AUSTRALIAN FOOD, BEVERAGE AND PHARMACEUTICAL PRODUCT MANUFACTURING INDUSTRY SECTOR

IRC Skills Forecast and Proposed Schedule of Work

2017–2020

Prepared on behalf of the Food, Beverage and Pharmaceutical Industry Reference Committee for the Australian Industry and Skills Committee

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IRC SKILLS FORECAST AND PROPOSED SCHEDULE OF WORK 2017–2020

Purpose

This skills forecast represents the latest industry intelligence and resulting schedule of work of the Food, Beverage and Pharmaceutical Industry Reference Committee (IRC). It was developed through research of national and industry data sources and ongoing input from IRC members and key stakeholders. The report is designed to provide industry intelligence to support the Australian Industry and Skills Committee's (AISC) four-year rolling National Schedule of training product development and review work.

This industry intelligence covers the following sections:

Sector Overview – examining the depth and breadth of the industry and identifying the macro environment that currently challenges and/or provides opportunities for the industry

Employment – reviewing the employment projections by the Department of Employment and outlining the current workforce profile and supply for the industry

Skills Outlook – identifying the key priority skills for the industry and how they can benefit from improvement or development of national skills standards

Training Product Review Work Plan – establishing the scope and timeframe of proposed training package development in line with industry priority skills.

This IRC Skills Forecast and Proposed Schedule of Work 2017–2020 has been produced with the assistance of funding provided by The Commonwealth Government through the Department of Education and Training.

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Executive Summary

This report provides an overview of workforce development and skills needs for the Australian food, beverage and pharmaceutical industry sector. The report was commissioned to support the Australian Industry and Skills Committee (AISC) in developing the four-year rolling National Schedule of training product development and review work. The report is structured, as per the AISC template, in four main sections as follows: Sector Overview, Employment, Skills Outlook, and Training Product Review Plan. Methods of analysis include research of published national and industry data sources and input from Industry Reference Committee (IRC) members and key stakeholders.

The report draws attention to the fact that food supply, exponential population growth and new demands for food provide this industry with the potential for growth and new business opportunities. The opportunities are also shaped by a number of current government policies that facilitate access to a diverse range of overseas markets and prioritise technology and business development in this sector; market trends that are characterised by a growing focus on healthier, 'ready to eat' and 'grab and go' food options; a growing export trade; and the implementation and ongoing development of advanced technologies.

Further, the report describes the industry sector's workforce. Consistent with many other industry sectors, the food, beverage and pharmaceuticals workforce is aging, with retirement age being reached in high numbers. This trend creates significant challenges for employers in respect to their ability to attract people to the industry and to develop their skills.

Importantly, the report shows that employers will increasingly seek high level skills to support more demanding job functions in most workplaces. This is because businesses respond to opportunities with new value-creation strategies, capital structure strategies, product development and investments in world-leading technologies, among many other innovations. The workforce needs to support higher efficiency targets, innovations and automation/digitisation.

Higher demands also add new functions to job roles to support broader processes and outcomes. Operational employees are increasingly required to undertake planning, quality inspection, information reporting, process improvements and technical maintenance. Specialist managers are required to support strategic developments and targets. Such examples include strategic leadership and change-management skills, marketing skills, developing investment project skills, global supply chain and logistics skills and other high level skills.

Summary of key points in each section

Sector overview

- The food, beverage and pharmaceutical product manufacturing industry can be described as having five sectors: food processing and manufacturing, beverage manufacturing, pharmaceutical manufacturing, nutraceutical manufacturing, and wholesaling/retailing of the above. The industry can also be described in more detail through a range of sub-sectors.
- The industry includes 12,480 manufacturing businesses and 27,000 wholesalers and retailers, who collectively employ approximately 721,000 people.
- In general, the sectors are characterised by a large number of small and medium-size producers who are producing for local or niche markets, and a smaller number of large producers who are often multinational companies and operating globally.
- Total sales turnover of the manufacturing sectors increased by 4.3 per cent (or $4.656 billion) to $113.9 billion between 2013–2014 and 2014–2015.
- The industry is represented by about 55 peak organisations at a national and state level, including industry and industry sub-sectors associations, industry services bodies such as research and development (R&D) corporations, professional associations, employee associations and regulatory bodies.
- Key regulations for the industry include, or are related to: Food Standards Australia New Zealand; industry/customer standards; Australian Consumer Law; the Australian Packaging Covenant; sugar industry regulations; excise compliance; export licence; advertising and packaging regulations; environmental protection measures; pharmaceuticals regulations, including international regulations such as the FDA in the USA for exports; complementary medicines regulations; wine industry regulations; and alcoholic product retail regulations.
- Key macro forces that currently challenge and provide opportunities for these five industry sectors include:
    - global food security significance and higher food demand in expanding markets, such as the Asia Pacific region, reflected also in a number of government policies aimed at facilitating the sector's growth
    - the range of therapeutic goods reforms, which is expected to encourage innovation and provide patients will faster and early access to lifesaving, innovative medicines
    - climate change and its effects on the upstream sectors, which create both challenges and opportunities for many food processing sectors to increase collaboration with the supply chains; these partnerships will aim to support decisions and development of more resilient crop varieties and large-scale farming systems
    - export growth of food, beverage and pharmaceutical products and clear customer trends, which provide opportunities for businesses to achieve greater adaptation of products to more diversified markets; and, where there is the greatest potential for value-adding, develop targeted marketing of different product qualities to market segments
    - ongoing development of enabling technologies that allow for more efficient and sustainable food, beverage and pharmaceutical processing, integrated packaging, enhancement of the nutritional value of products and reduction of waste and water use.

Employment

- Employment in the food, beverage and pharmaceutical industry sector is expected to grow by 2 per cent over the next five years.
- About 19 per cent of the industry workforce is likely to retire over the next five years.
- A significant number of the workforce occupies roles specific to factory process workers such as food/beverage process workers, packers, product assemblers and product quality controllers, and food trade workers such as bakers and pastry cooks. A significant portion of the workforce is also employed to undertake more general roles, such as specialist managers (i.e. business administration managers, marketing and sales managers, production managers, supply and distribution managers), clerical and administrative work, and sales.

Skills outlook

- Priority skills in the food, beverage and pharmaceutical industry over the next four years, 2017–2020, are summarised in the following table:

INDUSTRY-SPECIFIC PRIORITY SKILLS

Priority skill	Drivers	Training package solution [1]
FOOD AND BEVERAGE		
Wine production, cellar door sales and cellar operations	The existing units and qualifications no longer accurately align to industry changes and the specification of occupational outcomes.	Development of: • 1 qualification • 4 skill sets • up to 7 units of competency. Review of: • 2 qualifications • 135 units (including some generic FDF units).
Advanced food safety and advanced food safety auditing skills	Changing and more rigorous regulations on food and beverage products; Food Standards Australian New Zealand (FSANZ) introduced the latest revised Food Standards Code in March 2016; Food imports is an area regularly impacted by changing regulations in response to changing biosecurity risks.	Review of: • 2 qualifications • 75 units.
Traceability of product	Increased presence of the Australian food businesses in the global marketplace and international expansion of businesses demands abilities to deal with global supply chain management	Development of food specific Training Package components in support of food traceability. The units to be identified during

[1] For a full list or relevant qualifications and units of competencies, refer to Attachment A.

