Functional and Luxury Foods Research Project

Project Summary

PREMIUM FOOD AND WINE FROM OUR CLEAN ENVIRONMENT

SOUTH AUSTRALIA

Government of South Australia
Primary Industries and Regions SA

Functional and Luxury Foods Project
Project Summary

1. Introduction

Food and beverage manufacturing is the largest manufacturing sector in South Australia, and the only major segment of manufacturing in our state that has seen growth in over 17 years. While gross revenue from food and wine contributed AUD18.2 billion to the South Australian economy in 2014–15, there remains capacity for growth through domestic demand and in key international markets.

Functional foods are those which have had ingredients or substances added or removed to produce a food that contributes to health and wellbeing. **Luxury foods** are typically exclusive, expensive and consumed to meet emotive needs, as opposed to utilitarian ones.

In 2014, the global market for functional and luxury foods was worth an estimated USD220 billion, about 3 per cent of the total global food market. The Asia Pacific region is the fastest growing market for functional and luxury foods, in terms of volume and purchasing power. However, only 10 per cent of South Australian manufacturers currently focus on functional and luxury food production.

The Department of Primary Industries and Regions SA (PIRSA) commissioned VTT Technical Research Centre of Finland (VTT) to undertake the **Functional and Luxury Foods Research Project**, to identify where South Australia's food value chains (including beverages) could be switched to higher value-adding functional or luxury foods, using locally available raw materials. The Functional and Luxury Foods Research Project sought to gather data and intelligence to address objectives under the State Government's economic priority, **Premium Food and Wine Produced in our Clean Environment and Exported to the World**.

While South Australia enjoys an enviable reputation for our clean environment and our premium food and wine, these factors alone are not enough to drive growth for our food and beverage industry. The Functional and Luxury Foods Research Project sought to identify what opportunities functional and luxury foods could offer South Australia, in terms of industry development, market creation, and innovative products and processes.

VTT partnered with three other organisations to undertake the research between March and December 2015 – they were Frost and Sullivan (Australia), ESSEC Business School (France and Singapore) and the then Mondelez Food Innovation Centre (now Monash Food Innovation Centre, Melbourne). The Final Report for the project was presented to PIRSA in December 2015. This report included six recommended pathways that South Australia could consider in order to capitalise on the opportunities that functional and luxury foods present.

This Project Summary outlines the key findings of the Functional and Luxury Foods Research Project. It examines the opportunities for South Australia in both the functional and luxury domains, provides a high-level overview of VTT's six pathway recommendations, and summarises PIRSA's initial approach to the Implementation Phase of the Functional and Luxury Foods Project, to enable Government and industry to address the research results.

2. The Research Project: Context

Demand for functional and luxury foods remains particularly strong in Asia, given the region's strong economic development, the rapid growth in the size of the middle class, and the prevalence of high net worth individuals across the continent.

The research primarily focused on opportunities for South Australia in key Asian markets, including **China (and Hong Kong), India, Indonesia, South Korea, Japan, Malaysia, and Singapore**. These markets were selected as the most attractive for functional and luxury foods, based on their size, maturity, and growth potential. The **Australian domestic market** was a secondary focus of the study.

During the research phase, VTT engaged with South Australian businesses with functional and luxury foods potential, holding interviews, workshops and information sessions to capture the views of different food production areas, the packaging industry, research institutes and food associations.

As part of their research methodology, VTT also undertook a comprehensive analysis of South Australia's strengths, weaknesses, opportunities and threats.

VTT identified that among the **strengths** of South Australia's food and beverage sector are our many unique businesses, ideal for pursuing niche market opportunities. The researchers found good relationships of trust between established businesses, and examples of effective collaboration with strong industry representation, including Food South Australia, the Australian Wine Research Institute, the South Australian Wine Industry Association, and others.

Weaknesses include the limited funds available, particularly for small to medium enterprises, to acquire or upgrade their machinery, facilities, and to undertake research and development. VTT also found that South Australian businesses experience difficulties identifying and accessing their target export markets, and they lack the strategic capability to develop a sustainable export strategy, particularly for luxury products.

Opportunities for South Australia's food industry therefore exist in improving the readiness of our businesses to enter export markets, increasing their market intelligence and growing their local and international networks to meet the specific needs of their customers. These opportunities directly relate to South Australian companies supplying functional ingredients to food and beverage manufacturers, or manufacturing functional foods themselves. Opportunities also exist in luxury food production, luxury food experience and branding, and culinary tourism. The researchers also identified opportunities in increased research and development, and investments in technology, to establish new and complementary industries in functional food ingredients and smart and sophisticated packaging.

