UNIVERSITY OF SOUTHERN QUEENSLAND AUSTRALIA

Research

Queensland Government

Opportunities and challenges relating to the export of fruit and vegetable products from Queensland to Asian Countries

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For bibliographic purposes, this document may be cited as:
Sun, Ximing 2016, Opportunities and challenges relating to the export of fruit and vegetable products from Queensland to Asian Countries, Australian Centre for Sustainable Business and Development, University of Southern Queensland, Toowoomba, Queensland.

Contents

Executive Summary

Most fruits and vegetables produced in Queensland supply the domestic market. The export volume is less than 4%. Asia is our major export destination and is potentially the key demand region for Queensland fruit and vegetable products. To increase export to Asia, a sound export strategy needs to be developed based on the strengths and weaknesses in the production chain in Queensland and opportunities and threats in the marketplace in Asia. This report examines the potential to increase exports of Queensland mangoes, fresh cut vegetables, frozen vegetables, and value added products to Asian countries. It does this by analysing the challenges, opportunities, weaknesses and strengths facing each of the four product categories in regard to Asian markets. The report also examines the opportunities for using e-commerce to market these products.

Many countries in Asia are importing Queensland mangoes but not all of them have the potential to increase import volume. Based on market analyses, the report concludes that China and Korea are the only two countries suitable for expansion. It is recommended that the Queensland mango industry should focus on these two markets. Furthermore, the Queensland government needs to encourage investment in postharvest-related infrastructure and R&D for mango quality improvement and, at the same time, encourage mango farmers to work together to produce consistent quality and extend the supply window.

Fresh cut vegetables is a relatively new industry in Queensland. Unlike other vegetables which can be freighted by sea using comprehensive technologies in which Queensland lags behind its competitors, fresh cut vegetables has a very short shelf life and are required to be sent by air by all export countries. The same freight mode means that Queensland has an advantage over its competitors in Asia in supplying premium quality products. The Government needs to develop relevant polices to support firms already exporting to Asia. These polices should focus on helping firms develop economies of scale and consistent supply in terms of quality and quantity.

Frozen vegetables are not generally the focus in Queensland even though Queensland is capable of broadacre vegetable production and has the potential to produce some selected vegetable crops at low cost. Queensland must develop the necessary economies of scale in production and processing plants must be highly automated to minimize labour costs so that Queensland can compete in Asian markets.

Developing value-added products can overcome sanitary and phytosanitary restrictions imposed by many Asian countries on imports of fresh produce from Queensland. Queensland's food and agribusiness sectors are world-renowned for producing high-quality, safe, clean and green food at competitive prices. This report has found that Queensland can produce premium value-added products for top end markets in Asia. The keys to success are product differentiation and

a reliable supply of premium quality goods. The prerequisites are detailed market research combined with new product development.

Marketing and selling using E-commerce has potential in the Asia. suggests-commerce is more suitable for packaged products which require less restricted cold chain systems for maintaining quality. Queensland firms could use this online e-commerce technology to offer value-added products to Asian consumers who are looking for products that are unavailable in physical stores.

Introduction

Asia is our major export destination and has potential to be the key demand region for Queensland fruit and vegetables products. To maintain and increase exports to Asia, an export strategy needs to consider strengths and weaknesses in the production chain in Queensland and opportunities and threats in the marketplace in Asia. This report examines the potential to increase exports of Queensland mangoes, fresh cut vegetables, frozen vegetables, and value added products to Asian countries. It does this by analysing the challenges, opportunities, weaknesses and strengths facing each of the four product categories in regard to Asian markets. The report also examines the opportunities for using e-commerce to market these products, a growing channel for selling agricultural products in Asian countries.

Consumer tastes and purchasing behaviour are changing in developing countries, particularly those in Asia, which are predicted to consume half the world's food by 2030 (Anderson & Strutt, 2014). The increase in disposable income and in the numbers of middle class consumers in Asian countries provide a great opportunity for Horticulture Queensland to export to this market. Asian consumers are preferentially purchasing agricultural products from Australia because they are perceived as being safe, clean, green and high quality.

Horticulture is one of the major agricultural sectors in Queensland. It is valued at more than $2 billion per year and employs about 25,000 people (QFF, 2014). It has become the primary and secondary source of income for many families in regional Queensland, providing a significant contribution to Queensland regional economies and increasingly becoming the mainstay of many regional communities (Growcom, 2016).

Queensland fruit and vegetable production

Queensland has 16 defined horticultural regions with a total area under fruit and vegetable production of about 100,000 hectares. There are 2800 horticultural farms spreading from Stanthorpe in the south to the Atherton Tablelands in the far north of Queensland, producing more than 120 types of fruits and vegetables (QFF, 2014). The fresh produce ranges from temperate stone fruits and apples to tropical fruit, to staple vegetables, Asian vegetables and macadamias.

The major fresh fruits produced in Queensland are banana, citrus, avocado, pineapple, strawberry and mangoes. The total fruit production varies between 550,000 and 650,000 tonnes per year.

The major vegetables produced in Queensland are potato, lettuce, sweet potato, pumpkin, beetroot, capsicum and chili, onion and brassica. The total annual vegetable production is about 450,000 to 550,000 tonnes. Queensland vegetables typically supply the southern states during the cooler June to October

period. The production, total area, major location and value for individual fruits and vegetables produced in Queensland are presented in Appendix One.

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Evolution of the Queensland horticultural industry

The Queensland horticulture industry has been evolving gradually from production-driven paradigms of the past to the way of demand-driven horticulture. Production-driven means a firm develops and produces a product and then searches for a market niche, which is opposite to the demand-driven when a firm develops and produces a product based on customer needs. This change is driven by Coles and Woolworths, the two dominant supermarket chains in Australia. The size of their buying operations allows them to dictate terms to obtain produce preferred by their customers. Growers, instead of planning and growing what they like and want, have to grow what the supermarkets demand and meet the product specifications imposed by Coles and Woolworths, including production methods, size, shape and colour of produce.

The changes in the production chain are reflected by 1) fruit and vegetable farmers are taking more production risks than ever before exacerbated by extreme weather conditions such as drought, heavy rain and flood (ABARES, 2013) and 2) the average cost of production has also been increasing over the years (Ausveg, 2014). The cost of fruit and vegetable production varies from farm to farm depending on the size and scale of the business in question. In general the larger the farm size, the more efficient and less total cash cost (Jame, 2011). The effect of business size on the cost of production has resulted in the increased farm size and the intensification of cooperation and collaboration among growers for the purpose of reducing production and marketing costs.

Asian market

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The Asia Pacific region remains one of the highest annual per capital consumption of fruits and vegetables. The World Health Organization recommends 400g of fruits and vegetables per day for minimum healthy diets. In the Asia Pacific region average consumption stands at 560g per capita per day, resulting in 75% of the global vegetables and 66% of global fruits consumed in this region (Kocheri, 2015).

While leading deciduous fruit exporters around the world are seeing demand in many traditional markets either stagnant or declining, they believe that Asian markets offer the best future growth prospects because of their large populations and rapidly rising incomes (Admin, 2013).

The increased demand for imported fruits in Asia is driven by consumers who are looking for premium quality products and the counter seasonal shortage of domestic supply. People purchase imported fruits as gifts. Eating imported fruits in some countries such as China is perceived to have symbolic meaning,

reflecting individual's social status and personal achievement (Sun and Collins, 2002).

The imported fruit and vegetable markets in Asia are very competitive. Many countries and regions from outside are striving to send their products to these markets, including US, South Africa, South American countries, European countries, Israel, New Zealand and Australia. In addition, Asian countries are exporting to and importing from each other. Australian fruits and vegetables have established a good reputation among Asian retailers and consumers as being clean, safe, green and healthy produce. This reputation derived from its isolated geographic location, world class biosecurity systems which protect Australia from many pests and diseases, its clean air, soil and water resources, and most importantly the world–class food safety management system supported by a transparent legal system. This powerful combination of enabling factors means Australia can deliver safe food with world-class traceability and credibility. These are features that cannot easily be copied by other nations. The desire and willingness to pay more for clean, safe, green and healthy produce by the wealthy Asian consumers (Neales, 2015) presents enormous potential for Queensland to increase its export volume to this market.

Current Queensland exports to Asia

The Queensland horticultural industry has traditionally focused on suppling the domestic market. However, the majority of horticultural producers are currently engaged in exporting because of their ability to produce quantities of fruits and vegetables which exceed the demands of domestic market. Table 1 presents the estimated volumes of the major fruits exported from Queensland. Comparing the annual fruit production between 550,000 and 650,000 tonnes, the total export volume is less than 4%. Hong Kong, New Zealand, Singapore, UAE, Indonesia, PNG, Thailand and China are the major import countries of Australian fruits.

Table 1: Volumes of the major fruits and orange juice exported from Queensland

Fruit	Volume (Tonnes)	Major Import Countries
Mandarin	16,000 to 20,000	China, Indonesian, Hong Kong Singapore and UAE
Melons (Rockmelon and watermelon)	5,000 to 9,000	UAE, New Zealand and Singapore
Orange	2000 to 3000	Malaysia, Indonesia and Japan
Mango	2000 to 3000	Hong Kong, New Zealand and Singapore
Apple	1,000 to 1,500	PNG and Indonesia
Avocado	300 to 1,000	Singapore and Thailand
Grape	300 to 450	Hong Kong, Indonesia, Thailand and Singapore
Summer fruit	200 to 300	UAE, Singapore, Hong Kong and Taiwan
Strawberries	500 to 800	Hong Kong, New Zealand, Singapore and Thailand

Table 2 presents the estimated volumes of the major vegetables exported from Queensland. The total volume of the vegetables exported from Queensland is much smaller than fruits. Comparing the total annual vegetable production of Queensland between 550,000 and 650,000 tonnes, the total export volume is less than 0.4 %. The major export destinations of vegetables are the same as Queensland fruits.

