Future Growth for Potatoes

Current and emerging trends as drivers to growth and innovation

A report for

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Executive Summary

The research undertaken for this project examines potato growers, packers value add facilities as well as supermarket offerings, across Australia, New Zealand, Austria, Germany, Switzerland, Netherlands, United Kingdom, Ireland, Hong Kong and China.

This project identifies main areas which are driving change within the potato industry. These current challenges facing the fresh potato and fresh value add industries in Australia are identified as consumer behaviour including health, convenience and social responsibility, consumer messaging and the roles of industry bodies as well as product promotion and media influence, current retail strategies used by supermarkets and smaller innovative businesses and current and future trends and opportunities.

Consistent industry-led messaging should be developed around health claims, sustainability and provenance.

Producers need better access to customer information in order to improve their product offering in order to identify and test new innovation opportunities.

Potato producers can position themselves to compete with categories other than vegetables. There are also developing opportunities for potatoes as a base ingredient for 'meat alternative' and other products.

The industry is highly competitive and consumer habits and trends quickly evolve, if producers do not recognise future trends drivers and leavers to stay competitive and adapt, it is likely that some producers may be left behind.

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Foreword

As a young child my life consisted of farming. Growing up in a family farming business meant helping my family when needed. We would often hand pick and then grade potatoes at our small packing shed.

Our family farming operation began with my grandfather's small mixed farming operation where my father and uncle started with five acres of "spuds". They would clear land for neighbours and in return, gain the use of the newly cleared land for a season or two of a dry land potato crop. Eventually after a few seasons they earned enough money to purchase their first small farm. This is where I live today with my family, just two hours drive south west from Brisbane in Killarney "the scenic gem of the Southern Downs". Our business is truly 'family' and it always has been.

Growing up I was encouraged to gain a career that would be able to support me away from the family farming operation. The business experienced some tough times financially and it was my mothers' aspiration that her daughters become educated and therefore financially secure. I went to school in our small country community and later to college and graduated with a Bachelor of Teaching. I worked for a decade teaching until my mother retired from her administration roll in the family business. This was my cue to step in and carry on her important work.

During the expansion of our family business we were growing and supplying potatoes directly to supermarkets. My father, Peter Wickham, was always concerned about the amount of loss caused by the tightening quality and size specifications of the supermarkets. He knew that there had to be a way of turning the large, small and potatoes with minor defects into a more usable product than just feeding to cattle. I was impressed with my father's passion, drive and innovative solutions when it came to potatoes. I entered the business 14 years ago and it quickly became evident that my interest was in the value-add division of the business. I, too, developed a passion to drive innovation efficiencies, optimisation of machinery, processes and explore market chain development.

The fresh cut business enjoyed slow sustained growth for several years. We were able to invest in a purpose-built facility which we believed would surpass our growth, although we quickly grew, filling the space. By attending industry sponsored grower study tours to visiting other countries and similar facilities, I quickly realised we had the opportunity to purchase and import turnkey specialised potato processing equipment that would allow us to stay competitive. This led me to initiating projects, purchasing and commissioning machines from Netherlands and Germany and experiencing success.

Figure 1 Kerri-Ann Lamb Wickham Farms Killarney

Acknowledgments

I would like to thank Nuffield Australia for the exceptional experience of being afforded the opportunity to complete a Nuffield Scholarship. It has allowed me to extensively broaden my knowledge of the potato industry both in Australia and abroad. The knowledge and leanings I have gained will continue to evolve and translate directly into functional improvements both within my family business and the wider industry.

Thank you to my sponsor Hort Innovation for your continued support of Nuffield Australia. Such commitment support and considered value in the scholarship allows the horticulture industry to nurture future leaders. I am privileged to be able to repay your investment by sharing knowledge and passion within the industry that the program builds.

In my study pursuit I met many passionate potato people who invited me into their business and homes. I was humbled to exchange information and learn from many incredible people on this journey that have shared, encouraged, listened and inspired me during my travels, many of them who I now call friends. Thanks to each and every one of you.

I would like to thank my family business partners and also staff at Wickham Farms for your encouragement, patience and ongoing support. To my fellow scholars, thank you for your inspiration and motivation; sharing a common passion for agriculture and creating lifelong connections for years to come.

Most of all an enormous thank you to my husband, his patience has been unrelenting as I spent 16 weeks travelling internationally to study all things ‘potato’; you’ve watched me succeed, you’ve seen me fail, you keep me strong in every way, I am truly privileged.

Abbreviations

AHDB – Agriculture and Horticulture development Board

AUSVEG -Peak industry body for the Australian vegetable and potato industry

CEO -Chief Executive Officer

DAF- Department of Agriculture and Fisheries

EU- European Union

GI - Glycemic index

GMO - Genetically Modified Organism

NVL -National Vegetable Levy

NZ – New Zealand

QSR-Quick Service Restaurants

R&D- Research and Development

SIP- Potato Grower Strategic Investment Plan

UK – United Kingdom

USA – Unites States of America

USDA – United States Department of Agriculture

VA – Value Add

Objectives

Farmers are increasingly called on to become innovative to build and maintain sustainable businesses. While innovation may historically have been seen as the antitheses of farming, modern farmers are finding responsive, modern and creative ways to meet this challenge.

The objective of this study was to explore the opportunities that exist for farmers to diversify innovate and value add (VA) to their businesses, allowing them to express their passion for their produce, land and communities. By investigating the threats that impact on their ability to stay profitable and the way that potato farmers are continuing to create business success through their enthusiasm for their products and customers.

This motivated the following objectives:

- Research key drivers that impact the changing environment of the potato industry.
- Research emerging trends, risks and opportunities in the fresh potato market.
- Determine what the industry should be doing now to prepare itself for the future.
- Investigate how the producer can connect with their customers.
- Explore what value the farmer can add to stay sustainable.

From mail-order to vodka, this report examines how potato farmers are responding to the challenges of a changing industry and the drivers that are influencing their decisions to succeed.

Chapter 1: Introduction

Whoever thought that the humble potato could connect people throughout the world? The potato (*Solanum tuberosum*) is the third most important food crop in the world after rice and wheat in terms of human consumption. More than one billion people worldwide eat potato, and the global total crop production exceeds 300 million metric tons. (International Potato Centre, 2019).