Overall, the researchers concluded that South Australia's capacity to seize the opportunities presented by functional and luxury foods will need to be balanced by the perceived challenges or **threats** to our progress. In addition to external competition, including from other Australian producers and manufacturers, the researchers suggested that South Australia's progress could be hampered by future skilled labour shortages, our lack of experience navigating highly regulated and risky Asian export markets, and the limited access of small businesses to capital funds for technology upgrades or business expansion.

3. Functional Foods: Opportunities for South Australia

The global functional foods market is growing faster than the overall food market. In 2014, the Asia Pacific region it was worth USD55 billion with a growth rate of around 7 per cent each year. This is forecast to continue until 2020. The major markets for functional foods are in the categories of dairy, baked goods and confectionery.

> **SA case study – Solar Eggs Omega 3 Eggs:**
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> Solar Eggs in South Australia collaborated with scientists at the University of Adelaide to increase the level of Omega 3 in their eggs by incorporating flaxseed oil into the diet of laying hens. Solar Eggs supplies SA supermarkets with 50,000 eggs per week.

During the research phase of the Functional and Luxury Foods Project, VTT considered **12 functional products** that are currently developed in Australia. The researchers analysed the profile of these products in Australia's domestic market, extracts of which are provided below. VTT then measured the attractiveness of each product in the key Asian markets (China [and Hong Kong], India, Indonesia, South Korea, Japan, Malaysia, and Singapore), where functional foods are considered "health and healing" foods, responsible for improved health and wellbeing, or the reduction of disease.

Aloe Vera

The existing market for aloe vera in Australia is predominately focused on exports for cosmetics with a secondary focus on functional beverages. The forecast compound annual growth for Australian aloe vera sales by 2020 is estimated to be 13 per cent and worth more than USD10 million. Up to 60 per cent of aloe vera extracted in Australia is currently exported, with the country of origin being a significant selling point. The growing awareness of aloe vera's potential medicinal and antioxidant properties are seeing greater interest domestically and internationally with Asian markets particularly focused on functional beverages.

The South Australian food and beverage industry has an opportunity to address the relatively undeveloped market within Australia for using aloe vera as a functional beverage and ingredient. The strong reputation of South Australia and its clean environment could be a powerful product differentiation tool for local producers to leverage from.

Carotenoids

Carotenoids are fat soluble substances found principally in plants, algae, phytoplankton, bacteria, yeasts and moulds. In particular, there is emerging clinical validation of beta-carotene's cancer reducing properties. Australia currently produces carotenoid-based functional ingredients and foods with the domestic market forecasted to have a Compounded Annual Growth Rate of 7.3 per cent by 2020. The most commonly produced carotenoid in Australia is natural beta-carotene which is used as a colouring agent and as a functional ingredient.

South Australia has an opportunity to develop carotenoid containing functional ingredients or finished foods to supply markets across the Asian Pacific region. There are large variances across the markets in relation to the consumption and domestic production of carotenoids. The increasing acceptance of antioxidants as an important dietary supplement and having natural food colouring agents are helping drive the demand for carotenoids across Asian markets.

Gluten-free food

Australia is the largest gluten free market in the Asian Pacific region and a significant exporter to the United States of America and Western Europe. The Australian market for gluten free products was estimated to be worth USD90 million in 2014 with a Compounded Annual Growth Rate of 11.2 per cent by 2020.

Australia is a major producer, consumer and exporter of gluten free products. South Australia has an opportunity to export gluten free products as either a functional ingredient or as finished products to Asian markets. The promotion of the benefits of a gluten free diet coupled with the increasing awareness of gluten intolerance is vital to develop and mature these markets. The absence of significant domestic production in Asia positions South Australia well for exporting into markets with limited competition.

Lactose-free food

The lactose free market in Australia largely consists of liquid milk and infant milk powder. Dairy alternatives such as soy, almond and rice milks have not been included in this analysis of lactose free as they are generally consumed to meet alternative consumer demands. The Australian lactose free market was estimated in 2014 to be USD39 million with forecasted Compounded Annual Growth Rate at 8 per cent until 2020. Whilst lactose intolerance and malabsorption is prevalent in Caucasian populations in Australia, it is much more widespread in ethnic groups such as the Chinese. In recent years there has been a movement of lactose free products into baked goods and confectionary in addition to the established dairy markets.