Table 2: Volumes of the major vegetables exported from Queensland

Vegetables	Volume (Tonnes)	Major Import Countries
Onion	500 to 25,000	Europe and Japan
Tomatoes	2000 to 4000	New Zealand and PNG
Broccoli	1000 to 2800	Singapore and UAE
Chinese Cabbage	100 to 1600	Taiwan and Singapore
Carrot	1000 to 1500	UAE, Malaysia and Singapore
Green Bean	1000 to 1400	New Zealand and Taiwan
Capsicum	800 to 1400	New Zealand and PNG
Cauliflower	100 to 800	Singapore, PNG and Malaysia
Sweet potato	100 to 200	UAE and Singapore
Lettuce	100 to 200	New Zealand, Singapore, Indonesia and Malaysia
Cucumber	90 to 110	New Zealand

Activities and priorities for horticulture export by the government organizations and industry bodies

There are many government organizations and industry bodies supporting Queensland horticulture export, including Queensland Department of Agriculture and Fishery, Trade and Investment Queensland, Australia Trade and Investment Commission, Horticulture Innovation Australia and Ausveg. Supporting activities cover two areas: production and export development. With production, activities include (HIA, 2016):

- Developing an intelligent farm robot for the vegetable industry;
- Strengthening biosecurity for the Australian vegetable industry;
- Strengthening the fruit industry's fight against fruit fly;

With the export development, the focus is on: 1) the development of export markets in order for growers to expand their production and profitability through emerging international markets: and 2) the market access and linkage that can offer export-ready growers opportunities to connect with buyers from some of the world's leading retailers.

The generally recognized priorities for research and development in Queensland Horticulture consist of (Government Queensland, 2015):

- Understanding the needs and preferences of fruit and vegetable consumers in Asian counties;
- Investing in projects (on and off the farms) necessary to deliver high value products into niche markets in Asia and bringing more value to customers and more margins to growers;
- Building a competitive supply chain of Queensland fruits and vegetables to ensure that consumers can confidently purchase consistently high quality fresh produce at retail level of both domestic and Asian markets;
- Developing value adding processes for both domestic and international supply chains;
- Developing innovative techniques and technologies to improve on-farm production efficiencies. This will be supported by improved farm management approaches.

Research methods

Desk top research and in-field interviews of stakeholders in the vegetable and fruit supply chains to Asia markets are employed. The stakeholders include growers, processors, freight forwarders, exporters, importers, wholesalers, retailers and Asian consumers. Data will be analyzed using qualitative methods to examine the advantages, challenges, opportunities and barriers to exporting horticultural products from Queensland to Asian countries.

Organization of the report

This report is arranged into three sections.

Section one, discusses the Queensland mangoes industry, and discusses how to evaluate and select the right markets in Asian countries.
The second part of this section discuses fresh cut vegetables and demonstrates how to select the right products through understanding market needs and wants.

Section two explores the opportunity for frozen vegetables in Asian markets. It does this by analyzing the challenges, weaknesses and strengths in the production chain in Queensland and market situations in Japan and China. Through the analysis, opportunities for frozen vegetables in these two markets are presented. This section also includes value added fruit products. Using three Queensland food processing firms, Gin Gin & Dry, Austchilli and Nutrafruit as examples, this discussion explores Asian markets, and high quality products and how they can be differentiated from other products.

Part three explores the opportunities of using e-commerce to market food products, a growing channel of selling agricultural products in Asian countries. It concludes that e-commerce is more suitable for selling processed food products than for fresh fruits and vegetables. Section six provides the summary and recommendations.

1. Queensland mangoes

Mangoes (Mangifera indica) are grown in the Northern Territory, Queensland, Western Australia and New South Wales. Queensland and Northern Territory production makes up approximately 95% of the total national crop. In recent years production volumes from the Northern Territory have increased to the point that they now equivalent to those of Queensland (AMIA, 2014).

The seasonal harvest starts in the Northern Territory and Western Australia in September, followed by Queensland's dry tropical regions (Townsville /Burdekin/Bowen) in mid-November, Mareeba /Dimbulah in early December, Central Queensland in late December, and South East Queensland and Northern New South Wales in January (QDAFF, 2016). Queensland has a harvest window which has little overlap with other states, making it more competitive in both domestic and international markets.

In the international market the harvest window for Queensland mangoes fits right into the short supply season of most importing countries. As demonstrated in Table 3, the largest two production countries, India and China, finish most of their harvest before September. Mexico can supply until December, but its quality cannot compete with Queensland mangoes. Thailand is the only country which can compete with Queensland in the supply season. However, its varieties are very different to Australian ones, making Queensland mangoes unique in the Asian markets.

Table 3: Top six mango producing countries of the world

Country	Production (MT)	Rank	Harvest season
India	15,188,000	1	April to June
China	4,350,000	2	Later Feb to Sept
Thailand	2,600,000	3	Year around
Indonesia	2,131,139	4	Year around (little export)
Pakistan	1,888,449	5	May to Sept
Mexico 6	1,827,314	6	March to Dec

Strengths, weaknesses, opportunities and threats

According to Australian Mango Industry Strategic Investment Plan 2014/15 – 2018/19 (AMIA, 2014), the strengths for export include:

- The appeal of mangoes to consumers in taste and appearance;
- Seasonality of fruit provides marketing opportunities for the product;
- Extended season and new varieties providing increased offering to consumers;
- Access to new compounds to control disease and to improve quality;
- Wide geographic spread of producers – assists with more consistent supply of fruit into the market.

Weaknesses for export:

- Several main stream varieties have limited productive capacity that are affecting grower profitability;
- Ability to produce and supply a consistent high quality product profitably;
- Lack of industry discipline/skills to ensure that only mature fruit reach consumers;
- Export volumes are not increasing at a rate commensurate with expectations and the profile of country markets is changing;
- Export to China currently has a strong reliance on grey trade through Hong Kong and is therefore vulnerable;
- Market access investment is limited – reducing opportunities to build export markets.

Export market opportunities:

- Growing demand for food globally; growing economies particularly in Asia – suited to development of a premium Australian brand/offering;
- Access to new varieties and orchard systems to address need for increased productivity and consumer requirements;
- Opportunities to increase demand through continued effective marketing and promotion;
- Potential for changing supply arrangements leading to more sustainable business models.

Threats facing the Queensland mango industry cannot be eliminated and will take time to deal with. The short-term strategy is to take advantage of Australian mangoes in the Asian market and find the right markets to target.

Target markets for Queensland mangoes in Asian countries

Many countries in Asia are importing Queensland mangoes. However not all of them have the potential to increase import volume. The current major importing countries are Hong Kong, New Zealand, Singapore, UAE, Lebanon and Malaysia. To further expand Asian markets, Queensland need to identify countries which have the potential to increase Australian mango importation. Asian countries are different from each other regarding market access, regulatory issues, socio economic conditions, consumer preference and culture. The demand for Australian mangoes varies and therefore the opportunities presented in these countries for Queensland mangoes are different. By evaluating these countries respectively, Queensland can identify countries which have potential to increase

the demand. A detailed evaluation of each Asian country is presented in Appendix Two, which clearly reveals that, while the demand in other Asian countries is limited, China and Korea are the two markets which have huge potential to increase in demand for Queensland.

China and Korea are huge markets for Queensland mangoes to expand because:

- The Australian mango has already established its reputation in these two markets as one of the best mangoes in the world;
- Queensland has already established Vapour Heat Treatment (VHT) plants for meeting the phytosanitary requirements from China and Korea to treat fruit fly;
- The majority of the population in these two countries has not experienced Australian mangoes due to the market access restriction in previous years;
- Queensland mango harvest time comes across the New Year's Day, Chinese Spring Festival and Seollal (Korean Lunar New Year), the most celebrated national holidays when the demand for fresh fruits doubles.

Conclusion

The appeal of Australia mango to Asian consumers in taste and appearance, and its counter seasonal supply advantage give Queensland a great opportunity in Asia markets. The challenges and barriers facing Queensland mango to export to these markets at home will take a long time to overcome because our growers traditionally focus on the domestic market and the development of a competitive international supply chain requires the changes in thinking and behaviour. However, in the short term, Queensland can increase its export volume in Asia through selecting the right markets.

Many Asian countries are currently importing Queensland mangoes. However not all of them have the potential to increase export volume due to market access issues, a limited demand or the saturated market situation. China and Korea, on the other hand, have enormous potential in increasing demand. Queensland must focus on these two markets and provide a reliable supply of the market required quality mangoes.

Asian importers have complained about inconsistent supply in quality and quantity of fruits and vegetables from Queensland, viewing it as the major impediment for their market development for Queensland produce (Batt & Thein 2001). In Queensland the causes of inconsistent supply of mangoes come mainly from the difference in production and postharvest management at different farms. When Queensland exporters source and consolidate produce from farmers located in different geographic areas and managing their production and postharvest differently, inconsistency in quality often happens. The Queensland

government needs to encourage investment in postharvest related infrastructure and R&D for mango quality improvement and, at the same time, encourage mango farmers to work together to produce consistent quality and extend supply window.

2. Queensland fresh cut vegetables

Fresh cut vegetables are cultivated with very high plant densities and harvested and marketed in an immature stage of development compared to other vegetable crops. The demand is driven mainly by the health concerns of people and convenience of use. Fresh cut vegetables in Australia are used to serve the hospitality sector and supermarket chains. Only a very small proportion is exported to Asian countries. The production of fresh cut vegetable produced in Queensland is about 2200 to 4000 tonnes. The three major firms producing and supplying fresh cut vegetables in Queensland are OneHarvest, Story Fresh and Pilton Valley Produce.

OneHarvest can trace its beginnings to the traditional 'hawker style' trading of fruit and vegetables that was conducted by Duncan Robson from the Ipswich District Markets in Queensland in the early 1930s. In the early 90s, the traditional produce supply chains in Australia started changing from a centrally based market system to directly supplying customers from the source. The change initiated OneHarvest to introduce fresh cut salads and vegetables into its business. According to the information from company website (www.oneharvest.com.au). "Today, OneHarvest employs up to 800 people across Queensland, New South Wales, the Northern Territory, Western Australia, South Australia and Victoria and supplies a range of fresh cut produce to supermarkets and greengrocers around the country. These products include pre-packed salads and stir-fry vegetables, prepared deli salads and beetroot products."

"Story Fresh is a third generation, family owned, vegetable farming and processing operation located in South-East Queensland. Story fresh has been farming in the region since 1965 and processing since 1990, making one of the original grower-processors in Australia. Today Story Fresh utilizes its extensive experience to specialise in the year round supply of processed vegetable products to food service customers across Eastern Australia." (www.storyfresh.com.au).

"Pilton valley produce is a family owned business for five generations. The firm used to produce high quality vegetables and grains on various farms in the rich agricultural regions of the Lockyer Valley and Darling Downs of Queensland." (www.piltonvalleyproduce.com.au) With the total business farms on nearly 1000 acres, Pilton Valley Produce in recent year has established product lines for all leafy vegetable crops available most of the year, including a baby leaf salad line.

Challenges

"One of the biggest challenges firms face is weather. Small leafy crops such as lettuce and baby spinach are delicate, and particularly sensitive to all the weather variations they encounter during their short time in the field." according to Story Fresh (www.storyfresh.com.au).