INDUSTRY-SPECIFIC PRIORITY SKILLS

Priority skill	Drivers	Training package solution [1]
	and logistics including full traceability especially in times of product recall. Food Standards Australia and New Zealand (FSANZ), through food standards, places requirements on producers to be able to provide details about food on premises and its source on request and provides a code that covers the 'one step back and one step forward' elements of traceability among other related elements.	review and Case for Change development. Review of: • 4 units of competency.
Innovation in product development and food packaging	Higher business targets for efficiency, productivity and competitiveness reached through innovative new products and packaging, addressing industry-wide challenges while realising business opportunities. Existing new product development and packaging innovation to maximise opportunities in new markets, supply channels and food and beverage categories. New process and technological developments in food and beverage product making based on chemistry and microbiology discoveries of opportunities for existing food manufacturers.	Development of: • up to 4 units of competency. Review of: • 5 existing qualifications • 19 units of competency.
Food and beverage fermentation	Due to low-cost entry to market and growing demand for functional fermented food and drink products; small home-based and medium-sized businesses have started to appear in greater numbers. Occupational standards are required to support the growth in industry and ensure consistent and safe products are produced. Consumers seeking fermented products also include those who are health conscious and others who need the products for health reasons.	Development of: • 1 new qualification for food and beverage fermentation. Use of existing units (to be determined as part of the development process) and the development of new units – additional units to be identified for food fermentation at the time of functional review and development of Case for Change as part of the focus on new innovative segments.

INDUSTRY-SPECIFIC PRIORITY SKILLS

Priority skill	Drivers	Training package solution [1]
		Review of: • 1 unit.
Work health and safety (WHS)	Work health and safety remains a focus across the sector. Risk management skills and knowledge across all occupations will be needed as processes and procedures change within production and other aspects of the industry.	Review of: • 5 units of competency.
PHARMACEUTICALS		
Pharmaceutical production skills across a range of functions and employment levels	The five current units of competency, skill sets and qualifications no longer represent the skills needs of the pharmaceutical industry. Industry has provided feedback that because of this misalignment, there is limited formal vocational training using these qualifications despite there being a need for training.	Potential development of new Training Package components and review the potential for rationalisation of qualifications, with the number to be determined during the review and development of the Case for Change. Review of: • 17 units of competency.
Good Manufacturing Practice (GMP)	Skills transportability in pharmaceutical manufacturing, which is highly specialised, is not easily achieved across the industry. However, GMP does provide a common base for production staff across the industry and is seen as entry-level training.	Review of: • 5 units of competency.
Pharmaceutical auditing and compliance skills	Further investment in compliance to meet the global trend towards transparency reporting, additional government requirements regarding the registration of medicines, and compliance with the Therapeutic Goods Administration (TGA) in Australia and global regulations as there is an extensive export market.	Review of units of competency and the development of additional Training Package components where gaps are identified during review and development of the Case for Change.

CROSS-INDUSTRY PRIORITY SKILLS

Priority skill	Drivers	Training package solution
FOOD AND BEVERAGE		
Higher-level strategic planning and management skills across the food and beverage industry	Increased demand for Australia's quality food and beverage products from international domestic markets, and growing adoption in some food industry sectors of vertical integration and other approaches, including marinated meats, red meats cooked in-store in the same manner of cooked chickens, and new cuts of meat[2] to add value to current operations.	Development of: • up to 2 qualifications. Review of: • 15 units of competency.
Advanced supply chain management skills to support the food and beverage industry	Increased presence of the Australian food businesses in the global marketplace and international expansion of businesses. Many food producers have introduced systems into their product lines to enable the end user to track product from the farm or production line to the table.	Development of qualification/s for global supply chain management and logistics.
Online sales and customer service skills for the food industry	Opportunities exist for Australian producers across the food and beverage sectors to expand existing markets and enter new international markets, particularly in the Asian regions.	Develop/update qualifications and units of competency across 7 qualifications as identified during review and development of the Case for Change.
PHARMACEUTICALS		
Advanced sales, marketing and customer service to support the pharmaceutical industry	Growth strategies, including expansion into new therapeutic areas; increases in sales and marketing capacities (integrating research and market access functions as well as building up market access and external affairs capabilities); and the introduction of new products in portfolio pipelines and New Chemical Entities (NCEs). Developing countries also present growth opportunities.	Development of additional Training Package components where gaps exist as identified during review and development of the Case for Change.

[2] Beef Central, 2016, 'Top 10 Australian read meet food service / retail trends for 2016', viewed April 2017, *<http://www.beefcentral.com/trade/top-10-australian-red-meat-food-serviceretail-trends-for-2016/>.*

CROSS-INDUSTRY PRIORITY SKILLS

Priority skill	Drivers	Training package solution
Advanced leadership, management and risk management skills	Reliance on relationships and partnerships with other manufacturers, government, research bodies, customers and competitors is seeing a strengthening of the priority on strategic alliances and joint ventures, introducing additional risks to operations.	Development of Training Package components as identified during the review and development of the Case for Change. Review of: • 2 qualifications.
Advanced sales, marketing and customer service to support the pharmaceutical industry	Growth strategies, including expansion into new therapeutic areas; increases in sales and marketing capacities (integrating research and market access functions as well as building up market access and external affairs capabilities); and the introduction of new products in portfolio pipelines and New Chemical Entities (NCEs). Developing countries also present growth opportunities.	Development of Training Package components as identified during the review and development of the Case for Change.

A. ADMINISTRATIVE INFORMATION

Name of Applicable Industry Reference Committee (IRC)	Food, Beverage and Pharmaceutical Industry Reference Committee
Name of Applicable Skills Service Organisation (SSO)	Skills Impact Ltd

B. SECTOR OVERVIEW

Sector description

The food, beverage and pharmaceutical product manufacturing industry sector integrates all businesses that operate in the following sub-sectors.

Food processing and manufacturing

- Dairy product manufacturing
- Bakery product manufacturing
- Grain processing, cereal and pasta manufacturing
- Fruit and vegetable processing
- Sugar manufacturing
- Confectionery manufacturing
- Snack food manufacturing
- Functional food and beverage manufacturing.

Beverage manufacturing

- Wine and spirit manufacturing
- Beer manufacturing
- Soft drinks manufacturing.

Livestock and pet feed manufacturing

Pharmaceutical and nutraceutical product manufacturing

- Human pharmaceuticals and medicinal product manufacturing
- Complementary medicine manufacturing
- Veterinary pharmaceuticals and medicinal product manufacturing.

Wholesaling of the above

In 2016, the sector included 12,480 manufacturing businesses and 27,000 wholesalers and retailers, employing 721,000 people.[3,4]

The manufacturing of food, beverage and pharmaceuticals contribution to the Australian economy includes[5]:

[3] ABS, 2017, Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016.
[4] ABS, Australian Industry, 2014-15, Cat No 8155.0.
[5] ABS, Australian Industry, 2014-15, Cat No 8155.0.