Potatoes are the dominant vegetable crop grown in Australia and the largest vegetable category by volume at 1,380,385 tonnes and a total value of $752.6 million in 2018-2019 (Hort Innovation, 2019). The potato is an incredible gift of nutrition and efficiency, and has played a fundamental role in history. The potato has had an enormous historical impact on human health and nutrition as well as population growth and economic growth.

Many countries have a strong emotional relationship with potatoes as they (Hort Innovation, 2019) have helped them survive for years, but potato consumption is now on a stagnating slow decline. This report will discuss industry levers and drivers, such as consumer trends habits and behaviours. As well as emerging trends, risks and opportunities that challenge potato producers. While there is a fervent industry focus on research and development (R&D) around crop management, plant health, pest and diseases in the potato industry this report will not directly focus on these issues.

1.1 Consumption in Australia

In Australia, the overall production volume is distributed, 65% to processing 32% to the fresh market and 3% to export. Of the 32% of fresh market potatoes 84% are sold by retail, mainly supermarkets and remaining 16% through foodservice, catering and wholesale. Central wholesale markets are now only a secondary supply channel with most produce sold under contractual arrangements directly with supermarkets. Supermarket dominance has led to mass industry consolidation and fewer and larger highly vertically integrated potato businesses in the washed sector (Hort Innovation, 2017). While potatoes remain an Australian staple with an 87% ‘household penetration’, the net consumption per capita is gradually declining 2018 18.01kg per capita and 2019 17.56kg per capita (Hort Innovation, 2019; Hort Innovation, 2019; Hort Innovation, 2019; Hort Innovation, 2019).

Data collated by AUSVEG through the Meapulse panel found the most popular fresh vegetables, based the proportion of households purchasing them on a weekly basis, were; 1. Carrots, 2. Potato, 3. Tomato, 4. Onions. It was noted that carrots and potatoes were the only vegetables to be purchased on a weekly basis, by over 60% of households reflecting their market position as staples in the diet of everyday Australians (White, 2019).

In Australia potatoes are used as a carbohydrate in the diet, where they sit amongst rice and pasta. They also have a significant role as an ingredient in other dishes or to complement meat-based dishes.

There is an expectation among consumers worldwide that potatoes are available at an affordable price, and that they are of the highest quality all year round. In many countries with long cold winters and fewer growing seasons, potato and hard vegetable storage is taken very seriously. As a result significant technology and capital expenditure is invested by growers, packers, traders and manufactures, to make sure potatoes are available all year round. In Australia, there are several seasons of new season potatoes therefore consumers in Australia are usually able to purchase fresh potatoes all year round.

Production of potatoes in Australia has three distinct markets – fresh, processing and seed potatoes. When observing fresh potato offerings in supermarkets while travelling, Australia is one of the few countries that have a noticeable difference of fresh brushed potatoes on supermarket shelves. There is a distinct size and soil colour difference in Australia of loose and pre packed brushed potatoes. Brushed potatoes are quite large in comparison and are seen commonly with a distinctive light dusting of soil due to unique Australian bright red soils. Washed potatoes are generally similar in appearance across continents.

1.2 Current Challenges

According to the Hort Innovation Potato Grower Strategic Investment Plan (SIP), the major challenges facing the Australian fresh potato industry are negative health perceptions, declining consumption as well as a poor industry understanding of consumer needs. Among other challenges the SIP points to a lack of Australian industry cohesion. The industry struggles for cohesion due to lower demand, low market prices, rising cost of production including supply chain costs and shrinking market share (Hort Innovation, 2017).

Small growers often have to explore innovative small niche markets to continue to be viable. The SIP also draws attention to a low adoption of available research and development (R&D) on-farm, inconsistent seed quality across growing regions, inconsistent agronomic advice and lack of extension specialists. (Hort Innovation, 2017)

Australian growers have a level of protectionism from fresh imports due to quarantine restrictions but compete with escalating cheap frozen imports from global over supply as well as competing with a lack of economies of scale (Hort Innovation, 2017). The new country of origin labelling laws in Australia may have some impact on well-informed consumers wanting to buy Australian grown when distinguishing imported frozen potato products, although that is yet to be determined. The report highlights five main areas which are driving change within the potato industry; these are environmental concerns both for consumers and producers, as well as evolving consumer behaviour and consumption patterns, industry and consumer messaging, retail and marketing strategies.

Chapter 2: Consumers

Potatoes have been perceived a cheap, readily available commodity. Consumers found potatoes to be versatile, inexpensive and tasty. Price has for many years been a key driver in consumer decision making. (Agriculture and Horticulture Development Board, 2019)

When researching emerging trends in the potato market, it is prudent to understand potatoes are eaten generally as an ingredient in meals. Consumers apply a level of scrutiny to the foodstuffs they purchase, their decisions are based on more than just price, they have an understanding about what they are buying and what they are eating. Consumers think about the convenience, health and nutrition of their food along with where it comes from and how it got to them. They are much more aware of their purchasing power and the need to make socially responsible decisions.

There is regular scientific messaging around the need to shift to healthier diets therefore food is transforming. This has flowed onto a trend towards an increase 'consumption' of plant based diets. A summary report from the EAT – Lancet Commission states that 'transformation to healthy diets by 2050 will require substantial dietary shifts' (Prof Walter Willett, 2019). Vegetables could possibly be shifting from a side dish to centre of the plate, for that reason potatoes should be well positioned as a high-quality future food.

Consumers eating habits are varied and complex. Today food is consumed for the speed of busyness. Time pressures and changing family environments have reduced the importance of daily meal gatherings. When consumers make decisions about food, the food purpose is the main influence on their decision making. Snacking is rising, quick meals for sustenance to continue daily activity is rising and sharing daily meals around a family dining table or meals for home entertaining is occurring less. According to Mars Food, there has been a 50% decline in week-day family dinners and at least one of these meals is eaten sitting in front of the television, with almost one third of 18-25 year olds admitting to eating dinner in bed at least once per week (Mars Food Australia, 2019). Hence potatoes need to have the versatility to be eaten at a table, on the couch or even in bed.