The second challenge is the quality control and maintenance. Taking control of each stage of the plants life - from seedling through to delivery of the processed produce is critical to ensure the best possible quality every time. Fresh cut vegetables are cultivated with very high plant densities and harvested and marketed in an immature stage of development. Many practices developed and used for handling the mature vegetables are not suitable for fresh cut vegetables. To decrease the rate of deterioration, fresh cut vegetables are required to be packed under controlled levels of RH (Relative Humidity), temperature, O2, and CO2 concentration in order to reduce the respiration rate and the microbial population. During the process of harvesting, processing, storage and transport, the quality is also affected by various mechanical, chemical, physiological, physical, and microbial hazards. The final quality when reaching consumers is determined by production, processing, storage, and transport. Therefore, to control and maintain quality, a holistic and systematic quality management approach is needed, which includes (www.storyfresh.com.au):

1. Nursery seedling production tailored for the farm conditions;
2. Coordination across multiple locations;
3. On-Farm processing and quality control;
4. Reliable cold system; and
5. Transport time and critical delivery.

Opportunities and strengths

The demand for fresh-cut vegetables has grown steadily over the years in developed Asian countries such as Japan, Singapore, Taiwan and Hong Kong. Traditionally people brought whole fresh vegetables at retail markets and prepared them at home. In recent years, more people are buying pre-cut vegetables and packed salads to eat at home. In addition, restaurants and home meal replacement operators are purchasing fresh-cut vegetables to improve the efficiency of their operation.

The demand for fresh cut vegetables in Asia provides a good opportunity for Queensland. The export volume of most fresh vegetables from Australia to Asian countries has been limited by the inability of Australia to compete with produce from the US, the biggest competitor of Australia in these markets. One of the reasons is that Australia cannot supply leafy vegetables by sea to these markets with the quality as consistent as the US. The US has better technology in handling sea freight of vegetables than Australia. Exporting fresh cut leaf vegetables provides equal opportunity for Australian and the US. Fresh cut vegetables have to be sent by air due to the very short shelf life (9 to 12 days), which sets Queensland and US on the same level playing field.

Story Fresh to Asia

One of the pioneers of exporting fresh cut vegetables to Asia is Story Fresh. Story Fresh supplies 52 weeks of the year the retail ready fresh cut vegetables, including baby spinach, baby rocket, mesclun mixes, baby kale and customised blends, pack sizes and packaging. Story Fresh is exporting to Kong Hong and Singapore. In 2016 it entered the Taiwan market successfully.

The success of Story Fresh can be attributed to the following factors:

- All products are 100% Australian grown and 100% Australian packed to ensure quality;
- Products are grown and packaged according to customers' desire;
- 24 hours delivery from harvests to Asian markets;
- Year-Round supply and flexibility.

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Conclusion

The continuous increase in demand for fresh cut vegetables in developed Asian countries provides a great opportunity for Queensland. The case of Story Fresh demonstrates the potential of Asian markets for Queensland fresh cut vegetables. The export of fresh cut vegetables is a relatively new industry in Queensland. The Queensland Government needs to develop relevant polices to support firms already supplying Asian markets. These polices should focus on how to support the development of economies of scale and the consistent supply in quality and quantity.

3. Frozen vegetables

Queensland literally has no frozen fruits and vegetable industry. Farmfresh Fine Foods processes a small volume of mix frozen cut vegetables for the domestic market. Most fresh produce for processing has to be sent to Victoria. Simplot and McCain are the two leading frozen vegetable processing companies in Australia and are both located at Victoria.

Challenges and weakness

According to the IBISWorld report (2015), the Australian frozen vegetable industry has been plagued by soaring import penetration and high operating costs. The Australian frozen vegetable sector used to be insulated from imports and was able to survive by supplying the domestic market. This however generated negative impacts on the industry and made it less competitive in the international arena. Johnston (2011) has summarized four weaknesses of this industry including: 1) small economies of scale; 2) high operation costs; 3) high prices of fresh vegetables purchased from the domestic market and 4) high labour cost.

Opportunities and strengths

The Asia-Pacific market for frozen fruit and vegetables has grown over the years, driven by growing demand for food that is easy to store and prepare, innovation in freezing technologies, development of cold chain logistics and modern retail distribution as well as social and demographic changes, including rapid urbanisation, increase in working women, rise in dual income families, fast paced lifestyles (IBISWorld report , 2015).

In the international market, frozen vegetables are regarded as a commodity. In the commodity market, there is little product differentiation – products are more or less identical regardless of who produces them or which countries they come from. As a result, competition is mostly based on price. Reducing the cost of production and improving productivity becomes the key to being competitive in the international market.

Queensland has the potential to increase broadacre production in vegetables. Compared to the small land blocks in most Asian countries, broadacre production has the potential to reduce production cost though agricultural machination and innovation. Australian broadacre crop farmers are world leaders in grain yield per millimetre of growing season rainfall or unit of fertiliser, indicating that Australian producers are extremely cost competitive in global markets (Keogh, 2014).

2.1 Frozen vegetables in China

In recent years the demand in China for frozen vegetables in the retail sector has increased due to convenience of use. Currently there are only a few kinds of frozen vegetables allowed as imports to China, including frozen beans and peas and sweetcorn. Table 4 provides the prices of some of the popular frozen vegetable products in a Walmart supermarket in Beijing. It shows that the price difference between imported countries is not significant. In addition, the variation in prices between different products are very small.

Table 4: Retail prices of frozen vegetables in a Walmart supermarket in Beijing

Vegetable	Domestic		Imported	
	RMB/kg	AU$/kg	RMB/kg	AU$/kg
Mix frozen vegetable	22	4.4	32 (America)	6.4
Frozen pea	22	4.4	25 (New Zealand)	4.9
Frozen beans	27	$5.4	29.5 (America)	5.9
Frozen sweet corn	24	$4.8	29.5 (America)	5.9

According to Table 4, if the retail price of imported frozen peas and beans is 25 RMB/kg, the margin from wholesale to retail and retail to consumer is 20% to 25% respectively (data obtained from interviewing Chinese frozen vegetable wholesalers in June 2016) and value added tax for imported goods is 17%, the CIF (Cost, Insurance and Freight) price of frozen peas and beans to China from export countries demands about 13 RMB/kg or AU$2.5/kg (exchange rate of 1:5).

2.2 Frozen vegetables in Japan

Japan is a net importer of frozen vegetables and has no market restrictions for importation. In 2014, Japan imported 440,000 tonnes of frozen vegetables, of which 60% was from China. The rest was from the US, Taiwan and Thailand. Frozen vegetables are mainly used for commercial purposes (food service operations) rather than personal use (Shankoxiaoli, 2015) due to its easy to storage, less wastage compared to purchasing fresh produce and convenience for cooking (no need for chopping and washing).

In Japan 30% to 40% of total imported frozen vegetables are sold through various retail outlets. Table 5 lists the retail prices of the popular frozen vegetables in Japan. It shows that most vegetables are retailed at around the AU$10/kg mark except asparagus. As with the Chinese market, there is no

significant variation in prices between products and between countries of origin. The average CIF price for most frozen vegetables was about AU$2.5/kg in 2014 (TIQ, 2015). Given the depreciation of Australia dollar over the last two years, the CIP prices is around AUD$3/kg in 2016.

Table 5: Retail prices of frozen vegetables in Japanese retail shops

Vegetables	Retail price in Japanese Yuan/kg	Retail price in AU$/kg (exchange rate 1:75)
Frozen Broccoli	790 to 1272 (China, Ecuador	10.5 to 17
Frozen Beans and Peas	790 to 930 (US, Taiwan and Thailand)	10.5 to 12.4
Frozen Japanese Pumpkin	813 (Japan)	10.8
Frozen potato chips	750 to 875 (US)	10 to 11.7
Frozen asparagus	1453 (US)	19.4
Frozen sweet corn	526 to 752 (US and China)	7 to 10
Frozen mix vegetables	526 to 750 (US, Thailand and China)	7 to 10

Frozen vegetables in Chinese and Japanese markets indicates that it is very difficult to fetch a premium price for Australian frozen vegetable products through product differentiation. Every country has to compete on price. Queensland is well positioned to compete with some of the vegetable products such as frozen peas and beans in China and Japan. Broadacre production and mechanical harvest can make the cost of production in Queensland very competitive. To reduce cost, Queensland must develop the necessary economies of scale in production, and processing plants must be highly automated to minimize labour costs so that Queensland can compete in Asian markets. Queensland might also have the opportunity to compete with frozen pumpkin, potato and broccoli in the Japanese market if these crops can be harvested by machine (Hummingbirds, 2008).

4. Premium value added horticultural products

Queensland's food and agribusiness sectors are world-renowned for producing high-quality, safe, clean and green food at competitive prices. Many Australian and international food companies have established processing facilities in Queensland to take advantage of the range and quality of local produce, and the proximity to Asia-Pacific markets (Queensland Government, 2014). These companies have a wide geographical distribution, which extends from Cairns, Townsville, Brisbane, Gold Coast, Darling Downs, the Wide Bay Burnett area and South West Queensland.

Opportunities, strengths, challenges and weaknesses

Market access for Australian agribusiness products to many Asia markets remains a significant issue. In general, it is easier for processed foods to access these markets because for fresh produce there are quarantine and protocol requirements which act as hurdles to market entry. Currently many Australian fresh fruits and vegetables, particularly from Queensland, have no market access to Asian countries. Negotiation has to be initiated by Australia. The small volume in production and lesser dollar value compared with other agricultural products such as wheat, beef or sugar make fresh vegetables and fruits less likely to be on the top of the list for the Australian government to negotiate with Asian countries. The development of export protocols for each product has to be conducted country by country and it is tedious and time consuming. For example over the last 10 years, the Australian Government has negotiated with China for kangaroo meat to gain access to the Chinese market, and this process is still going on. With processed fruits and vegetables entering Asian countries (except China), there are no phytosanitary restrictions as long as they can meet technical market access requirements such as in-country product safety standards and product labelling requirements.

The weakness facing Queensland food processing industry are from the small economies of scale, high operation and labour costs. However, the biggest challenge is the lack of innovation of Queensland firms in creating new products suitable for Asian markets (Dossor, 2014; Commonwealth of Australia, 2012). Consumers are savvy and Asian consumers are looking for innovation and new products. Queensland lacks the ability to bring different products, textures and flavourings to a marketplace to excite consumers.