- total sales turnover, which increased by 4.3 per cent (or $4,656 million) to $113.9 billion between 2013–2014 and 2014–2015
- industry value added (IVA), which increased by 0.4 per cent (or $111 million) to $28.9 billion over the same period
- employment, which increased by 1.5 per cent (or 3,832 people) to 258,043 people at June 2015.

Relevant training package qualifications

The training package for the food, beverage and pharmaceutical sector is *FDF10 Food Processing*. FDF10 comprises 26 qualifications, 24 skill sets and 474 units of competency.

FDF10 QUALIFICATIONS
Qualification Level: Certificate I
Certificate I in Food Processing
Certificate I in Pharmaceutical Manufacturing
Certificate I in Sugar Milling Industry Operations
Qualification Level: Certificate II
Certificate II in Food Processing (Sales)
Certificate II in Pharmaceutical Manufacturing
Certificate II in Wine Industry Operations
Certificate II in Retail Baking Assistance
Certificate II in Food Processing
Certificate II in Sugar Milling Industry Operations
Qualification Level: Certificate III
Certificate III in Food Processing
Certificate III in Pharmaceutical Manufacturing
Certificate III in Plant Baking
Certificate III in Wine Industry Operations
Certificate III in Retail Baking (Cake and Pastry)
Certificate III in Retail Baking (Bread)
Certificate III in Retail Baking (Combined)
Certificate III in Food Processing (Sales)
Certificate III in Sugar Milling Industry Operations
Qualification Level: Certificate IV
Certificate IV in Food Processing
Certificate IV in Pharmaceutical Manufacturing
Certificate IV in Food Science and Technology
Certificate IV in Advanced Baking

Certificate IV in Flour Milling

Qualification Level: Diploma

Diploma of Food Processing

Diploma of Pharmaceutical Manufacturing

Diploma of Food Science and Technology

Sector analysis

Sub-sector description and analysis of businesses involved

FOOD PROCESSING AND MANUFACTURING

SUB-SECTOR NAME	DAIRY PRODUCT MANUFACTURING
SCOPE OF WORK	The sector consists of businesses that process milk and cream, that make milk and cream products with varying levels of fat content, and that manufacture dairy products such as cheese, butter, yoghurt, condensed milk, ice cream and milk powder.
PRODUCERS	In 2016, there were 563 businesses in the sector, with the majority being small and medium-size operators[6]; however, dairy processing in the sector is dominated by a small number of large, diversified dairy companies with global operations and multiple production sites across Australia. Smaller producers specialise in niche products or cater for smaller local or foreign markets. **Major producers**[7] • Devondale Murray Goulburn Co-operative Co. Ltd (MGC) (Australian dairy farmers' cooperative) • Lion Pty Ltd (subsidiary of Japanese Kirin Holdings Company Ltd) • Parmalat Australia Pty Ltd (subsidiary of Parmalat Belgium SA) • Fonterra Australia Pty Ltd (subsidiary of New Zealand cooperative of dairy farmers) • Bega Cheese Co-operative Ltd (Australian-owned and publicly listed manufacturer) • Warrnambool Cheese and Butter (subsidiary of Canadian dairy company Saputo) • Tatura Milk Industries Ltd (subsidiary of Bega Cheese) • Peters Food Group Ltd • Unilever Australia (Holdings) Pty Ltd (subsidiary of UK Unilever PLC) • Bulla Dairy Foods (Australian-owned company) • Bon Appetit Australia Pty Ltd • Norco Co-operative Ltd • Sara Lee Group (Australia) Pty Ltd (subsidiary of Canadian's frozen food company McCain) • Weis Frozen Foods
GEOGRAPHICAL LOCATION	While all Australian states have dairy product processing operations, Victoria contributes the largest share, followed by New South Wales, in national dairy product output. The processing establishments are generally located near dairy farms or areas with high concentration of dairy farming activities and water availability.

[6] ABS, 2017, Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016.
[7] Enterprises listed according to their relative market share or significance in the sector.

AUTOMATION AND DIGITISATION	The level of automation varies depending on the type and scale of production. New process engineering practices and technologies are being integrated into diary operations to develop new product attributes and ingredients and improve existing processes. Computerised systems are used to streamline administrative and managerial operations and to contribute to improved marketing and distribution systems.

SUB-SECTOR NAME	**BAKERY PRODUCT MANUFACTURING**
SCOPE OF WORK	The sector includes businesses involved in the production of all range of bread products and bread dough; cakes, pastries and other similar bakery products such as artisan breads; and biscuits. Bakery producers operate from either factory-based premises or non-factory based locations such as retail bakeries, supermarket in-store bakeries or home.
PRODUCERS	The sector is characterised by a large number of small and medium-size producers, with many producing from non-factory-based premises for local or niche markets. In 2016 there were a total of 5,852 businesses in the sector.[8] There is a small number of large producers, yet they dominate the national bread and biscuits product output through the large number of sites operated across Australia. Often, these companies are multinational, and operate globally. Smaller producers, including those operating as franchisees, account for a larger number of businesses with smaller, individual and specialised output. Many specialise in niche areas as a means to differentiate themselves in the market, for example, artisan baking. **Major producers[9]** • Goodman Fielder Ltd (subsidiary of Singapore's Wilmar International and Hong Kong's First Pacific) • Patties Foods Ltd (Australian-owned company) • George Weston Foods (GWF) (a wholly owned subsidiary of Associated British Foods PLC [ABF]) • Sara Lee Australia (subsidiary of Canadian frozen food company McCain) • Arnott's Biscuits Holdings Pty Ltd (subsidiary of the US-based Campbell Soup Company Inc.) • Green's Foods Holdings Pty Ltd (Australian-owned company)
GEOGRAPHICAL LOCATION	Bread and bakery production occurs across all Australian states.

[8] ABS, 2017, Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016.
[9] Enterprises listed according to their relative market share or significance in the sector.

AUTOMATION AND DIGITISATION	The level of automation and integration of digital technology varies depending on the scale of production. In large operations, bread production is a fully mechanised process, with machines undertaking jobs from dough mixing to moulding and baking, as well as slicing and wrapping. Larger companies are also using computer-based systems and software to achieve better inventory and production planning, and improved marketing and distribution systems.