Gathering for a meal with friends and family may now be an event, thus more time is spent on the selection and preparation of food for a special occasion. More care may be taken to make entertaining a special significant experience preparing ingredients that are chosen for flavour and provenance. "*Dining out has never been easier or more immediate. Food delivery options are increasing every day. But the fact that inviting people over and serving them something you've made yourself is still a priority*" (Lancaster, 2018). Potatoes are capable of possessing qualities such as exclusive heritage varieties, niche qualities or even unique provenance stories that command a higher price.

Household structure and eating habits are an important factor in potato consumption. Single households are increasing and with that there is less discretionary spend as the cost of living is not shared by dual incomes. The amount of single parent families is increasing. Potato pack sizes have been shrinking too as single people and smaller families are looking for a variety of pack sizes that meet their needs.

Pack size and convenience is having an impact on potato consumption decline. Consumers are not willing to carry heavy bags of potatoes. Research by the United Kingdom's (UK) Agriculture and Horticulture Development Board (AHDB) identified consumers concerns around pack sizes, saying they might not suit their needs or are too heavy to carry home, and that potatoes take too long to prepare (Agriculture and Horticulture Development Board, 2019)

While observing supermarket offerings when travelling it was noticed that the largest pack size in Australian supermarket shelf is about 5kg, alternatively in the UK pack sizes were much smaller 1-2kg. Pack sizes in the Netherlands, Germany and Austria were smaller as well 1-2kg and fresh VA potatoes packaging was from 500g to 1kg. Larger size packaging was seen in Ireland and regular large packs were about 7kg.

Consumption of potatoes by an aging population could possibly be a threat to the industry, due to perceptions of inconvenience. Although to the food service and prepared meal industries this ageing demographic requiring convenience for meal preparation in life style communities poses as an opportunity as they require cheap, nutritious and exceptionally versatile food. Seniors experience changes with age, especially reduced saliva and dental changes that can lead to difficulty chewing and swallowing. Eating soft, moist foods that don't require as much chewing such as mashed, soups, and casseroles, can make meals less of an effort, easier to eat and much more enjoyable (University of Wollongong, 2016). Therefore if the pre-preparation of potatoes are positioned thoughtfully they can still position themselves favourably within this growing demographic.

2.1 Promotional Pricing

When potatoes are positioned as a globally traded commodity, promotional pricing has a big impact on consumer buying behaviour. Supermarkets offer regular specials, ranging pack sizes and loose products, with anecdotal reports that consumers wait until perceived value promotions are available.

Case study: R S Cockerill

While visiting Rufus Pilgrim, Managing Director at R S Cockerill in York, a leading supplier and packer of potatoes in the UK, he discussed how the UK has a very price sensitive retail scene. Throughout most of the year discounters such as Lidl and Aldi have rolling promotional campaigns. Aldi, for example selling 'Super 6' of various fruit and vegetable items at hugely discounted prices for two weeks at a time. Their market share is still growing, and they regularly overtrade on fruit and vegetables. He believes consumers go out of their way to shop there for the discounted fresh produce (Pilgrim, 2019).

"*What must not be ignored is quality. Aldi especially set some very high standards. They want to appeal to shoppers with a Sainsbury's/Waitrose expectation. Therefore there is a customer 'value perception' rather than just price and promotion. Other retailers have tried to emulate the German discounters, but have either not had the mindset or ability to have either price or product demonstrably different from their existing 'premium' offering. Promotion definitely helps, but the discounters are doing pretty well overall any way"* (Pilgrim, 2019).

2.2 Health

There has been a developing interest in health and wellness. For a long time consumers have been looking for natural ingredients and, while media messaging discourages junk foods, consumers in western countries continue to struggle with obesity. The potato still suffers from a 'carbs are bad' message. Crowd sourced information and education coming from fad low or restricted carb diets (Muir, 2019) is not helping with the misconception.

"*There are conflicting stories behind the potato's relatively recent image problem and it can't be nailed down conclusively, but they are rooted in both diet and science or lack thereof. Fad diets ruling out carbohydrates first instigated mass panic about potatoes in the 1990s and 2000s, a problem for the industry that was compounded by a lack of solid science offering an alternate perspective"*. (Isaacs, 2012)

Who is telling the Australian potato industry story about health and nutrition? Is the industry allowing others to tell the story for them and hoping an accurate story will be told? Laurel Muir, Managing Director and partner of the Boulder, Colo.-based Sterling Rice Group, talked about consumer trends affecting potatoes at the 2019 Potatoes United States of America (USA) annual meeting in Denver. Muir believes the industry must tell the potato's nutrition story. *"What we need to do as an industry is to ensure that potatoes are not lumped in with refined grains and sugars, and that the powerful nutrition story of potatoes makes it a good carb story"* (Muir, 2019). Muir continued to discuss the importance innovating with potatoes to find new consumption opportunities and that innovation in food service dishes maybe a key to future potato demand. McDonald's Australia has in the last month launched a 'McVeggie' burger featuring a potato and veggie patty base with cheese, fresh lettuce and pickles. This is positive for producers if the produce is sourced locally by quick service restaurants.

Low carb potatoes are gaining increased attention in recent years and are on the rise, the Carisma variety is available in Australia, Canada and the Netherlands. The Gemson variety is also a low carb potato developed in Scotland and among others are Colomba and Carrera. Another carb smart potato developed in Idaho by Potandon Produce claims to have 55% fewer carb than pasta or rice. In New Zealand (NZ) a low carb potato was also recently launched named the Lotato (Fresh Plaza, 2018). Purchasing data indicated that marketing health claims are strongest when added to products already considered healthy (CPG, FMCG & RETAIL, 2015). Therefore if potatoes are reconsidered as healthy, then added health benefits of a carb smart potato may present opportunities for the potato industry in the future. Hort Innovation have recently commenced strategic levy investment project Potato - Fresh Fund (PT19002). This investment will develop a science-based digital platform housing research and resources that can be shared with health professionals including dietitians, nutritionists, and general practitioners, students of health-related disciplines, naturopaths, personal trainers and health coaches. The platform will use evidence-based information and resources to educate health professionals about the attributes and benefits of Australian potatoes (Hort Innovation , 2019).