South Australia has an opportunity to export high quality lactose free products either as functional ingredients or as finished products. South Australia's reputation of high quality produce and strict food security controls could be used as a product differentiation tool.

Other "free from" foods

Australia has one of the most developed 'free from' markets globally. This sector includes products that claim to be free from pesticides, dairy protein, nuts, sugar, genetically modified and many other items. The Australian market was estimated in 2014 to be worth USD12 million with a Compounded Annual Growth Rate expected to remain at 12 per cent until 2020 when it will exceed USD20 million. This market is expected to show strong growth for many years to come.

The 'free from' food sector is expected to be a potential export opportunity for Australia as there already exists a mature and sophisticated industry addressing domestic demand. Australia is the largest market and producer of these foods in the Asian Pacific region and is well positioned to meet growing international demand. There is currently limited pockets of demand across the Asian Pacific region that have limited knowledge and demand for free from foods at this stage.

Phytosterols

The 'free from' food sector is expected to be a potential export opportunity for Australia as there already exists a mature and sophisticated industry addressing domestic demand. Australia is the largest market and producer of these foods in the Asian Pacific region and is well positioned to meet growing international demand. There is currently limited pockets of demand across the Asian Pacific region that have limited knowledge and demand for free from foods at this stage.

South Australia has an opportunity to export phytosterols as either a functional ingredient or as finished products. The ongoing clinical validation of phytosterol as a potential functional ingredient able to limit cholesterol absorption will potentially lead to further development of enriched milk and other spreads.

Polyphenols

Currently Australia has an under-developed market for the consumption and processing of polyphenols. Australia mainly imports green tea polyphenols and produces small qualities of polyphenols derived from the wine and apple industries. There is growing awareness domestically about the potential health benefits of the antioxidant rich polyphenols. In 2014 the domestic market was estimated to be worth USD3.7 million with projected growth to USD5.7 million by 2020.

South Australia is very well positioned to actively engage in the production of polyphenols both domestically and on a global scale due to the well-entrenched and stable wine and apple industries which produce as by-products the necessary components for polyphenol production. Having these mature industries co-located lends any future opportunities the chance to work closely with potential primary suppliers.

Polyunsaturated fatty acids (PUFA)

In the Australian market, omega-3 is the best known example of PUFA and is prevalent across the country. There are producers in South Australia producing foods fortified with omega-3. The PUFA functional food market in Australia actively competes with the pharmaceutical and dietary supplement markets. There is an increasing demand for PUFA fortified food and beverages within Australia.

Polyunsaturated Fatty Acids (PUFA), including but not limited to omega-3, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), are some of the more commonly recognised functional ingredients amongst Asian consumers. Alternative sources to the predominantly fish based PUFAs will play a significant role in Asian markets where there is a large vegetarian population and consumer concerns around sustainability and scalability of fish sources as well as heavy metal concentrations in marine sources.

Prebiotics and Probiotics

Probiotics are health promoting living microbes and prebiotics are fibres that specifically promote the growth of certain gut microbes, often referred to as 'food for probiotics'. Probiotics are Australia's leading digestive health ingredients with growing digestive health issues in Australia's ageing population driving that focus. Traditional formats will give way to differentiated products, such as yoghurt smoothies and fortified kefirs and lassis. In 2014 the probiotic market was estimated at USD45 million, and is forecast to grow at an annual compound growth rate of 8.9 per cent up to 2020. Prebiotics are less well known by consumers but are often provided in combination with probiotics and have enjoyed similar growth. In 2014 the Australia prebiotic market was valued at USD38 million, and is forecast to grow at an annual compound growth rate of 9.7 per cent up to 2020.

Proteins and Peptides

Australia is the second largest dairy exporter in the Asian Pacific region and is a major producer of proteins and peptides. The market in Australia for proteins and peptides is focused on deriving nutrition from proteins. The market value of proteins and peptides in Australia for 2014 was estimated at USD826 million. The compounded annual growth rate is expected to remain at 5.6 per cent until 2020.