Despite the potential problems, Queensland still has a good chance to compete on premium value added horticultural products in Asian markets. The increase in disposable income in many Asian countries has created a market where consumers are willing to pay more for safe and healthy products as well as functional food. Queensland can capture this market opportunity through innovation and value-adding activities.

Premium markets are characterised by product differentiation. When a product has extra value created in contrast to its competitors, and consumers are willing to pay for that value, it becomes a premium product. Premium values are often created through distinctive and reliable product attributes, which can be tangible (colour, taste and flavour) and intangible (safe, clean and green) to consumers. To enter this market, Queensland firms should focus on innovation and product differentiation. Section 4.3, using three case studies of Queensland firms Gin Gin & Dry, Austchilli and Nutrafruit, demonstrates how firms can add values or create innovative products for Asian premium markets.

Examples of Gin Gin & Dry, Austchilli and Nutrafruit

Premium value added products compete on quality and differentiation. The goal should be capturing consumer value in markets where price is not the main criterion and where competitors cannot easily follow. Queensland firms Gin Gin & Dry, Austchilli and Nutrafruit provide valuable examples to this approach.

Gin Gin & Dry

The demand for dried fruits and vegetables in the Asian market is increasing over the years as more and more people use them as snack food. Success in this market depends on product quality and differentiation.

One of the most popular dried fruits across Asian countries is dried mango slices, mostly produced in Thailand and the Philippines. Queensland can produce better quality dried mango slices than these two countries and export to Asia. Queensland cannot compete in price with Asian products due to production cost, however it can still make a profit if firms are able to differentiate their dried mango slices from Asian ones and develop a premium image in the market.

On November 6, 2015, Professor Alice Woodhead and Dr Tim Sun interviewed Cameron & Muppi Dean, the owner of Gin Gin & Dry. Gin Gin & Dry is a family owned company that produces dried mango slices predominantly for domestic markets. Recognising consumer health concerns, the company developed mango slices which have ‘no added sugar [and] preservatives’. Gin Gin & Dry keeps the moisture of the dried mango slice less than 6% to extend the product’s shelf life up to three months. By doing so, Gin Gin & Dry has differentiated its products from those of Thailand and the Philippines, making its product healthier and better tasting than its competitors.

Gin Gin & Dry’s product development strategy which focuses on product differentiation and quality has shown initial success. Soon after its online shop opened to Asian consumers, the firm received more orders than its supply capacity.

Austchilli

Australian avocados are highly sought after in international markets, due to the excellent quality and year-round supply. Australia exported about 300 to 1000 tonnes of fresh avocados to Asian countries including Singapore, Hong Kong, Malaysia and Thailand each year. Although Japan imports avocados each year from the US, Mexico, Peru and New Zealand, and the import volume has grown each year from 14,000 tonnes in 2000 to 58,000 tonnes in 2014, Australia has no market access to Japan for fresh avocadoes due to the protocol not being developed between the two countries. Processed avocado products from Queensland has no market access constraints to Japan. The question is whether there is demand for processed avocado products in the Japanese market. If so, what types of processed products are suitable for this market? The firm Austchilli has handled these issues well.

Austchilli produces high quality chilli, vegetable, herb and fruit purees for the food manufacturing, beverage and service sectors. According to the company website, the company is always looking to create new and exciting products suitable for old and new markets. The company recognised that there was an opportunity for Queensland processed avocados in the Japanese market. To explore this opportunity, Austchilli started its market research in Japan to understand what the Japanese consumer _needs and wants.

Avocado is a common ingredient in Australia and US sushi. However, it was not the case in Japan. Using avocado in sushi was invented in California in 1960 by a Japanese chef who could not get hold of fatty tuna and used avocado instead for its similar texture. This led to the birth of the “California roll” and the avocado’s subsequent popularity in sushi in the U.S.

In Japan, avocado in sushi does not have the same prevalence as in Australia. It is often served as an accompaniment to shrimp or salmon, or reserved as a side salad. Many chefs also use avocado as part of the ingredients for various plates. The promotion of avocado for its health benefits over the years has increased the demand for avocados. One of the most typical ways of the Japanese eating avocado is to eat it fresh with soy sauce and wasabi. Some people also use avocado for topping up their dishes or lunch box.

With the knowledge of Japanese consumers, Austchilli has worked with its Japanese business partner and developed a tubed avocado paste with various flavours suitable for providing a topping (Figure1). The tubed paste is planned to market through vending machines located across the country.

Figure 1: Austchilli tubed avocado paste (Source: http://www.austchilli.com.au/avofresh)

Nutrafruit

One of the biggest global trends in the past 20 years has been the growing interest in health and wellbeing. It has become increasingly important for consumers to improve their health through using natural health products. Products targeting specific conditions, such as obesity, joint health, high blood pressure or diabetes show great potential for increased demand.

One of the successful cases of Queensland firms developing this market is Nutrafruit. Nutrafruit manages the production, marketing and processing of a range of stonefruit varieties and related intellectual property. According to Nutrafruit (www.nutrafruit.com.au), "Nutrafruit holds a global licence to commercialise a range of fruit varieties developed by the Queensland Department of Agriculture and Fisheries. These varieties include the Queen Garnet plum which was selected for its extremely high anthocyanin content' as well as its suitability for developing new processed products. Queen Garnet has around 3-6 times the antioxidant content of blueberries and 5 to 8 times the levels of anthocyanins as normal plums."

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Nutrafruit supplies both fresh and processed products including Queen Garnet Nectar and Queen Garnet Probiotic Powder (Figure 2). These products have been successfully marketed in Singapore, Hong Kong and UK. Already in high demand due to its very high levels of anthocyanins - an antioxidant linked to numerous positive health benefits - the supply cannot keep up with the demand (Macintosh, 2016).

The varieties managed by Nutrafruit are grown, marketed, processed and sold under license. The company manages the entire supply chain to maintain optimum fruit quality and to ensure maximum commercial benefit to the company.

Figure 2: Products from Nutrafruit (Source: http://www.nutrafruit.com.au/products.html)

Queensland is well positioned to produce premium value added products for the Asia market. The return can be lucrative if companies do it well. Gin Gin Dry, Austchilli and Nutrafruit present good examples. Their success contributes to:

- Understanding end user need (product and service);
- Differentiating their products from their competitors;
- Developing innovative products based on understanding market needs;
- Designing value adding products suitable to the targeted market;
- Close cooperation with business partners in import country;
- Cooperation and cooperation with supply chain partners to ensure the product quality and authenticity.

5. E-commerce for food products in Asian countries

According to Deprez (2015), within ten to fifteen years, 50% of world fruit and vegetables will be sold online and Asia will be the driving engine for this trend. The new marketing channel of e-commerce provides an opportunity for Queensland products to reach Asian consumers more directly. This section examines the general trend of e-commerce development in Asian countries. Through analysing the online grocery market development and consumer behaviour of online grocery shopping in several Asian countries, it further discusses the opportunities and limitations for selling Queensland fruit and vegetable products online in the Asian market.

Asian online shopping

E-commence and digital technology is changing the way in which people go shopping in the world. One of the most fundamental changes would be the way of shopping for groceries. According to Nielson (2015), one quarter of online respondents say they order grocery products online, and more than half (55%) are willing to do so in the future.

In Asian countries, bricks-and-mortar stores own the grocery market. However online shopping is catching on among busy urban shoppers. A study of Asia Pacific countries' online grocery shopping indicated that 62% of respondents purchased a product online, 48% compared prices for a grocery product online, and 38% looked for deals online (Nielsen, 2012). Asia-Pacific regions show the highest level of willingness in the world to use digital retailing options in the future (Nielsen, 2015). Business is expecting double-digit growth ahead for Asian online grocery business (The Nation , 2016).

To increase exports of Queensland horticultural products to Asian countries, this is a need to examine this emerging online shopping phenomenon in Asian countries and to explore the possibility of using this platform to market Queensland products.

Opportunity for food e-commerce in Asia

A detailed analysis of the online grocery market development and consumer behaviour of online grocery shopping in eight Asian countries is presented in Appendix Three. It indicates that although Asia has had the highest growth in online shopping in last decade, the level of development of online shopping varies by country and regions, depends on the availability of digital technology, cultural acceptance and suitability of logistic systems. In addition, the category of people who prefer to shop online varies and is largely segmented by age group, income level, education, and gender. In general people want availability, safety, quality and reasonable prices (Nielsen, 2015).

Opportunity for fresh produce

There is a great drawback in selling fresh produce online when compared to selling through physical stores. Aside from the obvious in-store benefit of fulfilling immediate shopping needs and personal face-to-face interaction with staff in the shop (Nielsen, 2015), there are sensory experiences which online shopping cannot offer its customers. The aroma of new reason mango, the vibrant colour of table grapes and deep green vegetables and the selection of the right ripe avocado individually are virtually impossible to duplicate online. Consumers can view the products online through photos and video clips posted by vendors. However virtual baskets do not necessarily reflect physical ones. There is also no guarantee that customers will receive exactly what they view online (Sara, 2013; Police, 2015).

The other challenge for selling fresh and chilled products online is to maintain product freshness. Asian consumers, when purchasing fruits and vegetables, give great attention to freshness of the products. If the products purchased online are not as fresh as they can purchase from physical stores, it will deter them from purchasing online unless there is a great price advantage for going online.

Many Asian countries do not have well established cold chain systems. Apart from some large developed cities, most cities in regional areas are not ready for handling fresh produce. Even in urban areas, the last mile delivery has posed a great challenge. Queensland firms need to examine if there is a well-established cold chain system in the destined market before exploring the opportunity to sell fresh through online system to Asian countries.

Currently Singapore, Hong Kong, Japan, Korea and Taiwan have well established cold chain systems, and large cities in China, Malaysia, India and the Philippines are on the way to developing cold chain systems. It has been reported that several e-commence companies in China have been investing in cold chain systems to improve the quality of the fresh produce they deliver (MLA, 2015). To export fresh and chilled products to these countries, Queensland firms have to target well developed Asian countries or large cities. Different fresh fruits and vegetables requires different postharvest handling procedure along the supply chain. Firms need to examine if existing systems are suitable for their produce.

Most importers in Asian countries tend to exaggerate their ability to handle perishable products (Zhang, 2015). Queensland firms need to check carefully in the field before making a decision. One way to examine the situation is to see if any produce that requires a similar cold chain system has been sold successfully in the market.