SUB-SECTOR NAME	**GRAIN PROCESSING, CEREAL AND PASTA MANUFACTURING**
SCOPE OF WORK	The sector includes businesses that process grains, vegetables or plants into a range of flour and meal products (primary processing activity) and businesses that manufacture prepared cereal foods, fresh and dried pasta, and prepared baking mixes.
PRODUCERS	In 2016 there were 94 grain processors in the sector, including three large businesses and smaller operators largely catering for niche and specialty products. Cereal and pasta manufacturing includes 259 businesses, both large multinational companies and small local manufacturers and resellers.[10] Smaller operators are usually specialist breakfast cereal and baking mix companies that concentrate on a specific range of products. **Major producers**[11] Grain processing: • Manildra Milling Pty Ltd (Australian family-owned business) • Food Investments Pty Ltd (subsidiary of the UK-based Associated British Foods PLC) • Allied Mills Australia Pty Ltd (subsidiary of Australia's GrainCorp Ltd) Cereal and pasta manufacturing: • Kellogg Australia (subsidiary of the US-based Kellogg Company) • Australian Health & Nutrition Association Limited (AHNAL) (Australian-owned company). Sanitarium Health & Wellbeing is the trading name of AHNAL and New Zealand Health Association Ltd, both wholly owned by the Seventh-day Adventist Church. • General Mills Australia (subsidiary of the US-based General Mills) • Nestle Australia Ltd (subsidiary of the Swiss Nestle SA Company) • Clearlight Investments Pty Ltd (Australian-owned private company)
GEOGRAPHICAL LOCATION	Flour and grain product manufacturers are located in both metropolitan and country areas. Metropolitan manufacturers are located close to downstream markets, such as wholesalers and food manufacturing industries. In country areas, manufacturers are located in wheat-growing areas to be close to key inputs. Likewise, large cereal and pasta producers tend to have operations

[10] ABS, 2017, Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016.
[11] Enterprises listed according to their relative market share or significance in the sector.

	near key inputs to reduce transport costs. Although sector producers are spread across Australia, New South Wales and Victoria have the largest share.
AUTOMATION AND DIGITISATION	The sector is characterised by the introduction of further automation of traditional processes and re-engineering or equipment design to increase efficiency and operating capacity. Other major developments relate to computerisation of processes and stocks, and improved packaging processes through adoption of automated equipment. Value-adding through the development of new products is a key driver of innovation in the sector.

SUB-SECTOR NAME	**FRUIT AND VEGETABLE PROCESSING**
SCOPE OF WORK	The sector represents businesses that process, bottle, can, preserve, quick freeze and quick dry fruit and vegetables, including dehydrated vegetable products, sauces, pickles and mixed meat and vegetable products.
PROCESSORS	The sector is comprised of 575 businesses, with the majority of them being small and medium-size operators including farmer cooperatives.[12] The sector is also characterised by a high level of vertical integration, particularly in the fruit processing segment. Where vertical integration is limited, processors enter into supply contracts with growers, which gives them a level of control on management functions related to quantity and quality of supply. Processors with large-scale operations in the sector are generally multinational companies. **Major processors**[13] • Simplot Australia (Holdings) Pty Ltd (subsidiary of US-based J.R. Simplot Company) • SPC Ardmona (SPC) (subsidiary of Coca-Cola Amatil) • McCain Foods (Australia) Pty Ltd (subsidiary of Canadian McCain Corporation) • Heinz Wattie's Pty Ltd (subsidiary of US-based Heinz) • One Harvest Pty Ltd (Australian, family-owned business based in Queensland)
GEOGRAPHICAL LOCATION	Production facilities are located in all Australian states, generally in areas with a high concentration of fruit and vegetable growers. New South Wales, Victoria and Queensland have the largest share of fruit and vegetable processors.
AUTOMATION AND DIGITISATION	The sector, particularly in relation to larger processors, integrates automated processes and digital systems that provide efficient control of inventory and management of production processes, and improved marketing and distribution systems.

[12] ABS, 2017, Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016.
[13] Enterprises listed according to their relative market share or significance in the sector.

SUB-SECTOR NAME	SUGAR MANUFACTURING
SCOPE OF WORK	The industry's major product is raw crystal sugar, which is sold to refineries both domestically and abroad. Approximately 95% of the Australian sugar produced comes from Queensland, with the balance coming from northern New South Wales. The Australian sugarcane industry is one of Australia's largest rural industries, with sugarcane being Queensland's largest agricultural crop. Up to 35 million tonnes of sugarcane is crushed annually. This can produce up to 4.5 million tonnes of raw sugar, 1 million tonnes of molasses and 10 million tonnes of bagasse annually. Approximately 85% of raw sugar is exported, generating up to $2.0 billion in export earnings. Sugar mills are self-sufficient in energy, burning the sugar processing by-product bagasse (which is a renewable fuel) to generate electricity and steam for factory operations. In addition, more than half of the electricity generated (around 500 GWh in 2014) is exported to the electricity network, supporting electricity infrastructure and reducing greenhouse gas emissions from power generation. The use of renewable bagasse for the production of 'green' energy reduces the nation's greenhouse gas emissions by over 1.5 million tonnes annually.
PRODUCERS	The sugar manufacturing sector is characterised by a small number of operators, which are a combination of publicly owned entities, private companies and cooperatives. Large producers include Australian-owned companies and global operators with a high level of vertical integration. **Major producers** Sugar manufacturing: • Wilmar Sugar Australia Ltd and its subsidiaries • Mackay Sugar Ltd (unlisted public company) • MP Australia Holdings Pty Ltd (trading as MSF Sugar, subsidiary of Thai-based Mitr Phol Sugar Corp) • Finasucre Investments (Australia) Pty Ltd (subsidiary of the Belgian sugar giant Societe Financiere des Sucres) • Tully Sugar Ltd (wholly owned subsidiary of Chinese agribusiness company COFCO) • Isis Central Mill (Australian-owned company; registered in 1894 by group of cane growers) • Sunshine Sugar (formed in June 2015 when NSW Sugar Milling Co-operative Ltd merged the refining and milling operation) • Sugar Australia (the leading supplier of quality refined sugar products, servicing the industrial and consumer sugar market, and market the CSR Sugar brand)
GEOGRAPHICAL LOCATION	Sugar processing facilities are located mainly along Australia's eastern coastline, from Mossman in far north Queensland to Grafton in northern New South Wales. There are approximately 4,400 cane-farming entities growing

	sugarcane on a total of 380,000 hectares annually, supplying 24 mills, owned by 8 separate milling companies. Sugar refinery facilities operate from Port Melbourne in Victoria to Mackay in Queensland. Chocolate and confectionery producers are located in most Australian states, with the majority in metropolitan areas in New South Wales and Victoria.
AUTOMATION AND DIGITISATION	Sugar manufacturing is characterised by extensive capital equipment; this capital equipment undergoes a renewal program in excess of $300 million every year. New technology adoption in the sector has been limited; however, this has improved in recent times with the introduction of foreign ownership and new capital.

SUB-SECTOR NAME	**CONFECTIONERY MANUFACTURING**
SCOPE OF WORK	The sector consists of companies that manufacture confectionery, chocolate or cocoa products, with or without sugar.
PRODUCERS	Chocolate and confectionery sector is represented by three large, globally operated producers and about 330 small and medium-size businesses.[14] Small producers have a significant role in small local and foreign markets and niche markets. **Major producers**[15] • Mondelez Australia Holdings Pty Ltd (subsidiary of the US-based Mondelez International Inc.) • Nestle Australia Ltd (subsidiary of Switzerland-based Nestle SA) • Mars Australia Pty Ltd (subsidiary of US-based Mars Inc.) • Ferrero Australia Pty Ltd (subsidiary of Luxembourg-based Ferrero International SA)
GEOGRAPHICAL LOCATION	Chocolate and confectionery producers are located in most Australian states, with the majority in metropolitan areas in New South Wales and Victoria.
AUTOMATION AND DIGITISATION	Chocolate and confectionary producers involve a high level of production automation and computer-controlled equipment for precise calibration and tolerances. Digital systems for improved supply chain arrangements, and better marketing and distribution systems, are also a driver of improvements in the sector.