2.3 Convenience

In the UK, the time taken to prepare and cook a main meal has halved from an hour back to 30 minutes, and consumers are noted to perceive potatoes as time consuming to prepare. To challenge the perception of time-consuming preparation, in the UK retail environment there are many new product offerings of “easy, speedy potato products”. These included frozen and chilled ranges of items which can be cooked in three to 14 minutes, potato based meal options alongside more traditional side dishes, as well as chips and chilled mashed potatoes (Mally, 2019). Packaging is also important when consumers consider convenience such as reusable, re-sealable, cooking in the bag and in built handles for ease of carrying.

Case study: AS Wilcox & Sons

While visiting AS Wilcox and Sons in New Zealand Mr Kevin Wilcox provided some further information at a meeting at Pukekohe in the North Island New Zealand. It is a strategy to use Wilcox Branding on products so customers can see a well know brand to make a local and known association and distinction in comparison to house supermarket branded products. Wilcox educates the consumer wherever possible around variety, shape, size, taste, cooking flavour and eating qualities. The enjoyment of taste is important as well as quality and ability for the product to perform during different cook styles. Consumers in New Zealand are discerning customers, recognize certain potato varieties and demand potatoes that have flavour. The Agria potato variety is popular and consumers will purchase it above other varieties as they are familiar with the consistent good taste (Wilcox, 2019).

Mr Wilcox identified that customers are looking for convenience, suitable bag size and short cook time. Their recent innovations included small portion cook in bag technology (Figure 2). This product offers microwave cooking and portion convenience in a 100g bag cooked in 15 minutes. He also recognised that health, calories, nutrition, as well as vitamins and minerals are also important to customers.

Figure 2: Wilcox Bite Size Medley Potatoes cook in 15 minutes

To maintain an authentic customer focus Wilcox and Sons use time data trends from data companies such as Fresh Logic for market insights, and the Neilson / Morton reports analyse real time current data. Communication to target customers is also very important; branded packaging, social media, printed media, influencers and radio advertising snippets that leads into and after news segments. It is important to have as much access to as many customers as possible. Wilcox also realises that offering low carbohydrate and low GI products cannot be dismissed as a marketing approach.

Wilson and Sons identify value for money is probably one of the most import factors. They use promotional pricing to reach customers and persuade them to buy. Pricing needs to be economical. One of the hardest things can be getting to know and continuing to know consumer perception and emerging trends. These can be tricky as some new VA products can add extended shelf life while others shorten the shelf life (Wilcox, 2019).

2.4 Snacking

The growth of snacking as a meal alternative is a big trend in western countries. Many consumers regularly consume snacks, healthy snacking habits prevail by only a slim margin and potato chips rank highly when it comes to snacking. The opportunity for healthy innovative meal replacement snacking is an untapped opportunity (The Nielsen Company, 2014).

Healthy snacking is trending, with emphasis on clean label, protein and vegan launches. According to Innova Market Insights, as snacks become healthier, more wholesome and satisfying, they are increasingly fulfilling the role of mini meals. Reflecting increasing health consciousness, snacks have become small portioned sized convenience food more often characterized by high nutrition with less regard for energy intake. (Australian Food News Thought for Food, 2014)

The market researcher's data on product launches between 2013 and 2017 showed there was a 17% increase in the growth of snacks with a health claim and a 22% rise in those with a 'nutritious' claim. A rising interest in veganism has also driven activity, with plant-based ingredient snacks growing at a 44% compound annual growth rate for the period (Hyslop, 2018). Rustic looking small batch kettle chips evoke quality and are gaining ground in the snack industry with crisps featuring sophisticated flavours like truffle and wine thriving in the adult market (Hyslop, 2018). New Zealand's Proper Crisps have also somewhat captured this global consumer trend.

Case study: Proper Crisps

Proper Crisps are making an impact on their consumers by being very conscious of what their customers are wanting. Proper Crisps is one of the fastest growing snack company in NZ, they are a small hand crisping company in Nelson NZ Founded in 2007. Aaron Groby of Proper Crisps discussed the company's ideas and innovation (Groby, 2019). Proper Crisps work with potato growers, to grow the variety, quantity and quality of produce they need for making their crisps. The company focus on no over-processed or artificially flavoured products. The crisps are made in small batches and the person in charge of each batch is so proud of what they do, their name is printed on each pack beside the use by date.

Proper Crisps have a strong marketing focus, and the company recently launched Crisps in 'Home Compostable Packaging' reflect their commitment to creating a sustainable future (Figure 3). They are always looking for ways to reduce their impact on the environment. They maintain their crisps are 100% Natural, Real Food**,** Gluten & GMO Free and are vegan-friendly, with no added MSG or trans fat. They and also provide Organic potato crisp products no Added MSG or Trans Fats, and High Oleic Sunflower Oil and Palm Oil Free.

Figure 3: Proper Crisps Organic Potato Crisps packaged in a home compostable crisp bag, Proper Crisp visit, July 2019, Nelson, NZ

Proper Crisps deal with their waste resourcefully, used oil goes to boilers to heat water to wash returnable plastic crates and other used oil also goes to a company AZWood Energy to lubricate moulds for wood pellets that is fuel for home heating. Water is 75% recycled for washing vegetables with only a final clean rinse and cooked waste goes to pig food.

Case study: Pieperz Veghel and Frietzaak Ermelo, Netherlands

Boutique snacking food as an experience is rising alongside convenience and snacking, whether from food trucks, restaurants or in the home. During a food experience, preparation and presentation are entertainment as much as the food itself.

In the Netherlands, potato fry speciality stores are a trend, providing a boutique food experience as well as snacking convenience. Frietzak and Pieperz stores in the Netherlands are a good example of this unique potato convenience concept. Fresh potatoes are hand chipped in front of customers, blanched and fried in special fryers and are served in a wrapped paper cones (Figure 4). Washed potatoes are on display in 20kg bags so customers recognise the potatoes are fresh. Potatoes are ordered, cut, blanched rested and then re-fried in front of the customer. Most stores have several toppings for the fries, mayonnaise, sauces, and mustards. There were a number of fry stores in the Netherlands and most were extremely busy. Some had very good marketing strategies around the supply chain featuring the potato growing farmer. Some stores had queues at least 20 people deep of customers waiting for hot fries. By serving in the cone container customers are able to walk around with on hand fee to dip their fries and snack. In the Netherlands this is considered convenient fast food snacking, an easy snack on the go snack (Pieperz, 2019) (Frietzaak, 2019).