In summary, selling Queensland fresh fruit and vegetables to Asian countries through e-commence platforms is very risky and difficult. A report in the Huaxi Daily (2016) indicated that more than 90% of firms in China selling fresh food

online make no profit or lose money due to cold chain logistics and last mile delivery problems. However, this does not means impossible. One good example is Australian mangoes that have been sold online in China at the price of 368.00 RMB for 2.5kg (about AU$32/kg) as illustrated in Fig 3. The success depends on the detailed market research and firm's enabling to use the right distribution channel and reliable and experienced business partners in import countries.

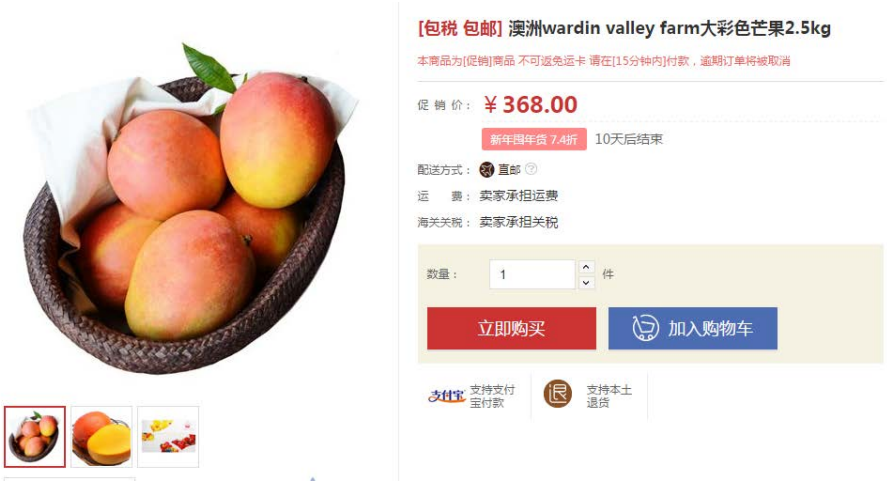


Figure 3: Australian mango retailed online by YMATOU (http://www.ymatou.com/product/af7c9b0bb34d40a4a9561a2f602244c2.html)

Opportunities for processed and value added products

One of the reasons that online grocery shopping is becoming popular in the Asia-Pacific is that people are shopping for Fast Moving Consumer Goods (FMCG) including packed processed and value added food items). Sales data from Nielson (2015) reflect the phenomenal online growth of FMCG purchases in China. Between 2013 and 2014, e-commerce sales increased 40% for 17 major Nielsen tracking categories, with food the primary growth engine. For example, while e-commerce's share of the liquid milk category is small (2%), it nearly doubled in size (+91%) between 2013 and 2014, leading the online growth of all FMCG categories. The popularity of online shopping for packaged food is due to:

- Food safety concerns driving consumers to research high-quality goods online (Global, 2015). This is particularly true in China;
- People looking for food items which are often difficult to find on in-store shelves (Nielsen, 2015), such as health related items and functional food;
- High population density and low labour costs making the home delivery model economically viable for products which have relatively long shelf life (KEARNEY, 2011).

In general, there is a great opportunity for Queensland firms to sell processed and value added products to Asian markets though online platforms. The cross-border online platform in China (Appendix Three) provides a great opportunity for Queensland small and middle enterprises producing innovative products. Zhang and Woodhead (2016) analysed the potential of cold chain logistics to dramatically accelerate the growth of perishable foods sales.

Summary of opportunities for food e-commerce

Online marketplaces are giving Australian exporters direct access to Asian consumers, with lower costs, minimal risks and easier market access compared to traditional exporting. However not all products are suitable for selling through online platform. Selling fresh fruits and vegetables through e-commence platforms is always risky and difficult due to the perishable nature causing quality change when delivered to end consumers. The success depends on detailed market research and a firm's ability to use the right distribution channel which has a reliable cold chain system and experienced business partners in import countries. Value added products, on the other hand, present a great opportunity. Rising incomes, combined with the rapid uptake of smartphones, and the time pressures of urban life, are leading more and more Asian shoppers online for processed and packaged food products, particularly for safe, healthy and functional foods. Queensland firms should use this online e-commercial technology to make their products available to Asian consumers. The advantage of selling online is to cut cost of middleman along the supply chain and consumers can purchase directly from Queensland with confidence of receiving safe, innovative and authentic products.

Conclusions and recommendations

Asia Pacific is the highest in the world in annual per capital consumption of fruits and vegetables. Because of the large populations and rapidly rising incomes, it offers the best future growth in fruit and vegetable consumption (Admin, 2013). Queensland horticultural industry has the opportunity to increase export to the Asian market. However, this market is very competitive. There are many countries outside this region exporting to this market, include US, South America, South Africa, Europe, Israel, New Zealand and Australia, In addition Asian countries import to and export from each other to meet their seasonal shortages in the domestic supply and consumer's demands for products of high quality.

Queensland horticultural industry has traditionally focused on suppling the domestic market. The total export volume is less than 4% with Asia the major export destination. To increase export to Asia, a sound export strategy needs to be developed based on the strengths and weaknesses in the production chain in Queensland and opportunities and threats in the marketplace in Asia. This report examines the potential to increase exports of Queensland mangoes, fresh cut vegetables, frozen vegetables, and value added products to Asian countries.

It does this by analysing the challenges, opportunities, weaknesses and strengths facing each of the four product categories in regard to Asian markets. The report also examines the opportunities for using e-commerce to market these products.

Queensland mangoes have great potential to increase export volume to Asia due to the appeal of Queensland mangoes to Asian consumers in taste and appearance, and the counter seasonal supply advantage. The challenges and barriers facing Queensland mango to export to these markets at home will take long time to overcome. These include market access, biosecurity, production, postharvest handling technologies and reliable supply in quality and quantity. However, in the short term, Queensland can increase its export volume in Asia through selecting the right markets which can be done through the evaluation of current existing markets as demonstrated in Appendix one.

Many Asian countries are currently importing Queensland mangoes. However not all of them have the potential to increase export volume due to market access issues, a limited demand or the saturated market situation. China and Korea, on the other hand, have enormous potential in increasing demand. To capture this opportunity, The Queensland mango industry should:

- Focus only on these two markets in Asia to expand;
- Increased coordination within the industry in order to develop and sustain best practices in cold chain management and deliver consistent fruit quality to these two markets;
- Encourage investment in postharvest related infrastructure and R&D for mango quality improvement, and at the same time to encourage mango farmers working together to extend supply window;
- Develop a long term relationship with importers, wholesalers and retailers in these two countries, an essential for developing a sustainable supply chain.

The demand for fresh-cut vegetables has grown steadily over the year in developed Asian countries such as Japan, Singapore, Taiwan and Hong Kong because individual consumers prefer the convenience of use, and increased restaurants and home meal replacement operators are purchasing fresh-cut vegetables to improve the efficiency of their operation. Queensland produces about 2200 to 4000 tonnes of fresh cut vegetables mainly to serve the domestic market including hospitality and supermarket chain shops. The recent demand in Asia for fresh cut vegetables has attracted some Queensland firms to explore this new opportunity. Similar freight costs means that Queensland has an advantage over its competitors in Asia in supplying premium quality products. The success of Story Fresh in Asian markets has demonstrated the potential. To develop the fresh cut vegetable industry, the Queensland Government needs to:

- Develop relevant polices to support firms already exporting to Asia. These polices should focus on helping firms develop economies of scale and consistent supply in terms of quality and quantity;
- Invest postharvest researches for a better understanding the basic physiological processes of fresh-cut products. In doing so, the quality can be better maintained along the supply chain;
- Conduct market research in Asia countries to understand the consumer preferences. The fresh cut vegetable industry in Queensland is relatively new and we have very limited knowledge about the Asian market.

Firms wishing to export fresh cut vegetables to Asian countries need to:

- Conduct market research to understand the product specifications the market wants, such as the package material, package size and labelling;
- Exam the suitability of the local distribution and cold chain systems for fresh cut vegetables;
- Develop direct relationship with the local supermarket chains in order to shorten the supply chain and reduce the risk of quality deterioration of the products.

The Asia-Pacific market for frozen vegetables has grown over the years, driven by growing demand for food that is easy to store and prepare, innovation in freezing technologies, development of cold chain logistics and modern retail distribution as well as social and demographic changes. Frozen vegetables in the international market are sold as commodities which compete on price alone. To enter this market, Australia has to be cost- effective in production. In this regard, Australia has both pros and con. The challenge facing frozen vegetable industry in Australia is small economies of scale and high operation and labour cost. However comparing to the small land blocks in most Asian countries, Queensland has the advantage of broadacre production which has the potential to produce some crops with competitive cost.

Queensland could be well positioned to compete with some of the vegetable products such as frozen peas and beans in China and Japan. Queensland is capable of broadacre vegetable production and has the potential to produce some selected vegetable crops at low cost. Four recommendations for developing this industry in Queensland are proposed:

- A well-developed and articulated vision and strategy needs to be fostered by the Queensland Government for the industry in Queensland;
- A detail economic analysis needs to be conducted by the Queensalnd's Department of Agriculture and Fisheries on crops which have the potential for broadacre production and for producing frozen products;

- Investment in processing plants in Queensland needs to be encouraged and supported by both the state and local governments;
- Firms wishing to invest in processing plants need to conduct a research on how to increase automation in order to minimize labour costs;
- Firms need to study the scale and size of production to supply markets

Developing value-added products can overcome sanitary and phytosanitary restrictions imposed by many Asian countries on imports of fresh produce from Queensland. Queensland's food and agribusiness sectors are world-renowned for producing high-quality, safe, clean and green food at competitive prices. The increased disposable income in many Asian countries creates a premium market where consumers are willing to pay more for safe and healthy products as well as for functional food. Queensland can capture this top-end market through value-adding activities. The examples of Gin Gin Dry, Austchilli and Nutrafruit demonstrates that Queensland is well positioned to produce premium value added products for the Asian market. The return can be lucrative if companies can develop the right products to the target market.