SUB-SECTOR NAME	**SNACK FOOD MANUFACTURING**

[14] ABS, 2017, Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016.
[15] Enterprises listed according to their relative market share or significance in the sector.

SCOPE OF WORK	The sector includes companies that manufacture dried fruit and nut bars, muesli bars, protein bars, mixed nuts, potatoes/corn chips, extruded snacks, popcorn, pretzels and other sweet and savoury snack products. The primary distribution channels are supermarkets, milk bars and convenience stores.
PRODUCERS	The snack food sector is represented by large multinationals that specialise in snack food production, such as Frito-Lay, or that dedicate a small segment of their business to snack foods, like Nestle Australia; major grocery supermarkets through their own private labels; and small-scale producers that specialise in niche, lower-volume products, with many entering the market in recent years. **Major producers**[16] • Frito-Lay Australia Holdings Pty Ltd (subsidiary of US-based Frito-Lay Inc.) • Smith's Snackfoods Company (subsidiary of the multinational corporation PepsiCo) • Snack Brands Limited (privately owned Australian snack food company) • Woolworths Ltd (private labels) • Aldi Stores Supermarkets Pty Ltd (private labels) • Wesfarmers Ltd (private labels) • Manassen Foods Australia Pty Ltd • Sakata Rice Snacks Australia Pty Ltd • Stuart Alexander & Co Pty Ltd • San Remo Macaroni Co Pty Ltd • Rice Growers Ltd • Menora Foods Pty Ltd • Nestle Australia Ltd
GEOGRAPHICAL LOCATION	The majority of snack food establishments are located in metropolitan areas of Queensland, Victoria and New South Wales.
AUTOMATION AND DIGITISATION	Many snack food producers benefit from the introduction of automated, computer-controlled equipment, which provides increased efficiency and, in many cases, improved product quality.

SUB-SECTOR NAME	**FUNCTIONAL FOOD AND BEVERAGE MANUFACTURING**
SCOPE OF WORK	The sector encompasses companies that manufacture foods and drinks, including fermented foods, fortified, enriched or enhanced with vitamins and nutraceutical components such as probiotics (micro-organisms that provide

[16] Enterprises listed according to their relative market share or significance in the sector.

	digestive benefits), omega-3 (fish oil) extracts, and nutrients found in plants (such as soy beans, blueberries or grapes) and algae/seaweeds. Examples of functional foods and drinks include fruit juice, bread and pasta fortified with vitamins and minerals, fermented cheeses, fermented fruit and vegetables, Kombucha, margarine containing plant sterols, yoghurt with specific bacterial strains, health drinks, sports drinks and energy drinks.
PRODUCERS	Food and beverage companies are the primary producers of functional food. Nutraceutical/ingredient extraction may be conducted in-house, or it may be outsourced to specialised suppliers dedicated to food ingredient technology research and product development.
AUTOMATION AND DIGITISATION	Nutraceutical extraction involves specialised, sophisticated technologies. Research and development is often significant.

BEVERAGE MANUFACTURING

SUB-SECTOR NAME	**WINE AND SPIRIT MANUFACTURING**
SCOPE OF WORK	The sector includes businesses that process grapes into wine, fortified wine and wine-based alcoholic beverages. These products are sold in bulk, bottles or casks in domestic and export markets. In 2015, the Australian wine industry exported 789 million litres of wine generating $2.11 billion for the Australian economy.[17] Domestically, wine sales totalled $2.78 in 2014–2015.[18] The sector also includes businesses that produce spirit beverages from grapes (including recovered material from wine production), sugarcane or sugar beet products (including cane juices, molasses and sugar), grain, and ferments (yeast and yeast cultures). Spirit products include food grade ethanol, brandy, vodka, gin, whisky and liqueurs. An additional stream in this sector is the recovery of wine industry waste materials including marc (the solid remains of wine grapes after pressing of the grapes) and transforming the waste into value-added products, such as grape alcohol, chemical additives for wine, tannins, grape juice and various agricultural and horticultural products including stock feed, mulch, soil conditioner and organic fertiliser.
PROCESSORS	The sector comprises 1,902 wine businesses, including a few large producers, several medium-size businesses and many small family-owned businesses.

[17] Wine Australia 2015, *Wine Export Approval Report*, Moving Annual Total (MAT) to December 2014.
[18] Wine Australia 2016, *State of Australia Wine*, March 2016.

	The sector includes also more than 49 spirit producers.[19] The majority are non-employing or small producers that make boutique spirits, with many promoting themselves as tourism destinations. **Major processors[20]** Wine processors: • Accolade Wines Holdings Australia Pty Ltd (private equity ownership, Australian Wine producer, largest winery in the southern hemisphere) • Casella Wines Pty Ltd (Australia's largest family owned winery, also distributor of a craft beer) • Treasury Wine Estates Ltd (TWE) (Australian-owned producer and distributor of wine with global operations) • Pernod Ricard Pacific Holding Pty Ltd (subsidiary of France-based spirits and wine giant Pernod Ricard SA, Australian winemaker, distributor of a range of well-known spirit brands) • Australian Vintage Limited (AVL) • Kingston Estate Wines • De Bortoli Wines Spirit producers: • Carlton & United Breweries CUB (a subsidiary of ABInbev) • Bacardi Lion (joint venture of Bacardi and Lion) • Diageo Australia (foreign-owned public company, distributor of beer, spirits and a small portfolio of premium Champagne) • Beam Global Australia (subsidiary of the US-based Beam Inc.) • Vok Beverages (independently owned and operated Australian alcoholic beverage company) • Brown-Forman Australia (subsidiary of the US-based Brown-Forman spirit company) • Suntory Australia (subsidiary of Japan-based Suntory Liquors Ltd) • Campari Australia (subsidiary of Italy-based Gruppo Campari) • Asahi Holdings (Australia) Pty Ltd (previously Independent Distillers, producer and distributor of a range of RTD products, spirits and craft beers) • ONEBEV (independently owned Australian alcoholic beverage company) • Coca-Cola Amatil Limited (CCA) (subsidiary of Beam Inc., distributor of a range of spirit, cider and RTD products) • Lion Pty Ltd (subsidiary of Japanese Kirin Brewing Company, producer and distributor of a range of wine, cider and beer products)
GEOGRAPHICAL LOCATION	Wine production facilities are located at or near vineyards in all Australian states, with concentrations in regions like the Barossa Valley, McLaren Vale, Clare Valley, Riverland, Coonawarra, Eden Valley and Adelaide Hills in South Australia, or Sunraysia, Yarra Valley, Mornington Peninsula, Heathcote, Western District, Rutherglen and Beechworth in Victoria. In New South Wales, winery regions include the Hunter Valley, Great Dividing

[19] ABS, 2017, Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016.
[20] Enterprises listed according to their relative market share or significance in the sector.