Protein and peptide ingredients range in sources, including but not limited to dairy (whey), plant (soy) and egg with preferences varying across markets. Increasing affluence and with it, increasingly weight conscious consumers, has been driving demand for proteins and peptides across Asian markets with opportunities to develop differentiated beverage and snack bar options. Limited awareness and affordability have been limiting factors in some markets suggesting that product penetration is likely to be more successful in targeted niche markets.

Vitamin D

There is significant interest in Australia regarding vitamin D due to our aging population. The health benefits from consumption of vitamin D is well established and accepted by Australian consumers. In 2014 the estimated value of the domestic vitamin D market was USD8.5 million. The compound annual growth rate is estimated at 3.4 per cent until 2020.

Vitamin D deficiency is an increasing health concern across Asian markets with strong links to bone health and calcium deficiency. Traditionally addressed through supplements, there is a growing interest in fortified products in Asian markets, with beverages being the more popular form for consumption. Across the Asian markets, there is a strong link between vitamin D fortification and a drive for increased calcium uptake. With lactose malabsorption being prevalent in Asian populations, there is an opportunity to deliver diversified lactose-free products that provide vitamin D and calcium fortification.

In addition to the above functional products, the researchers also concluded that opportunities for functional foods in South Australia may lie in the supply of functional ingredients as well as in finished functional food products. South Australia currently produces high amounts of food and wine side streams (waste) that could be used in the production of functional ingredients (wine, fruit, vegetable, cereal and milk processing waste). South Australia also has a number of natural resources that could be used in ingredient production, for example, seaweed and algae. Opportunities also exist in harnessing the wide array of Indigenous plants, native foods, and natural ingredients that offer small-scale production potential for functional food extracts. The success of this opportunity depends on the development of research to ensure local industry is up to world-class standard.

4. Luxury Foods: Opportunities for South Australia

Luxury brands are not just high-priced products. All luxury goods are relatively expensive, but all expensive products are not luxury goods. Luxury brands are created through careful marketing to a targeted consumer group. These brands share a number of characteristics: Unsurpassed Quality, Aesthetics, Rarity, Extraordinariness, Symbolism and Price and when combined, invoke or create emotive cues enticing consumers to purchase a luxury product. Luxury products are typically exclusive, expensive and successfully target consumers' emotional needs, as opposed to utilitarian ones.

Luxury foods in the Asia Pacific include both traditional Asian foods and western foods. While Asia's luxury food market is currently dominated by food service in restaurants and hotels, opportunities in the retail sector are growing.

SA case study – XO Brandy:

St Agnes Distillery has created two new luxury expressions of XO brandy. Boasting a 24 carat gold neck collar, the St Agnes 20 Year Old XO Imperial is priced at AUD800, and the St Agnes 40 Year Old XO Grand Reserve is AUD200.

SA case study – Beerenberg Honey:

Family-owned Beerenberg has built its brand on the heritage of the Paech family. Its Beerenberg Signature Collection included a limited run of 2,000 jars of honey made by Ligurian bees on Kangaroo Island. The luxury-packaged honey was produced and sold through a reservation system for AUD99 each. The company also created a separate website for Chinese customers to promote the honey.

Luxury foods include:

- Foods and beverages with a history of being rare, expensive, and consumed by the elite. They include champagne, some wines, caviar, truffles and oysters. All tend to be expensive but the top, rarer end of the range is the luxury bracket.
- Non-cultivated foods from nature that are rare, such as white truffles.
- Non-staple foods eaten for indulgence, such as chocolate, some coffees, teas, cheeses, meats and seafood.

In 2014, the global luxury market was estimated to be worth approximately AUD1174 billion. Of this, the global luxury foods market was worth AUD53.9 billion and the global luxury wine and spirits market AUD80.1 billion. Asia is considered to account for approximately 30 per cent of the market and is growing at a rate of 7 per cent each year for luxury foods and 5 per cent each year for luxury wine and spirits.

The largest opportunities for luxury foods will be in countries where symbolism in food consumption is important, and where there are significant numbers of consumers with investable assets of US1 million or more, also known as High Net Worth Individuals (HNWIs). As of 2014, VTT noted there were 4.5 million HNWIs in the Asia Pacific region, 75 per cent of whom were located in urban areas of Japan and China, including Hong Kong.

During the research phase of the Functional and Luxury Foods Project, VTT considered **12 luxury foods** that present opportunities for South Australia. It is important to note that for the purposes of this research, 'luxury foods' also encompasses wine and other alcoholic beverages.