Figure 4: Visit to Pieperz Veghel and Frietzaak Ermelo, Netherlands 2019

2.5 Social Responsibility

There has been an increasing realisation amongst both consumers and producers that there is only one planet thus there is a strong shared common connection regarding sustainability and the environment.

When discussing sustainable food preferences the potato ticks all the correct boxes. Consumers are not only looking for food that is nutritious they are also genuinely concerned for the impact they are making on the environment. Consumers show a strong awareness of their ability to contribute positively to sustainability by making informed decisions about what they purchase and why. So why are potatoes good for the environment? And what makes them sustainable?

Researchers from Cranfield University published in the Journal of Cleaner Production, looked at both greenhouse gas emissions and water consumption when growing potatoes and potatoes proved to have the least negative impact on the environment compared to both pasta and rice (AUSVEG, 2019).

The nutritional value of potatoes per hectare is also a valid calculation when comparing food sustainability. The United States Department of Agriculture states that on an area basis the potato provides three times more calories per hectare in comparison to rice. Potatoes also score well as a protein source when compared with a selection of grains and pulse, with only sweet potatoes and corn scoring higher. Furthermore, potatoes have significantly higher potassium content then comparable foods as well as a much higher Vitamin C content (World Potato Congress, 2020).

Sustainable packaging is also a consideration within the potato industry. The potato industry has used many forms of recyclable materials, prior to the view that one use plastic was a global environmental problem. Potatoes were traditionally packed in Jute or hessian bags as well as paper. Over time this became expensive. Now plastic is widely used as advanced machinery makes it extremely efficient to pack significant volume quickly and the ability to market bright glossy advertising messages to consumers.

Case study: Oakley Potatoes

One small NZ company making decisions around responsible product packaging was Oakley Potatoes. Although not the only company in NZ to pack potatoes into small cardboard boxes they had made significant investment into packaging their potatoes looking at future trends and customer buying habits. While visiting Mr Bernie Siew Sales & Operations Manager at Oakleys Premium Fresh Vegetables Limited in Southbridge, it was interesting to discuss the company's packaging. Oakley Potatoes deliver fresh prepacked potatoes to supermarkets throughout NZ the company has expanded their range of gourmet and petite potatoes. They are grown, washed and boxed into small 1.5kg cardboard cartons with illustrations on opposite sides of the cartons depicting a summer potato serving suggestion and winter recipe serving suggestion, hence boxes being able to be used and displayed all year round.

Figure 5: L-R, Bernie Siew and the author, Oaklea Produce, July 2019

The boxes are recyclable and keep the small potatoes cool, moisture fee and protected from any light. The boxes fit neatly into returnable plastics supermarket crates (RPC's) and are able to be displayed neatly and professionally on supermarket shelves. Oakley chooses to grow smaller potatoes as they are robust to handle during harvest, storage, washing and packing. When asked about whether it was a problem if the customers are not able to see the product inside the box it was explained that it was not a problem as the consumer could take a sneak peek if needed and also after an initial purchase if the consumer was happy with the product then a brand trust was built and the consumer continued to purchase the product with confidence in the quality of the product and brand.

The packaging is great for the shelf life of product and also the environment, the small pack size is convenient and on trend with recent customer buying habits. The product packaging looks visually appealing displayed on the supermarket shelf and also illustrates to the customer what to do with the product. At 1.5kg it is a convenient size for a meal, can be easily carried and does not take up too much real-estate in the customers green reusable shopping bags. All of this enhances the possibility of a sale to a discerning customer who wants package size convenience, generate less waste and has a sense of 'doing good' regarding the environment and sustainability (Siew, 2019).

Chapter 3: Consumer Messaging

While undertaking this research, it was extremely evident that successful farmers were sharing their story with consumers. This is an invigorating secret ingredient. When farmers are authentic and place passion before big profits, there is a powerful emotional trust that bonds producer and consumer. In the course of current messaging trends there is a desire for consumers to have a level of transparency. "The curtain has lifted off the food supply chain" (Eatherton, 2012).

Despite that, consumers can easily become confused about conflicting information around food health claims. The potato is guilty of having many and varied health claims, some not so constructive for the industry. Therefore information needs to be a source of trust for the consumer. Consumers are learning a lot more about food than they have ever learned before, possibly the more they know the more sceptical and concerned they become. It seems that not only do they want to recognize the ingredients in food they also want to know the back story even for a very simple food like potatoes. So, connecting to the consumer with an engaging story can make potatoes extraordinarily appealing. This could be a huge advantage for potatoes, one of the world's most nutrient dense vegetables in the years ahead (Eatherton, 2012).

"... quality... is a code word for products that are good for me good for my family and good for my planet. While quality and price have risen in importance, so too has nutritional value and health benefits, and I would predict that it's only a matter of time before nutrition and or health reach the top box of important considerations in shoppers minds around the world". (Eatherton, 2012)

There is an opportunity for the potato industry to tell the good story about potatoes.

3.1 The Role of Industry Bodies

Traditionally, the potato industry body in Australia has focused funding on research and development. While this has provided some benefit, there has been limited promotion of potatoes to grow overall demand in the market, or work to maintain market share. The potato industry has continually rejected a marketing levy and as result the industry suffers from an image problem which does not match its proven health benefits. This experience could be compared with the Banana industry or Avocado industry. A focus on R&D rather than promotion of the industry as a whole has had the unwanted side effect of fracturing the industry, putting farmers against each other to grow the market for the product segment while growing their own brands.

RMCG's report suggested "*A better way to get farmers to uptake on R&D may be to have a better and more targeted communication and extension (C&E) program that could help producers manage these [industry] and other risks. An effective C&E program that will meet* *the needs of industry requires an understanding of the current operating environment of the potato industry in Australia.*" (RM Consulting Group Pty Ltd trading as RMCG, 2019)

RMCG's report also reviewed the potato industry business profile, including current challenges and opportunities, and the national industry tendencies point towards new technologies and practices being slow to be adopted on-farm. Reasons for this are varied with many likely contributors. By recognising the differing needs of each sector (fresh, processing, and seed), and the diversity of business size, capacity and capability within the industry it was a recommendation to redesign a revitalised approach to delivering C&E (RM Consulting Group Pty Ltd trading as RMCG, 2019).