The success in the premium market lies in product differentiation and a reliable supply of quality goods. A detailed market research combined with new product development is essential. Firms need to understand what Asian consumers want and to be able to differentiate their products from their competitors. The future of the Queensland fruit and vegetable processing industry largely depends on its learning how to tackle the premium markets in Asia. Queensland firms need to take advantage of the reputation of Australia food products in the Asian market and create innovative value added premium products suitable to Asian consumers. To Queensland firms willing to develop value added products, they should:

- Conduct detailed market research to understand the consumers in the targeted market. This is because the initial market entry strategy adopted by a firm will influence consumers' perceptions of the product's value and hence establish its position in the market;
- Deliberately bring food technicians, economists, and marketing experts to work together to create products suitable for production as well as marketable at a profit;
- Be innovative and creative in the new product development;
- Develop firm's own brands in order to differentiate their products from the competitors.
- Build relationships to secure food distribution in Asia

E-commerce has shown great potential in marketing horticultural products in the Asia. It is expected that within ten to fifteen years 50% of world fruit and vegetables will be sold online and Asia is and will be the driving engine for this trend. Through analysing the development of e-commercial technology and consumer behaviour of online shopping in eight Asian countries, this report concludes that, although selling online has the advantage of cutting the cost of middlemen along the supply chain and consumers can purchase directly from Queensland with the confidence of receiving safe and authentic products, selling fresh has its limitations due the perishable nature causing quality deterioration when delivered to consumers. Unless cold chain system and last mile delivery is well established in the import cities and it has been proved reliable, selling fresh vegetables and fruits online is always risky. Selling fresh online also requires firms to do detailed market research, use the right distribution channel and experienced business partners in import countries.

E-commerce, on the other hand, is more suitable for packaged products which require less restricted cold chain systems for maintaining quality. Queensland firms should use this online e-commercial technology to make their products available to Asian consumers who are looking for online products which are safe, authentic, unavailable in physical stores or price competitive.

The conversion of an export market opportunity into a commercial reality takes time and effort. Attention to detail and perseverance is needed, particularly in the Chinese market. For instance, “Westerners normally build transactions and, if they are successful, a relationship will ensue. However, the Chinese believe that prospective business partners should build a relationship and, if successful, commercial transactions will follow.” (IMA, 2015). The relationship building can take several years. The potential challenges facing individual firms and the benefits have to be evaluated before firms take any action.

Appendix 1: The production, area, location and value of individual fruits and vegetables

AA Table 1: The production, area, location and value of individual fruits produced in Queensland.

Fruits	Production (tonnes)	Locations	Area (hectare)	Value ($millions)
Banana	190,000 to 300,000	The wet tropical coast of northern Queensland between Babinda and Cardwell	9700	300 to 500
Citrus	80,000 to 90,000	Mundubbera and Gayndah in the Central Burnett and Emerald.	2500	120 to 160
Avocado	32,000 to 55,000	Sunshine Coast, Bundaberg-Childers district, Central Burnett, Atherton Tableland, Tamborine, Toowoomba range and the Lockyer Valley	6000	100 to 160
Pineapples	48,000 to 50,000	Sunshine Coast, Wide Bay, Yeppoon, Coastal North Queensland and the Atherton Tableland regions.	N/A	50 to 60
Strawberries	30,000 to 40,000	Along the coastal strip from Caboolture to Eumundi. Bundaberg Atherton Tableland, around Brisbane, Lockyer Valley, the Darling Downs and Granite Belt.	600	120 to 140
Mango	25,000 to 35,000	Burdekin, Bundaberg and Mareeba regions.	7000	80 to 100
Apple	25,000 to 30,000	Stanthorpe	1200	90 to 100
Melon	10,000 to 20,000	Along east coast of Qld	1000 to 2000	15 to 20
Lychees	3000 to 3400	Along east coast of Qld		14 to 16
longans	1800 to 2200	Along east coast of Qld		9 to 12
Stone fruits	1300 to 1800	Isis region of Wide Bay Burnett, North and South Moreton, the Burnett region and the Atherton Tableland	500	2 to 3
Custard Apple	600 to 700	Sunshine Coast, Bundaberg district, Central Queensland and the Atherton Tableland.	200	2 to 3
Passionfruit	250 to 300	Sunshine Coast, Wide Bay, Atherton Tablelands and the coastal wet tropics, as far north as the Daintree,		8 to 9
Cherry	30 to 50	Stanthorpe and Granite belt	25 to 30	0.2 to 0.3
Dried mango	20	Gin Gin & Dry		1

AA Table 2: The production, area, location and value of individual vegetables produced.

Vegetables	Production (tonnes)	Locations	Area (hectare)	Value ($ millions)
Potato	80,000 to 110,000	Lockyer Valley, Eastern Darling Downs, Killarney, Bundaberg and Atherton Tableland	3000 to 4000	50 to 60
Lettuces	50,000 to 60,000	Lockyer Valley, eastern Darling Downs and Granite Belt.	2000 to 2500	65 to 75
Sweet potato	40,000 to 50,000	Bundaberg, Rockhampton and Mareeba	1500 to 1800	70 to 80
Pumpkin	40,000 to 45,000	Lockyer Valley and Eastern Darling Downs	2700 to 3200	25 to 30
Beetroot	35,000 to 45,000	Lockyer and Fassifern valleys	1000 to 1500	10 to 15
Capsicum and Chili	35,000 to 40,000	Bowen-Burdekin and Bundaberg regions	1500 to 2000	85 to 95
Onion	20,000 to 30,000	Lockyer Valley, Darling Downs, Callide Valley and on the Atherton Tableland	950 to 1100	40 to 45
Brassica (including broccoli, cabbage, cauliflower, brussel sprout and radish)	20,000 to 30,000	Lockyer Valley and Eastern Darling Downs	3000 to 4000	60 to 70
Green beans	10,000 to 20,000	Granite Belt, Gympie, Lockyer Valley, Bowen/Burdekin area and Bundaberg	2500 to 3500	45 to 55
Zucchinis, marrows and squash	16,000 to 18,500		15,000 to 20,000	45 to 53
Sweet corn	13,000 to 17,000	Lockyer Valley, Bundaberg and Southern Queensland	1200 to 1700	20 to 40
Tomatoes	14,000 to 15,000	Bowen, Bundaberg and south-east Queensland	2500 to 3000	180 to 250
Cucumbers	5000 to 6000	Undercover	200 to 250	8 to 15
Ginger	6000 to 6500	Wide bay area	100	5 to 10

*Data are estimated based on past ten years data from various sources.

Appendix 2: The evaluation of Queensland mango markets in Asian countries

Hong Kong and Singapore

Hong Kong and Singapore provide free market access for Australian mangoes. Hong Kong is the largest importing country of Australian mangoes, taking about one third of total Australian exports. However, the majority of mangoes exported to HK are re-exported to China due to China having no market access to Australian mangoes before 2009. So far there is no official data on the volume into China through Hong Kong. Given China has recently agreed to open its market to Australian mangoes, it is expected more Australian mangoes will go to China directly in the future. Singapore imports about 240 to 560 tonnes of mangoes from Australian each year. The variation is great depending on the exchange rate of Australian dollar to Singapore dollar.

Australia has a long history of supplying these two markets and Australian mangoes are presented in these two markets as high quality and are sold at premium prices through top retail outlets. The market opportunity in Singapore and Hong Kong is very limited for three reasons: 1) the limited population in these two countries who have experienced Australian mangoes for many decades; 2) the demand for Australian mangoes has not changed over the years; and 3) the Philippines and Thailand can supply mangoes in the same seasonal window at cheaper prices. Unless the price drops the demand in these markets will not increase.

Korea

Korea used to imports mangoes only from the Philippines. Now, they also import mangoes from Taiwan, Thailand, Vietnam and Australia. Korea represents about a 10,000 to 20,000 tonnes market for mangoes. Koreans have access to mangoes year round through imports. However, Australian mangoes are different in appearance and taste to mangoes from other countries (AB Fig 1).

AB Figure 1: Mangoes from Thailand (left) (US$7.78) and the Philippines (right) (US$5.6) in a Korean supermarket in 2011

After many years of negotiation and planning to ensure all of the market protocols were met, Australia was finally given access to the South Korean market. In 2010 the first Queensland mango shipment was exported direct to South Korea under new quarantine protocols in which Australian mangoes are required to have vapour heat treatment before leaving Australia. Since then, there has been significant growth in mango exports to South Korea. In 2015, over 60 tonnes of mangoes were exported to South Korea, up from 25 tonnes the previous year, and three tonnes during the 2012/2013 season.

The recent Korea Australia Free Trade Agreement has strengthened ties between the two countries. It is expected the current tariff on exports of mangoes to Korea (24%) will drop over the years. This will make Queensland mangoes more competitive in the market. The potential to increase the sale of Queensland mangoes in Korea is enormous. Korea should be a target market for Queensland to increase mango exports. Commercial practitioners should work with postharvest horticulturalists to improve the sea freight to Korea so that an efficient and effective supply chain to Korea can be developed.

Indonesia

The reopening of the market in 2015 is good news for the Queensland mango industry, which has set an ambitious goal of exporting 20% of the national crop each year by 2020. Indonesia, however, has the same harvest window as Queensland with most mangoes being harvested in October and November. Nusa Tenggara Barat (NTB) has a late harvest, which peaks in November and December and continues until January or February. According to Wandschneider et al., (2013), Indonesia produces 1.3 to 2.4 million tonnes of mangoes annually, mainly for domestic consumption. Export volume is insignificant (1,000 tonnes of fresh mangoes per annum). The volume of mango imports is very

small. However it has increased significantly during the last decade. In 2010, Indonesia imported just over 1,100 tonnes of fresh mangoes.

Contrary to other countries, Indonesians have no marked preference for yellow-skinned mangoes. They have grown accustomed to eating green-skinned varieties and attach much greater value to taste than skin colour. Yellow-skinned mangoes have been imported from Thailand and South Africa, but in very small quantities. Such imports are concentrated during the February-April period, when local mangoes are in short supply. For most Indonesians, price is still the main determinant of their mango purchasing choices (Toiba et.al., 2012). The wholesale price is from 0.17 to 1.2 US/kg depending on supply.

The opportunity for Queensland mangoes in this market is very limited. Although there is demand from the high income population who are looking for unique and premium quality mangoes, volume is very small.

Malaysia

Mangoes are among popular tropical fruits grown in Malaysia for many years. The mango tree grows on commercial scale farms as well as individual tree in the home garden or as an avenue landscape. The statistic reports from Malaysia Department of Agriculture recorded about 5,450 hectares of mango trees grown in Malaysia in 2012 producing about 2,420 metric tonnes of mango, mostly for fresh domestic markets (Animagro, 2013).

Malaysia imports between 200 to 400 tonnes of mangoes per year from Australia, Thailand, Indonesia, India and Pakistan, of which 50% is from Australia. Malaysia requires Australian mangoes to be vapour heat treated before leaving Australia. The retail price of imported mangoes varies by origin of export countries and seasonality. The top-end market for imported premium quality mango is 18 to 20 RM/kg (4.32 to 4.8 US/kg). As with Singapore and Hong Kong, the opportunity to increase sales in this market is very limited due to the cheap supply year-round from neighbouring countries including Philippines and Thailand and the saturated demand for Australian mangoes indicated by the stagnant import volume from Australia over the years.