Through the findings of the VTT report, it was recognised that if South Australia is to be successful in producing globally recognised luxury products and offerings, there needs to be a collaborative narrative crafted around the heritage and pedigree of South Australian produce that celebrates and enhances the unique aspects of our clean green environment and produce quality.

Abalone

Abalone is one of the most valued seafood products globally, especially in Asia. It is produced both from natural fisheries and from farming, with farmed production growing extensively over recent years. South Australia's 'greenlip' abalone exports currently represent 1 per cent of total market share.

South Australia is the second largest producer of wild caught abalone in Australia and has an opportunity to increase farmed abalone production, given that in 2012-13 it represented only 0.2 per cent of global farmed abalone production, and only 32 per cent of Australian production. Due to the huge increase in production of farmed abalone in China and Korea, South Australian producers cannot compete in the commodity market for abalone.

Bluefin Tuna

Bluefin tuna fisheries are highly regulated globally and are closely managed by fishing quotas for specific regions. Australia is the largest producer of Southern Bluefin Tuna, followed by Japan. The majority of Southern Bluefin Tuna catching, farming and processing occurs in Port Lincoln. The Southern Bluefin Tuna supply chain in Australia is mature and closely controlled.

South Australia's model of wild capture plus grow-out provides the industry with the advantage of being able to supply markets year-round while the catch management system ensures improved sustainability of stock and contributes to an environmentally sustainable image, which others cannot claim.

To reinforce premium positioning, it is imperative that an industry-wide comprehensive marketing program is designed. Diversification of export markets is an important risk-mitigation strategy but also provides a long-term a long-term avenue to realising more flexibility on pricing. In particular, VTT recognised there was a large market opportunity to develop value-added tuna products for specific markets. This would translate into increased demand for loins (as opposed to whole carcasses); and more consumers willing to pay a higher price per kilogram for fresh tuna. However, specific marketing strategies would need to be developed to support the premium positioning of South Australian product in this context.

Brandy, Cognac and other Distilled Spirits

In 2014 the global market for distilled spirits was estimated to be worth USD230 billion. Of this, more than 40 per cent was based in the Asian Pacific region. The Asian Pacific region as a whole has seen more than a doubling in consumption from 2005 to 2014. This region has seen compound annual growth rates far higher than the Americas and Europe.

There are opportunities for South Australian producers to reposition their brandies at the premium end for Asia Pacific markets, and to focus on emerging brandy markets in Asia where the position of Cognac is less-entrenched (for example, Thailand, Vietnam, Philippines). Additionally, South Australian producers could potentially target new / developing brandy markets in Asia where the awareness of Cognac is still relatively low. Australian brandy could be positioned as a luxury product, whilst below the price charged for the highest end French Cognacs.

South Australian distillers, and their products, are being noticed by a wider audience of consumers who want to try 'craft' spirits. Given the dominance of traditional producers, South Australian producers cannot compete in the commodity market for distilled spirits by volume. Value chain opportunities are likely to lie in product differentiation, marketing and niche developments in the value-added craft sector. However, to date South Australia has not created an 'origin' story for its niche distilled spirits to the same extent as Tasmania has with its whisky industry.

Caviar

Caviar is salt-cured fish eggs of the Acipenseridae family. The roe can be fresh (lightly salted) or pasteurised, with the fresh roe being the higher valued product. Generally the higher valued caviar is from the roe of sturgeon with Beluga being the most valued.

Currently there is no sturgeon farming in Australia with Victoria and South Australia declaring the sturgeon a noxious species. There is however scope for sturgeon aquaculture to occur in South Australia if the environmental requirements are met and PIRSA Fisheries and Aquaculture grant a permit. This would be subject to stringent environmental assessment and evaluation.

Currently global demand for caviar is far greater than the global supply.

Chocolate

The global market for all chocolates in 2014 was worth USD117 billion with Europe and the United States being the largest markets. The luxury chocolate markets in Japan and China are continuing to grow on the back of the strong gift giving cultures of both countries.

South Australia has an opportunity to export luxury chocolate into the Asian Pacific region. It is feasible for South Australian companies to produce, export and enter the luxury chocolates market, leveraging Australia's reputation in Asia as a reliable manufacturer of high-quality product. Opportunities exist in specifically marketing luxury product to affluent local and international tourists at exclusive airport boutiques, and in high-end and flagship stores.

