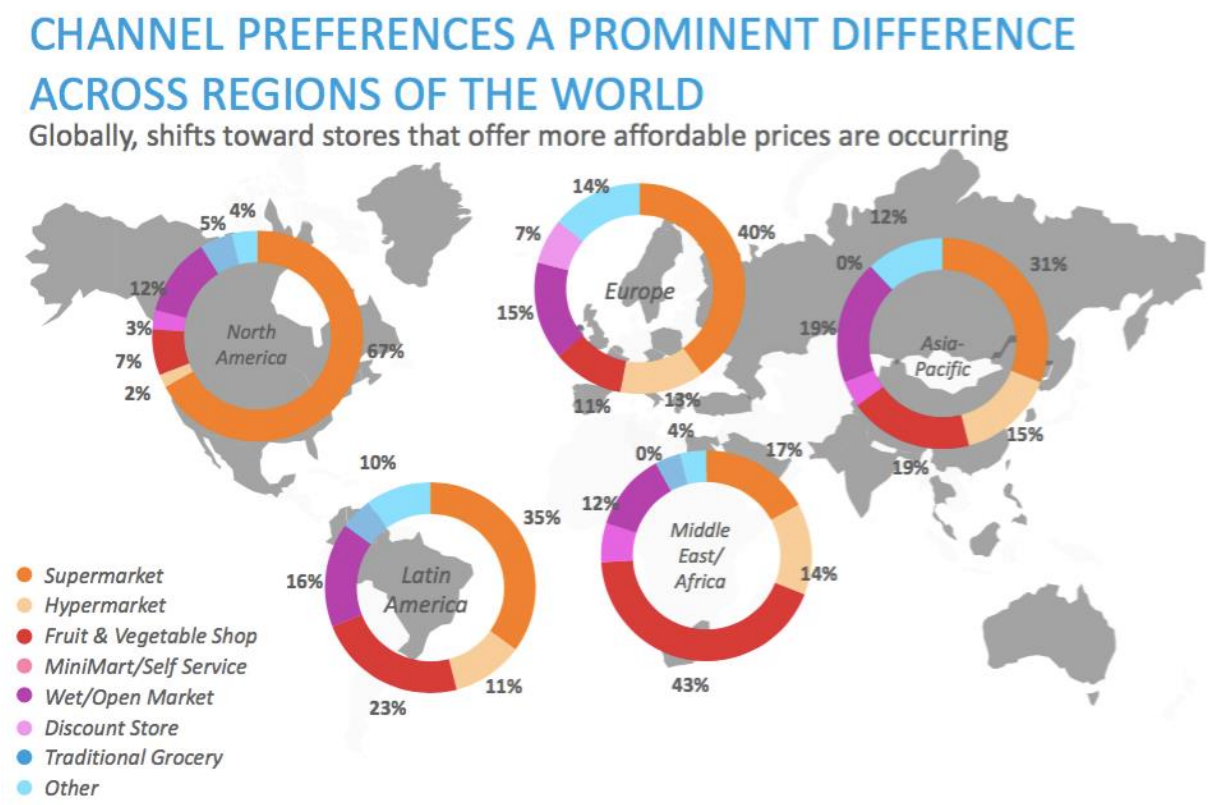

Figure 32: Global channel preferences

Source: (Nielsen 2015)

In the Asia Pacific region, Japan, Singapore, Australia and New Zealand rank supermarkets as the preferred retail channel. In all other Asia Pacific countries, small fruit and vegetable stores or open-air markets are the preferred channel (Figure 32). This, in combination with the frequency of shops, highlights where exports should be targeted. Consumer trends need to be monitored over time for future planning. For example, South Korean consumers prefer hypermarkets; this preference has occurred in the last ten years, since global retail giants such as Costco have entered the market.

7.3. Online sales

Online marketing could turn into the ultimate game-changer of the produce industry. Already over one billion consumers around the world are buying online (Nielsen 2015). The world is becoming increasingly connected; consumers now require both native and foreign foods to be regularly available. Online sales are a future macro trend which will become more apparent in the next ten years. The development of online sales for fruit in Asian countries, especially around the Chinese New Year, is already apparent.

The modern consumer is informed, educated and always looking for new alternatives to challenge the norm. Vegetable producers in Australia need to capitalise on this opportunity and understand that the modern consumer is actively looking for new and modern alternatives in products and packaging. Once a product has entered a market, the challenge is to continue to develop and maintain contact with the latest trends to ensure brands are not left behind in modern marketing, especially in the retail space which is going to dominate developed worlds in the future.

Conclusion

The Australian vegetable industry needs to adapt to modern trends beyond the farm gate. As producers, we are very good growers, however improvements can be made throughout the supply and value chain.

Food trends and demand for imported food are rapidly developing in Asia. The Australia vegetable industry needs to be persistent, and to research, market, plan and promote product in export destinations to capitalise on the opportunities, which will eventually arise throughout Asia.

Export of vegetables will eventually alleviate over-supply on domestic markets and should lead to improved farm gate returns, increasing longer-term sustainability in the industry.

In summary, growers need to be versatile and run professional businesses with a long-term approach and with a strong emphasis on export markets.

Transparency needs to exist throughout the supply chain and growers need to value-add and move away from traditional marketing and ‘arms length’ trading relationships.