India

India ranks first among the world's mango producing countries, accounting for 50% of the world's mango production. It is also one of the top mango export countries. Currently Australia is in negotiation with India for Australian mango access. If Australia is granted market access permission, there is definitely a market for Queensland mangoes. This is because

- Indians love mangoes and Queensland can supply mangoes in a season when domestic supply has already finished

- India has a large population
- India has a group of high income consumers who are willing to pay more for premium quality
- Australian food has been regarded as a premium product in India due to its clean, green and safe image.

Japan

Japan offers a premium but small and static market, importing around 13,000 tonnes per annum mainly from Mexico, the Philippines, Thailand and Taiwan. Strict chemical residue regulations coupled with expensive phytosanitary requirements result in very high retail prices for Australian mangoes in the Japanese market, which limit the market demand and export volumes from Australia. For exporting to Japan, Australian mangoes are required to have vapour heat treatment (VHT) to kill fruit fly larvae and pay for a Japanese inspector to be in the VHT facilities for the duration of the mango export season. VHT facilities can cost up to US$1 million, a very significant investment in a context characterised by a short season, with the equipment having to lie idle for nine or 10 months during the year. In addition Japan has imposed restrictions on postharvest fungicide use. It is estimated that agreement between Australia and Japan on maximum residue levels of fungicide cannot be reached until at least after 2018. Selling mangoes to the Japanese market can be expensive, but a profitable and risky venture. Australia could face temporary import bans due to strict quarantine regulations (ABC, 2010). There is little optimism over the continued market demand for Australian mangoes. After decades of behaving differently, Japanese consumers are changing. Instead of willingness to pay for quality and convenience and usually being uninterested in cheaper products, Japanese consumers are now flocking to discount and online retail shops to cut expenditure. Sales of relatively affordable private-label foods have increased dramatically, and many consumers, despite small living spaces, are buying in bulk. Instead of eating out, people are entertaining at home.

This fundamental shift in consumption behaviour seems likely to persist, irrespective of any economic recovery. That is because the change stems not just from the recent downturn but also from deep-seated factors ranging from the digital revolution to the emergence of a less materialistic younger generation (Brian, 2010).

The opportunity for increasing Queensland mango exports to Japanese is small unless 1) the current protocol is simplified and made workable and 2) the unnecessary cross-border cost is eliminated. These changes can lead to a drop in retail drops and increases in demand.

China

Australian mangoes previously entered China by Hong Kong through grey channels. Direct access to the Chinese market was granted in 2007, followed by trial shipments to Shanghai conducted by Department of Agriculture and Fisheries Queensland which has proved very successful.

The phytosanitary requirements for access to the Chinese market imposed by Chinese customers are 1) mangoes have been harvested from Chinese government certified orchards and 2) mangoes need to be treated by hot vapour to eradicate fruit fly before leaving Australia.

Among all the Asian countries, China is the most promising country for Queensland to increase exports. This is because:

- Australian mangoes have already established their reputation in this market as the best mango in the world;
- Queensland mangoes have counter seasonal advantage;
- Market access provides opportunities to improve and shorten the previous supply chain which is through Hong Kong to China;
- The continuing improvement of Chinese domestic logistic and cold chain systems make it possible to bring Queensland mangoes to second and third tier cities;
- China has massive market size.

Appendix 3: Asian online shopping by countries

Korea

Korea is ranked no.1 in the world in term of broadband access per 100 inhabitants (OECD, 2014). This has led to the increased uses of internet-based commercial transactions by Korean customers in every line of businesses. Especially with large number of internet users and superior internet infrastructure, the volume of e-commerce has grown exponentially (Kim etal., 2008), from US$19 million in 2000 to US$37 million in 2010, taking up 74% of the total population (Korea Internet & Security Agency, 2012). More than half of these internet users had used internet to buy goods or service.

As part of a direct agricultural market policy, the Korean government empowered agriculture by developing electronic commerce (e-commerce) in the late 1990s for local farmers. E-commerce has been associated with policies that shortened the supply chain by minimising the role of the middleman, and thus provide consumers with fresher products at lower prices along with higher profits for farmers. The market has increased from US$182 million in 2001 to US$3,847 million in 2012 (Statistics Korea, 2013). The retail formats of grocery shopping have diversified into e-commerce and other non-store formats following the success of e-commerce as a medium for the direct agricultural market.

According to Leea et al., (2015) TV commerce (t-commerce) based on Internet Protocol TV (IPTV) has received attention as an innovative transaction channel for increased competitiveness of the agricultural sector. T-commerce is an electronically mediated form of commerce that uses television as an interactive tool. It is also a non-store transaction format, similar to TV home shopping and e-commerce. This tool, like that of previous e-commerce activities, is expected to shorten the previous supply chain and thus enhance the welfare of farmers and consumers. Although the number of IPTV subscribers in South Korea has been increasing, and exceeded 7 million in 2013, the current t-commerce market is still in the initial stage relative to other non-store transaction formats (Korea On-Line Shopping & Association, 2013).

Imported fresh fruits and vegetables have been retailed online. For instance, imported mangoes from the Philippines can be purchased online at the price of US$17.6 for a box of ten pieces (AC Figure 1). Queensland mango sales in Korea are at the initial stage of market development and the response from consumers in the market is very positive. It is obvious that online marketing for Queensland fruit and vegetable products can be one of the viable channels for selling the products.

AC Figure 1: Philippines mango sold on line in Korea. Source: www.ilovemango.co.kr

Singapore

73% of the population in Singapore used the internet in 2013. However internet shopping for groceries is not growing as fast as expected. Singapore is a densely populated small area with easily accessible shopping malls, department stores, and supermarkets and these characteristics may weaken people's need, interest or willingness to shop via the Internet (So et al., 2005). On the other hand, high information technology penetration rates, sophisticated consumers, long working hours, and fierce competition may push both sellers and buyers to move online.

In Singapore, Honestbee and RedMart are the two dominant players in the online grocery shopping scene and both of them exist to solve the time constraint issues faced by consumers. The two firms provide an online platform for consumers to choose grocery items and have them delivered to the door within the same day for a modest fee. The retail price is lower, or at least the same as what it would cost consumers in the brick and mortar store. However, the two firms have totally different business models.

Honestbee enters into a collaboration with the traditional brick and mortar stores. Consumers would buy their goods at the same price through their online portal and make a payment. Honestbee does not own any of the groceries, but picks up at the outlet of these brick and mortar stores nearest to their clients and delivers to the door within a one-hour time slot. Besides the headquarters staff, Honestbee does not have other employees. The people who pick up the goods and the people who deliver the goods (known as Bees) are freelancers who are paid based on an assignment basis.

RedMart, on the other hand, does not have any physical retail presence and the company operates out of a large and modern warehouse. They also own a fleet of delivery vans and promise to deliver within a two-hour window. RedMart

therefore employs significantly more employees (the delivery drivers) than Honestbee.

The future of online grocery shopping in Singapore is not clear due to people's easy access to various offline grocery outlets across the city. Most importantly, people shop not just for convenience but also for leisure. They relish the interaction with store staff and cashiers, they are there to see the colours of the stores, and smell and select the fresh produce themselves. The opportunity to sell Queensland food products online in Singapore depends on the products. Products which are not available in offline shops will be more likely to succeed.

Indonesia

Internet is a relatively new communication media in Indonesia, an archipelago that spans over more than 17,001 islands. In 2013 only 15.8% of the population used internet. Based on Communication Ministry of Indonesia data, 80% of users are between 15 and 30 years of age. In recent years some businesses have developed marketing strategies by using both offline (conventional stores) and online stores in order to increase sales. The value of online shopping transactions was AU$380million in 2012 (Miftachul, 2012), and it reached AU$1 billion in 2014.

Grocery online shopping is new to Indonesians. However as road traffic grows thicker in big cities such as Jakarta, online grocery shops are appearing to help people save shopping time. In 2015 there were eight grocery online retail stores in Jakarta. One of them is called Happy Fresh (https://happyfresh.com/). People can pay by both cash on delivery and credit card, and delivery can be done within a selected time window or if not at home consumers can have the delivery person leave it on the door step. The service is available on app for both iPhone and Android. The further growth of online grocery retailing in Indonesia, particularly for fresh produce, depends on the services and the level of consumer satisfaction with the quality of produce delivered. However for fast moving consumer goods including packed processed and value added food items, online channels should be considered.

Malaysia

Malaysia has many more internet users than Indonesia, with up to 67% of the total population using it in 2013. Exploring the factors that might affect the behaviour of Malaysian consumers toward online shopping, Haque and Khatibi (2006) revealed that online products' price and consumers' trust toward internet stores and educational levels significantly influenced the frequency level of online shopping activities. They also found that online consumers in Malaysia still lack confidence and trust in using the internet as a shopping channel. Ling et al., (2011) revealed that impulse purchase intention, quality orientation, brand orientation, online trust and prior online purchase experience were positively

related to the customer's online purchase intention. Online shopping ranges from purchasing flight tickets and booking hotel rooms to movie ticket purchases and the latest fashion apparel.

Online grocery shopping in Malaysia is new and is only happening in large cities. In Klang Valley the centre location of Kuala Lampur, local grocery stores have expanded their services to cater for online purchases and delivery. Residents can stock their kitchen at home without the hassle of fighting through traffic congestion, waiting in long queues and carrying heavy groceries. Tesco is the first hypermarket in Malaysia to make their wide range of products accessible to shoppers online. Frequent Tesco shoppers can now collect Club points and enjoy in-store promotions while making their purchases online. Queensland firms with an intention to sell online need to consult their business partners in Malaysia to determine if their products are suitable.

India

India is one of the fastest growing economies in the world and the world's fourth largest economy in purchasing power parity with a GDP of approximately US$3.36 trillion (World Bank , 2010). Penetration of the internet, however, is comparatively low with only 15.1% of the population using internet in 2013.

The Indian grocery market is the sixth largest in the world. Online groceries are a very small proportion although it is one of the fastest growing sectors. According to industry estimates, food and groceries account for a US$350 billion retail market, and India's online groceries accounted for about US$100 million of this in 2015 (Menon , 2015), or 0.02% of the total grocery market.

BigBasket is the country's largest online grocery, starting operations in 2011. Benefiting from cheap labour and logistic costs, BigBasket has already operated profitably in its home market Bangalore. It currently has a range of over 18,000 products across 1,000 brands and over 450,000 active customers across five cities. For Queensland firms interested in online sale of their products in India, more detailed market research is needed.