Matsutake Mushrooms

Tricholoma matsutake is one of the most expensive species of mushrooms in the world. Known as the matsutake mushroom, it is revered in Asia for its flavour and aroma. The mushroom originated in Japan and subsequently has an established position in Japanese culture and cuisine. The mushroom cannot be artificially cultivated and is being threatened by disease and insect infestation in Japan which has seen a dramatic drop in Japan's domestic harvest.

Matsutake mushrooms are not currently produced in Australia, however on a small scale, a producer is growing Japanese red pines with the hope of producing matsutake in the future (Forest Fungi). The viability of producing matsutake in South Australia is unclear, hence technical research is needed into the potential cultivation opportunity in South Australia. If feasible, there is likely to be a significant demand in Japan for Australian matsutake, as Japanese consumers have significant concerns over the safety and quality of products from China, which is currently the largest supplier to Japan. Production of matsutake in Australia would involve the planting of suitable trees to act as hosts.

Olive Oil

Olive oil is widely available and not generally thought of as a luxury food. However certain oils in certain markets could be considered a luxury and can command correspondingly higher prices than other oils on the market. In markets such as China, extra virgin olive oil has seen consumption surge from almost zero to 37,000 tonnes in 2014. Similarly, India has seen a compound annual growth rate in the last few years of almost 80 per cent.

Australia has a small, niche olive oil industry that currently largely relies on the domestic market, with exports only about 10 per cent of local production. The opportunity for South Australian olive oil producers is likely to lie in the luxury, premium end of the olive oil market and not in competing for bulk commodity olive oils against the main European producers. The perception of South Australian produced olive oil as a high quality, highly pure and trustworthy product needs to be developed. Product development, for example olive oil / truffle oil mixtures, can enable South Australian producers to access very high value markets in Asia, with these products selling for over $100/litre. Hence, encouragement of product development initiatives across the broader luxury food ecosystem in South Australia can help producers to access value-added opportunities.

Red Wine

Australian wines are seen as 'new world' wines and as such often are discounted as a luxury wine in preference to established, usually French, wines. There is a growing awareness and acceptance of Australian wines as being comparable to French wines but there is still a way to go. Given the high margins in the luxury wine segment, the high operational cost impacting most other Australian produce will be less of an issue for the market. The larger challenge will be for South Australian luxury wine producers to establish reverence in the hearts and minds of the Asia Pacific consumer.

The two primary sources of reverence in this market are historical pedigree and critical endorsement. While endorsement can be achieved through producing a superior quality product, a historical pedigree is much more difficult to emulate, at least in the eyes of the sophisticated, wealthy consumer. The goal for South Australian luxury wine producers would be to reach this segment, educate them on the distinctiveness of their products and make them willing brand ambassadors.

Ensuring traceability through the supply chain will be increasingly important for South Australian producers, as counterfeiting of wine is widespread in Asia, particularly for premium and luxury brands. The ability to demonstrate traceability of origin and minimise any counterfeiting is therefore important for South Australian producers, and the use of traceability technology could provide a source of competitive advantage against competing countries and regions.

Rock Lobster

In Australia, there are two main species of rock lobster which are commercially harvested and sold. They are the Southern Rock Lobster which are prevalent in the southern coasts of Western Australia, South Australia, Tasmania, Vitoria and southern New South Wales. The other variant is the Western Rock Lobster which is found off the mid-Western Australian coast. These two species account for 90 per cent of all rock lobsters harvested in Australia. The Australian rock lobster market produced AUD451million worth in 2012-13, of this South Australia contributes around 15 per cent.

South Australia benefits from the 'high quality', 'clean' and 'sustainable' image that Australia enjoys in global markets (for example, the strict annual allowable lobster harvest quotas ensure sustainability of the sector). Moving forward, as traceability becomes a key demand trend in several export markets, South Australia's high environmental standards will help sustain its competitive advantage. In this context, the Marine Stewardship Council (MSC) certification may support the marketing message to export destination markets.

Free Trade Agreements with China, Japan and Korea all include rock lobster, and provide the South Australian industry with opportunity for market diversification, including value-adding to currently undervalued lobsters (e.g. >2kg lobster). To do this however, would require bolstering direct marketing efforts to specific end-customers so that the 'pull' effect is strengthened by reinforcing premium value. This could include proactive efforts to influence the food service sector to support this premium positioning by specifically confirming source through labelling or naming on the menu as 'South Australian Southern Rock Lobster'. This will help protect South Australian product from the risk of substitution by lower-priced rock lobster from other sources.