Angus Armstrong form Greenville AP, a leading supplier of potatoes in the UK, talks about the need to use all the drivers and leavers as an industry to prevent people from leaving the potato category, and to make sure people are coming back to potato products. There is further work to do getting the message across that potatoes are a convenient, like fresh baby potatoes taking 15 to 20 minutes to cook. Potatoes have to compete with other carbohydrates and health positioning and messaging about the benefits of potatoes has to be communicated to consumers. The industry struggles to get the message across (Armstrong, 2012).

"I think we could see a steep change in this industry, if we had real engagements with the public and allowed them to recognise that actually potatoes are better for us than we realize." (Armstrong, 2012)

3.2 Media Influences

Cooking shows, influencers, storytelling, and social media have a significant impact on consumers buying habits; it is important that the industry messaging is efficient in its influencing and marketing strategies. But first, strategists need to understand what media is influencing which consumers and why. The more that is understood what motivates the consumers' habits the more they are able to be effectively influenced.

Connected Cooking developed in partnership by Meat and Livestock Australia, Ruby Cha Cha and Nourish Brands entered into a project 'The Changing Influences on Australian Cooking Behaviours' expecting to see the big numbers being read about in the media translate into consumer behaviour at home. This wasn't always the case. What they found was that more than half the time there is no direct media or external influence on what people cook for dinner. Most nights, the need to 'just get the food on the table' is met by cooking from memory or experience (Meat & Livestock Australia , 2011).

This presents a problem for food marketers; how can consumers be influenced around what to cook for dinner each night, when over half the occasions are not influenced by any form of 'media'? The answer lies not in relying on any one form of media to influence consumers, but in getting the media and message combination right to match the cooking mindset of consumers at that time. In essence, this can be done by creating an ecosystem of influence around consumers so that the media connects together as much as consumers are connected to each other (Meat & Livestock Australia , 2011).

3.3 Potato Industry Promotion

There are many examples from Australia and worldwide of industry bodies working to raise the profile of their product and seeing good outcomes. A marketing campaign was developed in the UK which was hugely successful. The campaign executed by Agriculture and Horticulture development board (AHDB) was called ‘More than a Bit on the Side’, AHDB is a statutory levy board, funded by farmers, growers and others in the supply chain with a purpose to inspire farmers, growers and industry to succeed in a rapidly changing world. AHDB equip the industry with easy to use, practical know-how which they can apply straight away to make better decisions and improve their performance.

The marketing campaign was launched in July 2015 in conjunction with Bord Bia the Irish Food board, with the aim of emotionally re-engaging younger consumers with the potato, demonstrating its health and nutritional virtues, as well as showing modern and contemporary ways in which potato can be used to fit in with today’s busy lifestyles. The campaign generated five million web visits, three million YouTube views and a following of over one million across social media. That's a lot of people viewing new and exciting recipes putting potatoes at the forefront of people's mind when they ask 'what's for tea? (Agriculture and Horticulture Development Board, 2019)

Data showed that in December 2018 shoppers bought 3% more potatoes compared to 2015, and the figures for the last 12 months were equally encouraging. Kantar Worldpanel reported that a total of 2.2 million tonnes were sold in 12 months. 2018 total potato sales results showed an increase of 1.8%. (Agriculture and Horticulture Development Board, 2019).

Dr Rob Clayton Strategy Director at AHDB Potatoes, said, *“These retail figures will be welcome news to farmers who have long been worried about falling sale ...We hope they show that the work we have put into spreading all the good nutritional news about potatoes – like the fact that they are fat free, gluten free and low in sugar – is beginning to take hold”* (AHBD Potatoes, 2018).

When discussing this campaign with Rufus Pilgrim, a UK grower packer, he explained that potato sales in the fresh market are reasonably static. As with all such levy funded organisations there’s competition as to how you allocate the limited budget. There was some European Union (EU) funding for previous campaigns, but this has come to an end. Going forward the consensus is that promotional activity is still a priority, but market intelligence and knowledge exchange is close behind. “*Don’t be surprised if in future the industry funds a generic marketing campaign – getting everyone on side is the challenge. It’s* *happened with other sectors; 'There's a beer for that', from the British Beer Alliance"* (Pilgrim, 2019).

The universal popularity to have potatoes in diets around the world prompted a question by the International Potato Centre "*How do you promote something that we all take for granted?"* (International Potato Centre, 2019). This lead to the Centre's thought-provoking campaign message 'Imagine a World without Potatoes' (International Potato Centre, 2019) from 2018 through to 2020. The campaign endeavours to support industry organisations in developing their own strategy to include the message in their marketing, communication and outreach initiatives about the potato and its extraordinary value for humankind. This is global coordination with institutions and associations including Peru, India, Ecuador, Colombia, Australia, U.K., Ireland, Canada, China, Spain, and the Netherlands, as well as others (International Potato Centre, 2019).

"... farming has become a dirty word in many parts of our world, the practices that we use are foreign to some, scary to others, misunderstood by many and roundly rejected, often without fair trial. You have an opportunity to reinforce consumer value and trust in the products that you make and sell by simply highlighting the positive sustainable practices of potato farming and helping the public to learn more" (Eatherton, 2012).

Chapter 4: Retail Strategies

Changes in retail strategies can have a big impact on how growers conduct their businesses. Producers need to build agile value chains for the ever changing retail scene. Supermarkets have access to significant data on consumer buying and behaviour which allows them to predict sales of new innovative products and respond quickly to market changes. This control of information makes it challenging for new market entrants.

Supermarkets do not simply act to sell the products consumers want. For many years supermarkets have worked to lead consumer trends. One strategy has been through their involvement in shows such as MasterChef. Supermarkets have paid influencers and these television shows feature products through recipes that can be directly linked to sales (Eckersley, 2010).

In the UK, five big supermarkets dominate the market. AHDB has observed a trend to rationalise product lines among their Big four supermarkets, Tesco, Sainsburys, Waitrose and ASDA, to increase their competitiveness as a response to the increased market share held by discounters such as ALDI and LIDL (Agriculture and Horticulture Development Board, 2019)[i].