	Range, Orange, Forbes, and Griffith. In Western Australia, the regions include the Margaret River, Frankland River, Mount Barker and Swan Valley. There are a number of spirit manufacturing enterprises in New South Wales, Queensland and Victoria. Tasmania has some world-recognised whisky distilleries, while Queensland and South Australia have some of the oldest and largest.
AUTOMATION AND DIGITISATION	The sector, particularly in relation to larger processors, integrates automated processes and digital systems that provide better quality control, greater product consistency, efficient control of inventory, management of production processes, and improved marketing and distribution systems. Smaller boutique producers often have a rich heritage and produce unique wine that reflects the character of wines of their region. These producers, while innovative and dedicated, are generally not in a financial position to automate but are often very active in the digital and/or social media space.

SUB-SECTOR NAME	**BEER MANUFACTURING**
SCOPE OF WORK	Businesses in this sector manufacture keg, bottled and canned beer in a range of varieties, such as ale, lager and stout. Businesses in this sector also produce cider, including apple cider, pear cider and a range of other non-traditional cider flavours.
PRODUCERS	The sector includes 364 producers, the majority of which are small, privately owned brewers producing premium beers.[21] There are a few large, multinational companies that dominate the market. Besides a few large-scale operations of major players such as Lion and CUB, there are about 100 small cider producers in Australia, serving niche markets. **Major producers and distributors[22]** • Lion Pty Ltd (subsidiary of the Japanese Kirin Brewery Company Ltd) • Carlton & United Breweries CUB (a subsidiary of ABInbev, the world's largest brewer) • Coopers Brewery Ltd • Australian Beer Company (ABCo) (joint venture of the Coca-Cola Amatil and Casella) • Gage Roads Brewing Co. Ltd (Woolworths has 25% stake in the company) • Asahi Holdings (Australia) Pty Ltd
GEOGRAPHICAL LOCATION	Although the majority of industry establishments are concentrated in Victoria, New South Wales and Western Australia operations can also be found in Queensland and South Australia and a smaller number in Tasmania.

[21] ABS, 2017, Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016.
[22] Enterprises listed according to their relative market share or significance in the sector.

AUTOMATION AND DIGITISATION	Computerisation is playing a major role in ensuring consistency in beverage products by monitoring ingredient flow and ensuring that these ingredients are mixed in correct quantities and at specified temperatures.

SUB-SECTOR NAME	**SOFT DRINKS MANUFACTURING**
SCOPE OF WORK	The sector includes businesses that produce canned or bottled soft drinks, (carbonated and non-carbonated), cordial, juice, syrup, sport drinks and energy drinks.
PRODUCERS	The sector is dominated by a few large, multinational companies but also contains 404 smaller, regionally-based operators.[23] Many of these operators produce private-label products and service niche market segments. **Major producers and distributors[24]** • Coca-Cola Amatil (Australia) Ltd (CCA) (subsidiary of US-based Coca-Cola Amatil Ltd) • Asahi Holdings (Australia) Pty (subsidiary of the Japanese-based company) • Tru Blu Beverages (Australian-owned private company)
GEOGRAPHICAL LOCATION	Soft drink manufacturers have facilities all over Australia, with key sites in Sydney, Melbourne, Adelaide and Perth.
AUTOMATION AND DIGITISATION	Soft drink manufacturing is characterised by extensive capital equipment, with the adoption of new technology in the sector being limited. Digital systems for improved supply chain arrangements, and better marketing and distribution systems are also adopted in the sector.

LIVESTOCK AND PET FEED MANUFACTURING

SUB-SECTOR NAME	**LIVESTOCK AND PET FEED MANUFACTURING**
SCOPE OF WORK	The sector includes businesses involved in the manufacture of stockfeed for animals and birds (including cereal meal, grain offal or crushed grain for use as fodder) and canned food for pets. Products are transported in bulk form to distribution centres across the country.
PRODUCERS	In 2016 there were 289 businesses in the sector,[25] with the majority being small operators. However, the stockfeed products market is dominated by a small number of large and medium producers. The level of vertical integration within the sector is relatively minor. Also, some of the major

[23] ABS, 2017, Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016.
[24] Enterprises listed according to their relative market share or significance in the sector.
[25] ABS, 2017, Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016.

	companies listed below are stockfeed or pet food divisions of global food and beverage corporations. **Major producers**[26] • Ridley Corporation Ltd (Australian-owned public company) • Mars Australia Pty Ltd (subsidiary of US-based Mars Inc.) • Riverina (Australia) Pty Ltd (subsidiary of Japan-based Mitsubishi Corporation) • Ingham Holdings (subsidiary of US-based private equity firm TPG) • Nestle Australia Ltd (subsidiary of Switzerland-based Nestle SA) • Ricegrowers Ltd (Australian-owned public company)
GEOGRAPHICAL LOCATION	The majority of stockfeed and canned pet food production facilities are located across New South Wales, Queensland and Victoria, generally in rural or country areas and close to key inputs such as grain mills, cattle farms or meat processing plants. A few facilities are also located in Western Australia and South Australia.
AUTOMATION AND DIGITISATION	The sector integrates high levels of automation and involves almost continuous operations. Processes and stock inventory and distribution are supported by computerised systems. Packaging also involves a variety of packaging equipment, including collators, conveyors, spiral chutes, carton drops and automated case packers.

PHARMACEUTICAL AND NUTRACEUTICAL PRODUCT MANUFACTURING

SUB-SECTOR NAME	**HUMAN PHARMACEUTICAL PRODUCT MANUFACTURING**
SCOPE OF WORK	The sector comprises of businesses that manufacture medicinal and pharmaceutical products for human use, including medicines, chemical or diagnostic testing agents, blood serums and biotech products. Recent developments include booming export markets, (mainly China), in the vitamins and food supplements categories, which has been a driver for improved company growth and opportunities. The sector includes organisations across a breadth of specialisations and manufacturing processes, with some being extremely specialised while others not quite so. The more complex the tasks within the production process, the less reliance there is on generic, transferable production skills such as Good Manufacturing Practice (GMP) and more reliance on internal training on organisation-specific equipment. For example, organisations producing sterile products would have extremely specialised processes in their production and focus on developing staff in one specific part of the process rather than developing generic skills across the entire process. These skills will be less transferrable across the industry. An organisation that produces product in an environment with less stringent requirements

[26] Enterprises listed according to their relative market share or significance in the sector.

	may be more reliant on industry-transferable skills with a focus on skill development that is not specific to their organisation. There is a need for basic GMP skills across a continuum in line with the complexity of the production process and a focus on general employability skills to assist in determining a candidate's aptitude for the industry.
PRODUCERS	The sector includes 360 producers,[27] including the following major producers, often multinational, pharmaceutical manufacturing companies that dominate the market.[28] • Pfizer Australia Holdings Pty Ltd (subsidiary of the US-based company Pfizer Inc.) • AstraZeneca Pty Ltd (subsidiary of the British-Swedish AstraZeneca PLC) • GlaxoSmithKline Holdings Pty Ltd (GSK Australia) (subsidiary of the British GlaxoSmithKline PLC [GSK]) • Aspen Pharmacare Australia Pty Ltd (subsidiary of the South Africa-based company Aspen Pharmacare Holdings Ltd) • CSL Ltd (Australian-based, public company) • Alphapharm (subsidiary of the foreign-owned company Mylan) • Sanofi-Aventis Australia Pty Ltd (subsidiary of the French Sanofi-Aventis company)
GEOGRAPHICAL LOCATION	New South Wales and Victoria account for two thirds of the business enterprises in this sector. Several businesses are also located in Queensland, Western Australia and South Australia, and a small number in Tasmania.
AUTOMATION AND DIGITISATION	The operations used in the sector range from simple processes of mixing ingredients and packaging, to complex procedures involving the latest capital-intensive technology. The sector is evolving in line with various technological advancements. As the job task becomes more complex there is greater focus on organisation-specific training and less on accredited training, especially with automation within the industry.