Truffles

Australia is the fifth largest truffle producer in the world with the majority being Perigold or black truffles. Australian truffle growers have also successfully produced white truffles on a smaller scale. 80 per cent of Australian truffles come from Western Australia, with New South Wales making up the majority of the remainder. South Australia currently has around 10 truffle growers with none producing large commercial crops.

Global supply of truffles has been in decline over recent decades due to disruption in traditional growing areas, while global demand has continued to grow with particularly strong growth in Asian markets with large, wealthy and westernised populations. As demand in Asia grows for fresh truffles and value-added truffle products, South Australia has an opportunity to broaden and enhance its truffle industry, which currently forms a negligible part of the overall truffle ecosystem in Australia. Opportunities for a South Australian truffle industry include growing white truffles, which are more highly valued in Asia and which would differentiate South Australia against other Australian and Chinese producers. Use of traceability technology to verify that truffles are Australian-grown as a product differentiation point.

Wagyu Beef

Wagyu beef outside of Japan typically contain Wagyu bloodlines from Japanese genetic stock exported in the 1990's as this practise is no longer permitted. Currently Australia and the United States are the largest exporters of Wagyu beef with 80 to 90 per cent of Australian exports going to the United States.

Australia has the largest population of 'full blood' Wagyu beef outside Japan. Of the approximately two million full blood Wagyu's that exist globally, 96 per cent are in Japan, and the second highest population is in Australia (around 20 per cent of the 83,000 Wagyu in Australia are full blood). Currently Wagyu cattle represent 3 per cent of the feedlot cattle numbers, they represented AUD261 million in sales in 2014, accounting for approximately 8 per cent of the total feedlot carcass value. The Australian Wagyu Association forecasts that Wagyu will account for 7 per cent of feedlot cattle turnoff, and AUD580 million (17 per cent of total feedlot carcass value) by 2020.

Given that Australia has the largest population of full blood genetic Wagyu outside of Japan, in an optimal environment, free of the diseases that have otherwise restricted exports to other markets, the Australian Wagyu industry has good prospects. Opportunities lie in eery node of the value chain, with a particular pull-through focus on further improving eating quality and increasing returns to the beef industry.

In summary, South Australia's current share of the Asia Pacific luxury market is negligible. However, there are opportunities if a narrative can be clearly crafted around a luxury product's unique heritage, culture and history.

Having a luxury product allows a business to sell an item at a price far beyond its practical value and draws on the emotive desires that luxury inspires in a buyer. This higher value allows South Australian businesses to negate the higher production costs that often limit their competiveness in commodity markets.

A critical skill for success in the luxury market is through the development of an effective narrative to build meaning and create value associated with a food or beverage product. A branding strategy, for example, should identify ways that allow an immediate distinction and clear differentiation in the consumers' mind, particularly when viewed against competitors. Luxury shoppers choose the brand that best reflects who they are and how they want to be perceived by society. Luxury consumers have high expectations of what their experience with the brand should be like. While in the past the quality and lure of a product alone could tempt buyers, today's consumers expect more.

VTT also identified that South Australian businesses have the opportunity to attract HNWIs to the state with luxury wine driven culinary tourism. Businesses could develop an array of offerings with broad appeal to luxury tourists including those seeking luxury in a traditional sense (i.e. globally accepted luxury items) but also those seeking unique 'Australian' experiences.

Key requirements for developing a competitive luxury tourism offering include a comprehensive offering of complementary services, such as luxury accommodation, premium dining and wine experiences, facilities for recreation and sports, shopping and cultural entertainment. No one company can provide the set of services alone, therefore collaboration between service providers and suppliers is critical.

5. Packaging: Opportunities for South Australia

VTT identified that a critical success factor in developing functional and luxury food industries in South Australia is the role that packaging plays to support these products and the value they have the minds of the end consumer.

The current packaging supply in South Australia is focused on conventional packaging solutions, with limited specialisation in active and intelligent packaging solutions. To be successful in the functional and luxury foods market, South Australian food and beverage companies need to develop competencies to exploit state-of-art packaging solutions. Currently, these solutions fall short of communicating the supreme quality, exclusivity and sophistication of a product in the luxury foods segment.