During a visit with Branston Potatoes in Lincolnshire, Carolyn Bowes General Manager Prepared Division discussed that supermarkets are becoming more focussed on keeping shoppers from shopping around. With Tesco offering a ‘Finest’ and ‘Value’ range of products so it can be all things to all people. They are also reducing their product ranges and introducing more of their house brand products (Bowes, 2019). This reduces opportunities for other producers/growers to innovate with product offerings as entry becomes prohibitive.

Supermarkets and other retailers have a very big influence on potato consumption either as fresh or packaged products; controlling pricing, promotion and opportunities for product innovation. They have quickly adapted to the online shopping model and customers have the option of home delivery or in store collection. This type of purchasing does not drive particular categories as it is considered a service by supermarkets offer to maintain customer loyalty.

Meal boxes have been a recent growing trend, and there are a growing number of meal box alternatives. Hello Fresh a meal box company believe their meal boxes remove the barriers to fresh home cooked meals, they claim after ordering that their customer has no planning no shopping therefore no meal time stress. Hello Fresh is spread across several countries including North America, Europe and also in Australia and NZ with headquarters in Berlin, Germany. The revenue for the 2018 financial year showed the company gaining 41% growth. Hello Fresh wants to make sure meal boxes arrive to customers as fresh as possible so they work to optimize their supply chain.

Australia in particular has two warehouses, Sydney and Perth. Hello Fresh promote less food waste in the supply chain in comparison to supermarket purchase as a marketing tool to engage with the environmental conscious customer although the perceived good by the customer may not consider the full environmental impact of packaging or food miles (Tilsley, 2019).

Case study: The Potato Shop

Increasingly a small number of businesses have built a brand, skipping the "middleman" and sell direct to consumers. These niche businesses can have less over heads and can get to know their customers and consumers, be responsive agile and gain immediate feedback on products and service.

During a meeting with Nicki Crawley an owner of The Potato Shop in Kent, UK (Figure 6), it was interesting to see a somewhat unique marketing strategy. The Potato Shop is a small farming enterprise that grows and sells heritage potatoes directly to consumers through an online platform and posts the potatoes by mail directly to customers from the farm. They carry out all their own sales and marketing, and control their own online selling mail order platform. The day the meeting took place Nicki was staging product for a photo shoot with new varieties for their web page in a small room in their office space with a digital camera. They have a small farm shop and Nicki said '*in the past year their web sales has grown by 80%' Postage to mainland UK is just £5 for up to 14kg of potatoes, £10 up to 28Kg* (Crawley, 2019).

Figure 6: L-R, Kerri-Ann Lamb and Nicki Crawley, The Potato Shop visit, Kent UK, 2019

4.1 Export Markets - China

China has been identified as a big export opportunity for many vegetable producers. For potatoes however the opportunity may not be so straightforward. Although the Chinese are the largest potato growers in the world they don't consume potatoes in the same way western cultures do. The Chinese see potato as a peasant food and most potatoes are fed to animals or made into powders, flours or used in soups similar to how cabbage is used. The western eating trends are gaining traction in China with love of potato fries, potatoes with cheese and butter and western style dining. There is also a love of Australian products especially fresh food products. While visiting a product showcase and networking event it was evident that Australia is still considered to grow clean and green produce and has trusted farming practices. Potatoes are generally valued when their origin is from Australia although the export market opportunities lend themselves to food service, servicing western style hotel chains and restaurants.

Figure 7: Australia Product Showcase and Networking Event ANZ Asia Delegation South China Guangzhou, 2019

The Chinese have a rapidly evolving retail environment. At Alibaba Group's Hema Fresh store a 'super' supermarket which is actually more like a working warehouse than a grocery store. A ceiling track transports online customer shopping bags around the store as staff assembles the ordered items placing them into the bags. The assembled bags continue on the ceiling track to the back of the store and are dispatched. Online shopping can be delivered locally within a 10 kilometre radius within 30 minutes! Alibaba's Alipay is also used for checkout both online and offline, the company uses artificial intelligence technology to record data about purchases to serve up personalised recommendations for shoppers. Most shoppers go to the store to touch and feel and taste the items before buying at a later time online for home delivery. There is a wide variety of vegetables on offer and VA vegetables and prepared meals are gaining more momentum.

Chapter 5: Product Trends and Opportunities

Pressures on producers and processors such as declining consumption, decreasing margins and an increasing focus on environmental and sustainability challenges has seen innovation being driven by production considerations in conjunction with consumer trends. The potato industry has been operating the same way for a long time. Technologies together with automation have the potential to address many increasing costs while maintaining a competitive advantage. For many potato producers' innovation does not always equal growth, but is only a way for the business to stay afloat under challenging conditions.

According to the SIP, the major opportunities potato producers can harness is development of new products to stimulate the domestic market, and leveraging branded Australian products in nearby Asian export markets. As well as using the newest technology advances and the development of new non-food uses to achieve a greater return for waste and by-products (Hort Innovation, 2017).

5.1 Fresh Packaged Product

Product development and product diversification strategies involve the development and introduction of new product into new and existing markets. It seems that a lot can be learnt from what potato growers and processors are doing in the Netherlands, Germany and Austria. Pre-cooked and pasteurised fresh potato products are common place in supermarkets and this meets the needs of extended shelf life, convenience and health. These products also meet the need of the food service industry including quick service restaurants enabling them to provide pre prepared potato quickly as an ingredient in meals.

In the UK and Ireland, supermarket shelves are expanding with a variety of prepared meals with potatoes as the base of some incredible bowl concepts. Heat-and-eat mashed potatoes are an opportunity for producers to capture more mealtime solutions and shoppers looking for foodservice style offerings.

Case study: Mash Direct

While visiting Jack Hamilton, CFO at Mash Direct in Belfast Northern Ireland, he discussed how the company grew from growing potatoes to now providing mashed ready to heat potato products. Mr Hamilton's father developed the first mashed product in the family kitchen. The new products were initially sold at the main local market, and by selling direct to customers the consumer feedback about the products was almost instant. The products were a hit. Mash Direct progressed, supplying to independent supermarkets and developed a stable customer base. Mash Direct now in the sixth generation have a strong customer focus and realise when developing new products that if the consumer does not have a good experience the first time than try a product then the return sales are limited. They truly engage with customers to get it right the first time. Mash Direct are very consumer orientated and have a strong ethos around sustainability (Hamilton, 2019).