SUB-SECTOR NAME	**COMPLEMENTARY MEDICINE MANUFACTURING**
SCOPE OF WORK	The sector comprises businesses that manufacture vitamins, mineral and dietary supplements, herbal and homoeopathic medicines. Dietary supplements are products in form of liquid, capsule, powder or pill, which concentrate nutraceutical components derived from natural sources such as herbals, non-herbals and others.
PRODUCERS	The sector includes few highly specialised companies that produce their own branded dietary supplement products, such as Blackmores Ltd and Swisse

[27] ABS, 2017, Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016.
[28] Enterprises listed according to their relative market share or significance in the sector.

	Wellness Pty Ltd, and a number of small contract manufacturing businesses that produce a range of vitamins and supplements for pharmaceutical companies and consumers.
GEOGRAPHICAL LOCATION	Industry activity is concentrated in New South Wales, Victoria and Queensland to take advantage of the infrastructure provided and market size.
AUTOMATION AND DIGITISATION	The equipment for extracting nutraceutical components can be specialised and based on sophisticated technologies. Other operations in the sector range from simple processes of mixing ingredients and packaging, to complex procedures involving advanced technology. The sector is evolving in line with various technological advancements. As the job task becomes more complex, there is greater focus on organisation-specific training and less on accredited training, especially with automation within the industry.

SUB-SECTOR NAME	**VETERINARY PHARMACEUTICAL MANUFACTURING**
SCOPE OF WORK	This sector manufactures drugs, medicines, medicinal chemicals, vaccines, serums and other pharmaceutical products for veterinary use.
PRODUCERS	The sector includes 71 producers.[29] There are a few large, multinational companies that dominate the market, several medium-size businesses, and a larger number of small, family-owned producers. **Major producers**[30] • Zoetis (a global producer, spin off from Pfizer) • Virbac Australia Pty Ltd (subsidiary of France-based Virbac) • Intervet Australia (MSD Animal Health Australia) (part of the US-based pharmaceutical giant Merck & Co Inc.) • Jurox Pty Ltd (family-owned and Australia-based company) • Bayer Australia Ltd (subsidiary of German-based Bayer company) • Bioproperties Pty Ltd (Australia-owned company) • Elanco Australia (A division of Eli Lily and Company)
GEOGRAPHICAL LOCATION	The majority of industry establishments are concentrated in New South Wales but there are also production facilities in Victoria and Queensland.
AUTOMATION AND DIGITISATION	Veterinary pharmaceutical manufacturing generally involves complex processes using capital-intensive technology and equipment. The sector is evolving in line with various technological advancements. As the job task becomes more complex, there is greater focus on organisation-specific training and less on accredited training, especially with automation within the industry.

[29] ABS, 2017, Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016.
[30] Enterprises listed according to their relative market share or significance in the sector.

WHOLESALING AND RETAILING OF FOOD, BEVERAGE AND PHARMACEUTICAL PRODUCE

SUB-SECTOR NAME	WHOLESALING AND RETAILING
SCOPE OF WORK	This sector operates via two channels: ▪ retail and trade merchants ▪ wholesalers, manufacturers, importers and exporters. Wholesalers, manufacturers, importers and exporters sell, import and/or export large volumes of food, beverage and pharmaceutical produce, and distribute them through the retail sector or directly to the specialist industries.
PLAYERS	The sector is highly fragmented, comprising many geographically focused wholesalers and a large number of retail points. Large supermarkets and large retailers deal directly with manufacturers, reducing the need for an industry wholesaler.
GEOGRAPHICAL LOCATION	Food, beverage and pharmaceutical merchants operate throughout Australia.
AUTOMATION AND DIGITISATION	Manufacturers and merchants are increasingly reviewing the best ways of providing products, information and services to the customers; are adapting to new ways of collaborative logistics (computerised inventory control systems, tracking and reporting technologies) and digital communication.

Relevant stakeholders

The food, beverage and pharmaceutical industry sector is represented by about 55 peak organisations at a national and state level. These organisations include over 35 industry and industry sub-sectors associations, about 10 industry services bodies including R&D, and a small number of professional associations, employee associations and regulatory bodies. There are also over 80 local wine region associations focused on the promotion of wine from their defined wine regions.

Table 1: Relative number of industry peak bodies.

CATEGORY	NUMBER
Industry associations	7
Industry sub-sector associations	28
Industry services bodies	6
Industry R&D services bodies	4
Employee associations	3
Regulatory bodies	4
Industry standards body	1
Professional association	2
Total	**55**

Table 2: Peak industry organisations.

CATEGORIES – PEAK INDUSTRY ORGANISATIONS	GEOGRAPHICAL REPRESENTATION
INDUSTRY SECTOR ASSOCIATIONS	
Ai Group	NATIONAL
Australian Food and Grocery Council (AFGC)	NATIONAL
Food Technology Association of Australia	NATIONAL
Foodservice Industry Association	NATIONAL
Food and Beverage Importers Association	NATIONAL
Foodservice Suppliers Association Australia (FSAA)	NATIONAL
Food Industries Association of Queensland (FIAQ)	QLD
INDUSTRY SUB-SECTOR ASSOCIATIONS	
DAIRY	
Australian Dairy Products Federation (ADPF)	NATIONAL
Dairy Australia	NATIONAL
Dairy Industry Association of Australia Inc (DIAA)	NATIONAL
National Centre for Dairy Education (NCDE)	NATIONAL

CATEGORIES – PEAK INDUSTRY ORGANISATIONS	GEOGRAPHICAL REPRESENTATION
BAKERY	
Australian Society of Baking	NATIONAL
Baking Association of Australia	NATIONAL
National Baking Industry Association (NBIA)	NATIONAL
SUGAR	
Australian Sugar Industry Alliance	NATIONAL
Australian Sugar Milling Council	NATIONAL
SOFT DRINKS	
Australian Beverages Council	NATIONAL
BEER	
Craft Beer Industry Association	NATIONAL
Brewers Association of Australia and New Zealand	NATIONAL
Cider Australia	NATIONAL
WINE	
Australian Vignerons	NATIONAL
Winemakers' Federation of Australia	NATIONAL
NSW Wine Industry Association	NSW
Queensland Wine Industry Association	QLD
South Australian Wine Industry Association	SA
Wine Grape Council of South Australia	SA
Wine Victoria	VIC
Wines of WA	WA
SPIRITS	
Distilled Spirits Industry Council of Australia (DSICA)	NATIONAL
Australian Distillers Association	NATIONAL
PHARMACEUTICAL	
Medicines Australia (MA)	NATIONAL
Generic and Biosimilar Medicines Association (GBMA)	NATIONAL
Complementary Medicines Australia	NATIONAL
Australian Self-Medication Industry Association	NATIONAL
AusBiotech	NATIONAL
The Pharmacy Guild of Australia	NATIONAL
INDUSTRY R & D SERVICES BODIES	