Japan

Online sales of food and beverage products takes only a small proportion of the total retail value sale in Japan, it is however the only retail distribution channel among the total 9 channels that is expanding as shown in AC Table 1. The rest of the eight channels have all declined in sale value since 2009. The total annual grocery retail value in Japan has kept steady at US$324 billion and will be maintained at slightly below this level until 2018. However internet grocery sales have increased from US$0.28 billion in 2009 up to US$5.7 billion in 2014 and they are expected to reach US$8.1 billion by 2018.

Reliable logistics systems, low internet fraud rates, and overall convenience along with the rapid growth and penetration of smartphones and tablets have contributed to the development of Japan's internet retail market. The most significant bottlenecks to online grocery usage include distrust that online retailers will deliver the right products, and a desire for the physical shopping experience and/or to receive same-time delivery. However, according to McKinsey & Company (2010), the drivers for growth of online shopping come from:

- Continued focus on purchasing at the lowest possible price (even at the expense of local neighbourhood stores); Growing web fluency and high penetration rate;
- An aging population and more women in the workforce, with both seniors and working women embracing the convenience of home delivery;
- Rising stay-at-home consumption and “cocooning” in response to current economic conditions, facilitated by increasing technological sophistication to support telecommuting and at-home entertainment.

Queensland firms interested in online sale in Japan need to focus on processed and packaged products. The best opportunities for Queensland products should be products that are either cheaper than offline shops or unavailable in physical shops. I’m wondering about products from Queensland.

AC Table 1: Japan's grocery retail market size by distribution formates - retail value sales (Historic/Forecast) in US$ Billions

Category	2009	2013	2014	2018
Grocery retailers total	326.5	326.8	325.7	323.3
Internet grocery retailers	0.28	5.3	5.7	8.1
Modern grocery retailers	241.7	257.7	259.1	263.0
(Modern grocery retailers) Convenience stores	92.9	110.5	112.7	118.9
(Modern grocery retailers) Forecourt retailers	0.3	0.2	0.2	0.2
(Modern grocery retailers) Supermarkets	148.1	146.9	146.2	143.9
Traditional grocery retailers	84.8	69.1	66.6	60.2
(Traditional grocery retailers) Food/drink/tobacco specialists	37.9	28.8	27.5	25.3
(Traditional grocery retailers) Independent small grocers	28.7	23.5	22.5	19.2
(Traditional grocery retailers) Other grocery retailers	18.2	16.9	16.6	15.8

Source: Euromonitor International, 2015.

Hong Kong

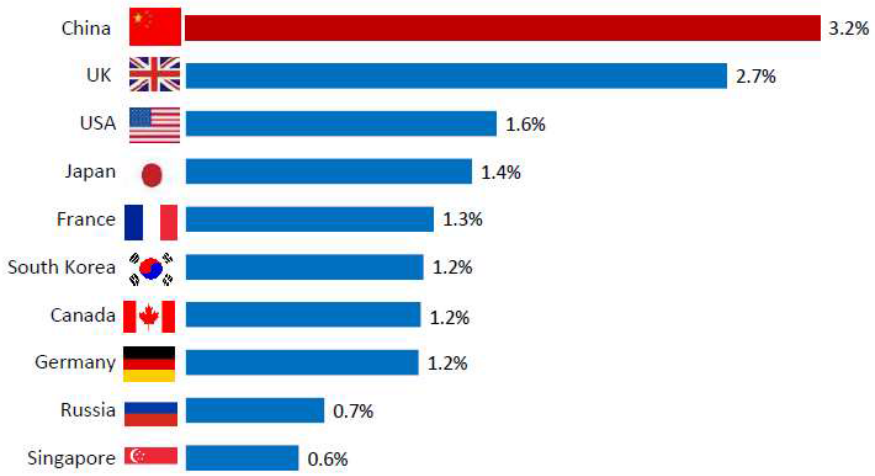
Hong Kong citizens spent US$1.9 billion on online shopping in 2011 (HongKong Business, 2011). This figure reached US$3.5 billion in 2015 (Go-Globe, 2015). Forty-seven percent of all shoppers in Hong Kong have shopped online, and 36% have purchased fashion and food products (Prnewswire, 2015). The average order in Hong Kong is US$321, compared to US$183 for the rest of the world. The most popular online categories in Hong Kong are airline tickets (75%), hotel

reservations (71%), apparel (31%), car insurance (31%), cinema tickets (26%), electronics (13%), grocery (9%) and home appliances (4%) (Go-Globe, 2015).

The low percentage of online grocery shopping in Hong Kong is due to people being deeply ingrained in their cultural preference for buying groceries in real life. Hong Kong is very convenient in terms of grocery shopping and people only need to walk outdoors for a minute to reach grocery shops. However this does not necessarily mean that online grocery shopping has no future in Hong Kong. Consumers in Hong Kong are very price sensitive and many of them will switch food brands if they find a cheaper alternative. They always go to the stores that offer the biggest discounts, and some consumers go online for cheaper prices. Compared to what major supermarkets charge, the cost of online stores are cheaper since virtual vendors don't have the same overheads as retailers with rents and manpower. The opportunity to sell Queensland food products online in Hong Kong depends on prices.

China

China has over 600 million internet users, about 50% of the country's population in 2015. It is the largest e-commerce market in the world with a total value of US$440 billion annually, almost equivalent to the total of North American e-commerce sale, 8 times that of Australia and 15 times that of India. As shown in AC Figure 2, China's e-commerce share of GDP surpasses developed countries.



AC Figure 2: E-commerce sale as % of country GDP in 2014 (Yihaodian, 2015).

In general, online shoppers in China are price sensitive but also willing to pay a premium for genuine quality and branded products. A Nielsen 2014 study on Chinese online shoppers revealed:

- The most popular products and services purchased online are apparel, daily household products, and tourism.
- The top three things that online shoppers want are a wide selection of brands and products, comparatively lower prices, and convenience.

One of the factors that drives Chinese consumers online is that many people, mostly the low and middle income population, are seeking to buy cheap luxury brand goods such as clothes, handbags and watches. They know what they purchase could be counterfeit, but they appreciate the value for the money they spent because they cannot buy authentic ones.

Counterfeiting is a massive problem in China. Most fakes in the world are made in China and the Chinese government has neglected to take strong action against counterfeiters. Chinese laws of intellectual property are not strictly enforced. However the fundamental divers for the rampant counterfeiting is the market demand for cheap luxury goods from low income groups. As long as counterfeiters can stay out of jail and hold on to their profits, the trade in fakes will likely flourish.

Some products however people want to buy authentic include grocery, cosmetics and skincare products, and electronic applicants. For these products, people focus on quality and safety. Price becomes a secondary consideration.

The Internet online platform in China provides a good place for millions of people to establish their own business with very little investment. It also, on the other hand, provides a perfect place for people to sell poor quality or counterfeit products. Despite spending millions to stop counterfeit (For instance, Alibaba the online platform provider spends US$20m each year to fight counterfeit goods sold through its platform), companies often end up with a superficial and temporary solution, shutting them down and only to see them pop up again in other online platform or registered with different business names.

In order to reduce the risk of consumers purchasing poor quality or counterfeit products through online shopping, Chinese firms have been continually modifying their online business model to ensure customers getting what they want. A C Fig 3 illustrates the evolvement of online models over the years in China.

Model 1	Online order	⇨	Deliver to door		
Model 2	Online order	⇨	Pick up from dedicated offline shops		
Model 3	Try offline shop	⇨	Order online	⇨	Deliver to door
Model 4	Try offline shop	⇨	Order online	⇨	Pick up offline shop

AC Figure 3: The evolvement of online model

Model 1 is the original model in which people order online and sellers deliver to door. Model 2, 3 and 4 shows online stores collaborating with offline stores to sell to customers. In Model 2, people can choose products from online catalogues and then order the goods online and collect the goods by going to the physical stores. If people do not have confidence in the online virtual product reflecting the real products, they can purchase through Model 3 in which they can try the products at the offline shops and then order online and the firm will deliver to door. If people have no confidence on the delivery, they can use Model 4 in which they can pick up the product they order from physical stores. Obviously Model 1 has the highest risk to receive poor quality and counterfeit products, but it is the most convenience one to customers. Model 4 has less chance to receive poor quality and counterfeit products, but it is the most inconvenience one to customers. In other words, consumers have to sacrifice their convenience for product authenticity and quality.

Chinese consumers who go online for food items are looking for quality, safety, reliability, reasonable prices, and convenience. Queensland firms have a great opportunities to meet these requirements through Chinese cross-border e-commerce platforms.

Chinese cross-border e-commerce started in 2013. It provides Chinese consumers with the opportunity to purchase genuine and quality international products directly from overseas. According to Tmall Global (Global, 2015), baby care (32%) and beauty (25%) are the two largest products in the cross-border sales, followed by healthy products/food (24%) and apparel (13%).

The advantages of cross-border e-commerce include:

- Entry barriers to China are lower than traditional e-commerce or retail;
- No value added tax and lower duties (10% for food and drinks);
- Affords unique benefit for products that require CIQ inspection;
- Supervised by Chinese customs and the process therefore is transparent, no fake products.

The disadvantages of cross-border e-commerce include:

- Logistics and delivery process is complicated, tedious and time consuming;
- Changing or refunding is impracticable when products pass through two customs systems with product inspection involved;
- Package breakage and loss rate are far higher than those of domestic e-commerce logistics.

Currently there are eight government approved portals handing cross-border e-commerce:

- Shanghai www.kuajingtong.com
- Ningbo www.kjb2c.com
- Zhengzhou www.wgyp.com
- Hangzhou www.tmall.com.hk
- Chongqing www.cqkjs.com
- Guangzhou www.wtdex.com
- Shenzhen TBD
- Tianjin TBD

Cross-border regulations are changing and vary with each portal. For instance, the Shanghai portal only uses its own payment and logistics company. However each portal has its own strengths and weaknesses. The Chinese government consistently monitors the system and makes policy adjustment accordingly.

Given the pros and cons of cross-border e-commerce, processed and value added products which do not require a cold chain system to maintain quality have much more chance of success than fresh produce in using cross-border e-commerce. For Queensland firms seeking to set up shop on cross border e-commerce platforms, they need to:

- Do a detailed economic analysis, if it is profitable;
- Register their trademark in China;
- Define their China strategy;
- Select payment and logistic system suitable to their products;
- Develop marketing and management strategies;
- Find the right business partner in China to maintain their online business.

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