The current volume of production in South Australia is a limiting factor in creating demand for advanced packaging solutions. There is, however, an opportunity to develop a collaborative packaging model aimed at attracting a modern multiplatform packaging company that can work across sectors in both functional and luxury products.

Designing functional packaging

Packaging for functional foods need to communicate the benefits of the product to consumers while meeting the target market's labelling requirements. Many of the latest innovations in intelligent, smart and active food packaging are aimed at enhancing product safety and shelf life while securing the brand experience. Opportunities exist through the implementation of active, intelligent and polysensual packaging options, which can drive customer demand and better protect the integrity of the product.

Designing luxury packaging

Luxury food packaging solutions need to shift away from designing 'for a product' to creating 'an experience' that triggers an emotive response. Successful packaging aesthetics are about communicating trust and a narrative or personality that encourages a human connection. This could be in the form of a hand illustration that tells a story, or declares the personality of the product and its brand through design. In the case of luxury goods, this often means packaging that is stripped down to the pure essence of what the brand represents by focusing on subtle and minimal designs that create a strong sense of composure. These considerations play an essential role in determining consumer purchasing decisions. Package colour and picture labelling is one of the highest factors influencing a consumer's willingness to purchase a product.

In summary packaging solutions targeted to functional and luxury food sectors need to fulfil the functions of convenience and containment while emphasising brand protection and communication.

6. The Results: Pathways and Policy Recommendations

VTT concluded that South Australian food and beverage businesses need to take ownership of, and responsibility for, seizing the primary products-based and industry-wide opportunities that emerged from the research phase of the Functional and Luxury Foods Project. Such industry-led transformations would position South Australian companies on 'the productivity frontier'.

The researchers suggested that the South Australian Government can support industry in these leadership endeavours by encouraging better market understanding; creating opportunities for collaboration within and between businesses and the research community; encouraging peer-to-peer mentoring; and urging the uptake of shared technological solutions to help businesses work together and transform the food and beverage manufacturing sector.

VTT developed six pathways to help South Australia consider how these opportunities might be realised, based on South Australia's current capabilities and resources, and mapped to Asian market opportunities (in 2015).

VTT Pathway	Description
Pathway 1: Food processing technology upgrading	The technology capability in South Australia is generally considered low in international comparison. Adoption of new process technologies has the potential to increase the productivity of businesses and improve quality and safety of the products and provide longer shelf life.
Pathway 2: Functional food products	This pathway sets out a clear opportunity for South Australian companies to add more value to their offering based on the desires of target markets to consume products that bring them health benefits.
Pathway 3: Ingredients for functional foods	This pathway recognises that there is little production of functional ingredients in South Australia. However, there are opportunities to tap into and commercialise the strong research capability in functional compound extraction that sits across our universities. Additionally, there are a number of natural resources and food industry side-streams that could be utilised in the production of functional ingredients.
Pathway 4: Active, intelligent, and polysensual packaging	Industry awareness and adoption of sophisticated and innovative packaging solutions should be increased in order to drive customer demand and attract global packaging providers to increase their presence in South Australia.
Pathway 5: Luxury foods business strategy uptake and export promotion	In order to succeed in a luxury market the quality of final product is only one piece of the equation - South Australian companies need to understand the critical success factors and evolve all facets of their business models.
Pathway 6: Luxury wine-driven culinary tourism	This pathway recognises that there is a large opportunity for South Australian businesses to attract HNWI to the state through luxury wine-driven culinary tourism – this requires a comprehensive offering of complementary services such as the luxury accommodation, dining and wine experiences, shopping and cultural entertainment. It recognises that no one company can provide the set of services alone, thus collaboration is a key requirement

The researchers also put forward three cross-cutting recommendations to address overall shortcomings in South Australia's food industry innovation ecosystem:

1. The need for more applied research and food process piloting capacity necessary to support food innovation;

2. The need for greater education and awareness-raising on technology adoption, including training, demonstration, and technology transfer, which is particularly important for small-to-medium enterprises with limited resources; and

3. The need for improved collaboration between businesses to facilitate networking and establish partnerships and alliances that create local demand for products and build avenues for export markets.

While VTT's research presents the pathways and policy recommendations in a linear fashion, the researchers acknowledged that when it comes to implementing the results, activities will more likely overlap.

The most impactful pathways will therefore be those where collaborative opportunities can be identified to realise success beyond an individual business.