Recommendations

Australian growers need to improve in the following areas:

1. Value chain adoption with transparency and trust in relationships.
2. Export is key - having access to multiple international markets as well as the domestic market to reduce risk.
3. Farmers need to invest in modern technology to produce a more consistent product.
4. Cooperation of growers in different production regions to reduce risk of supply shortage needs to be organised. This would improve consistency for marketing produce and brands.
5. Increased investment in post-harvest cold chain management and treatment of product.
6. Farmers need to move away from traditional ‘arms length’ buy and sell relationships.
7. Management structures and overall professionalism within companies need to be changed and developed.
8. Product branding and specialist marketing for differentiation needs to be developed.

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Plain English Compendium Summary

Project Title:	**Supply chain, post harvest and export opportunities** Australian Vegetable Industry
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Scholar:	James Terry
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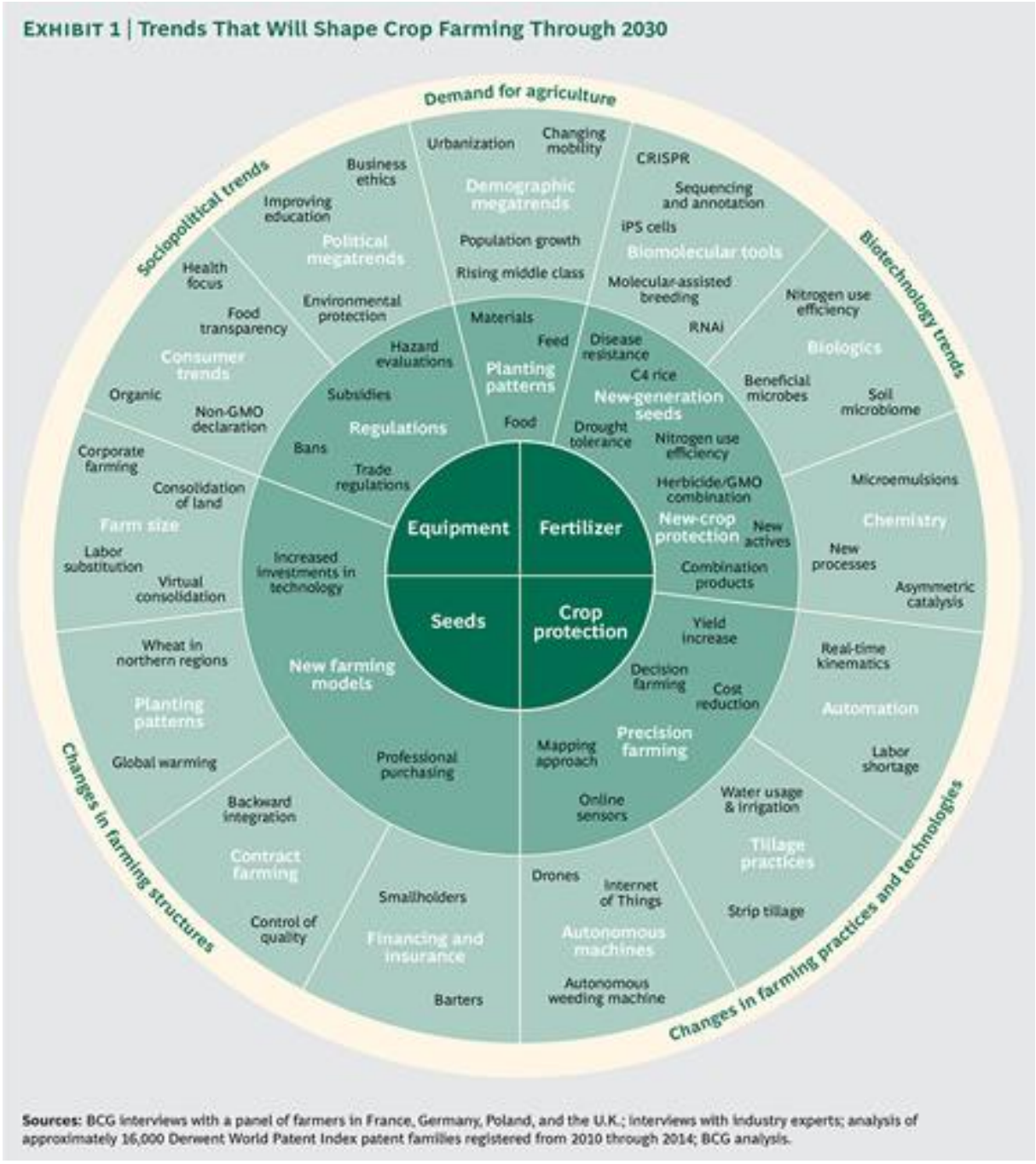
Objectives	Travel to 20 countries, including developed, developing and undeveloped countries, to further understand horticultural trade and the opportunities for the Australian vegetable sector, both domestically and internationally.
Background	The author is an asparagus grower and involved with a large vertically integrated asparagus company, growing, packing and marketing asparagus throughout Australia and South-East Asia.
Research	Holistic research on worldwide vegetables, production, supply chains, trade and marketing to determine how the Australian industry can capitalise on future trends.
Outcomes	Exports are essential for long term industry sustainability. Australia is ideally situated geographically to capitalise on the large population base in the rapidly developing Asian region. Supply chain transparency and communication on all levels is important.
Implications	To use value chain management to improve future vegetable exports with potential to expand the Australian vegetable industry.
Publications	Cotton Yield and Soil Carbon under continuous cotton, cotton – corn, cotton – vetch – corn and cotton – wheat rotations. The University of Sydney, November 2007

Appendix

Attachment 1: Trends and complexities in Agriculture



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