Figure 8: R-L, Jack Hamilton and the author, visit to Mash Direct, 2019

5.2 Industry Opportunities

Optimising waste streams are an opportunity for the potato industry. Every producer, packer and processor have a portion of product out of specification which means they are not acceptable to supermarkets. This results in opportunities for a clean and human consumption grade high value waste. Vegetable producers can also use second grade produce more to deliver greater cost savings and add value to their current offerings.

Some of the options for potato waste usage include feeding waste to Insects such as black solider flies converting the waste to an efficient protein source. Dehydrating waste to make high fibre powders that can be used as an additional ingredient in breads to increase the fibre content. Also converting waste to bio-fuel for energy and Heating as is done in Austria and the Netherlands.

Case study: Priory Potato vodka

Potatoes also lend themselves to other diverse products. Mr David Rolling is a potato farmer who has developed Priory Potato vodka; it is boutique potato vodka which is nurtured from seed potato to the bottle. David produces potatoes grown on their family farm and makes the potato vodka with fresh local spring water that makes a short journey from 13 miles down the road. Mr Rolling has a fully functioning working farm, along with his family he grows potatoes and other arable crops supplying to some big retailers and restaurants. The farm also boasts a tastefully renovated Priory originally built in the 12 century, which is now run as a fully functioning wedding venue. The family have been operating the wedding venue for about ten years. Mr Rolling wanted to minimise potato waste so he tried his hand at making potato vodka with the help of an employee who had Polish heritage and potato vodka distilling experience.

Figure 9: L-R, David Rolling and the author, visit to Priory Vodka, Yorkshire UK

Mr Rolling first started trying his hand at vodka in 2015 and a few years later they arrived at a product which has won some amazing awards. Mr Rolling showed the brewing fresh vodka, the smell of steaming potato was a gorgeous aroma, and the facility was quite small with only one part time staff member and David himself. They do not have a cellar door shop at the farm as all of the vodka is sold through an online platform or customised for wedding venue customers such as customised bottle labels and small bottles for wedding favours. David said they are not quite profitable yet as they will need to sell about 100 bottles of vodka a week to be profitable. But they are well on their way to doing that; he said they are considering a farm store in the future.

Figure 10: The author at The Potato Shop, Kent UK, 2019

Conclusion

This paper has shown that a new revitalised thinking about potatoes at all levels within the industry is required. New products and exports alone will not revitalise the industry. The industry would benefit from developing a consistent messaging approach from industry to consumers. Potatoes tick all the boxes so why not let consumers know.

Health claims matter, therefore consistent messaging around health claims to consumers is essential. Consumers are willing to ‘do good’ and they are keen to demonstrate social responsibility so telling the correct story around sustainability is critical. Consumers are also influenced by positive provenance stories about potatoes, how to use them, where they come from and their freshness which adds an element of discovery.

Australian producers would benefit from better access to customer information in order to improve their product offering, and identify and test new innovation opportunities. Unfortunately, the cost and availability of data can be prohibitive for small to medium sized producers and industry could support these producers by providing this data.

Potato producers have the ability to position themselves to compete with plant based food categories as well as categories other than vegetables such as rice and pasta. Developing opportunities exist for potatoes as a base ingredient for ‘meat alternative’ and as a base ingredient in other food products. Strategic and innovative delivery opportunities also exist for producers in response to evolving consumer demands.

Consumers are willing to spend more on VA products than on potatoes as a fresh commodity. Customers are time poor and seek simple nutrition solutions. Small agile producers may have a competitive advantage if they have access to technological advances including sustainable packaging opportunities, and turnkey machinery allowing them to gain and open new markets.

Recommendations

- Consistent industry-led messaging should be developed around:
  - Health claims – sending the right messages around health claims are essential.
  - Sustainability – consumers are willing to demonstrate social responsibility so telling the correct story is immediately critical.
  - Provenance – tell a positive story about potatoes, how to use them, where they come from and freshness add an element of discovery for the consumer.
- Producers need better access to customer and consumer information to explore emerging trends to improve their product offering in order to identify and test new innovation opportunities.
- Healthy convenience products present opportunities for more VA products as customers are time poor and seek simple nutrition solutions. This is a growth category where growers can work with business to business (B2B) customers as well as retail customers (B2C) to develop product offerings.
- Successful implementation of VA largely depends on a producer's ability to be agile and make changes according to market and customer preferences. This must be at the forefront of product development.
- Technological advances and turnkey machinery allow small agile producers to gain competitive advantages and open new markets.
- Strategic and innovative delivery opportunities exist responding to consumer demands.
- Potato producers can position themselves to compete with categories other than vegetables. There are also developing opportunities for potatoes as a base ingredient for 'meat alternative' and other products.

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Plain English Compendium Summary

Project Title:	Future Growth for Potatoes. Current and emerging trends as drivers to growth and innovation
Nuffield Australia Project No.:	1907
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Objectives	Research key drives emerging trends and opportunities for the fresh and value add potato industry. Specifically: • Research key drivers that impact the changing environment of the potato industry. • Research emerging trends, risks and opportunities in the fresh potato market. • Determine what the industry should be doing now to prepare itself for the future. • Investigate how the producer can connect with their customers. • Explore what value the farmer can add to stay sustainable.
Background	Fresh potato category has been declining gradually. This decline is likely to continually impact Australian producers. Throughout this scholarship, the author was looking to gain greater insight as to what Australian potato growers can do to drive higher consumption resulting in greater returns and growth for their businesses. In order to achieve this objective, trends were investigated and analysed as they emerge from other countries, and how they can help to address the current issues.
Research	Growers, packers, value added manufactures, private companies, vegetable machine and equipment manufacturers, government institutes, retail outlets and trade shows were visited throughout eight counties to investigate the objectives.
Outcomes	New innovative products and exports will not revitalise the Australian industry alone. A focus on a consistent messaging from Industry to consumers around health, versatility, sustainability and provenance, by knowing the customer and sending the right messages to the right demographic is critical.
Implications	Industry and producers must adapt together in changing consumers perceptions to remain profitable. Producers must have a customer-focus rather than a supply-chain-focus if they wish to achieve success. Customers are seeking a healthy, versatile socially responsible, product.
Publications	Verbal presentation at the 2021 Nuffield Australia National Conference