CATEGORIES – PEAK INDUSTRY ORGANISATIONS	GEOGRAPHICAL REPRESENTATION
Dairy Innovation Australia Limited (DIAL)	NATIONAL
Sugar Research Australia (SRA)	NATIONAL
Sugar Research Institute	NATIONAL
Grape and Wine Research and Development Corporation	NATIONAL
Meat and Livestock Australia	NATIONAL
Grains Research and Development Corporation	NATIONAL
Food Agility Cooperative Research Centre (CRC)	NATIONAL
EMPLOYEE REPRESENTATIVE ORGANISATIONS	
Australian Manufacturing Workers' Union	NATIONAL
Breweries and Bottleyards Employees' Industrial Union of Workers of Western Australia	WA
National Union of Workers	NATIONAL
INDUSTRY SERVICES BODIES	
Food Innovation Australia Limited (FIAL)	NATIONAL
The Allergen Bureau	NATIONAL
Medical Technology and Pharmaceuticals Growth Centre (MTPConnect)	NATIONAL
Nutrition Australia	NATIONAL
Wine Grapes Marketing Board	NATIONAL
Queensland Sugar Limited	QLD
Sugar Terminals Limited	QLD
INDUSTRY STANDARDS BODIES	
Food Standards Australia New Zealand	NATIONAL
Standards Australia	NATIONAL
PROFESSIONAL ASSOCIATION	
Australian Society of Sugarcane Technologists	NATIONAL
Australian Society of Viticulture and Oenology	NATIONAL
REGULATORY BODIES	
Australian Grape and Wine Authority (Wine Australia)	NATIONAL
Pharmaceutical Benefits Advisory Committee (PBAC)	NATIONAL
Therapeutic Goods Administration	NATIONAL
Food Standards Australia and New Zealand	NATIONAL

CATEGORIES – PEAK INDUSTRY ORGANISATIONS	GEOGRAPHICAL REPRESENTATION
Standards Australia	NATIONAL
ACT Health	ACT
Northern Territory Department of Health	NT
New South Wales Food Authority	NSW
VineHealth Australia	SA
Dairy Authority of South Australia	SA
South Australian Department of Health	SA
Queensland Department of Health	QLD
Safe Food Production Queensland	QLD
Tasmanian Department of Health and Human Service	TAS
Dairy Food Safety Victoria	VIC
PrimeSafe	VIC
Victorian Department of Health and Human Services	VIC
Western Australian Department of Health	WA

Industry and occupational regulations and standards

Industry regulations and standards

Australian food, beverage and pharmaceutical industry operates under high level of regulation.

Food Standards Australia New Zealand

All food and beverage manufacturing operations are subject to national food standards and food safety assurance systems enforced by Food Standards Australia New Zealand (FSANZ). The Food Standards Code (The Code) represents the uniform law governing Australian food and beverage production.

The Code describes appropriate labelling requirements, provides specific definitions of products, details the composition of products and permitted ingredients and outlines approved processing methods.

All genetically modified (GM) foods intended for sale in Australia and New Zealand must also undergo a safety assessment by FSANZ. FSANZ will not approve a GM food unless it is safe to eat.

Likewise, businesses manufacturing functional foods and drink must comply with all requirements under The Code that are relevant to content formulation and nutrition, health and related claims made on labels or in advertisements.

The industry is likely to be affected by further regulation changes related to country of origin labelling laws due to hepatitis outbreaks in February 2015. Under the proposed changes, manufacturers will need to explicitly state where ingredients have come from.

Food safety practices are also enforced by local councils and environmental health offices. These systems are applicable to local producers.

Producer's licence

A producer of liquor who wants to sell their liquor is required to hold a producer's licence or equivalent licence under the respective state/territory liquor licensing legislation.

Wine industry regulations

The wine industry has stand-alone regulations in relation to geographical terms, labels and exports under the *Australian Grape and Wine Authority Act 2013* and *Australian Grape and Wine Authority Regulations 1981.*

Industry/customer standards

The food and beverage manufacturing sector is also subject to many customer food standard requirements, including Woolworths Quality Assurance (WQA) Standard, and international food safety standards including the BRC Global Standard for Food Safety and the IFS International Food Safety Standard.

Australian Consumer Law

All nutrition content and health claims of functional food and drink products must be factually correct and substantiated through scientific research papers or clinical trials to avoid misleading consumers and breach Australian Consumer Law.

Australian Packaging Covenant

Businesses signatory to the Australian Packaging Covenant, an agreement between government, industry and community groups, are obliged to find and fund solutions to address packaging sustainability issues.

Sugar industry regulations

In the past, the Queensland Government played a central role in forming industry policy and regulations in the sugar industry in relation to controlling price, sugarcane plantation areas, and compulsory sale of all sugar to Queensland Sugar Limited (QSL) and mills' licence permits. In recent years, this sector has become more open and transparent. Early in 2014, QSL was removed as the only option for sugar milling companies to market their sugar. As a result, most major sugar companies decided to break ties with QSL from 2017, creating their own marketing and export channels. In response to cane grower concerns regarding changes to sugar marketing arrangements in Australia, a federal government-established taskforce released a report in 2015, recommending the creation and implementation of a mandatory code of conduct for the Australian sugar industry. Subsequently, the *Sugar Industry (Real Choice in Marketing) Amendment Act 2015* was passed in the Queensland Parliament, providing Queensland cane growers the right to choose who sells and prices Grower Economic Interest (GEI) sugar, and permitting arbitration if required.[31]

Excise compliance

The alcoholic beverage sector is subject to excise regulations that require producers to measure and sample the alcohol content of the product they produce to calculate the excise that is payable. A licence from the Australian Taxation Office (ATO) is required to distil alcoholic spirits in Australia. This licence imposes several obligations to ensure spirit products are kept secure, accounted and excise duty is paid when due. The ATO requires significant and adequate records for all excisable products to show these obligations have been met.

Export licence

Wine producers and exporters have to obtain an export licence from the Australian Grape and Wine Authority (AGWA). The regulation of wine exports is primarily to ensure the quality of Australian products marketed overseas. AGWA also oversees labelling requirements for wine producers to ensure labels include the variety of grapes used and regional zones of production.

Advertising and packaging regulations

Alcohol beverage advertising and packaging also needs to be consistent with other applicable laws and codes, for example:

- federal competition and consumer legislation
- state/territory fair trading legislation
- Alcohol Beverages Advertising Code
- Australian Association of National Advertisers (AANA) Code of Ethics
- Commercial Television Industry Code of Practice
- Commercial Radio Code of Practice
- Outdoor Media Association Code of Ethics.

Environmental protection measures

Food and beverage manufacturers must adhere to national and state environment protection measures as do all businesses; however, there are particular challenges in relation to the discharge of waste into waterways and chemical emissions in the air caused by fermentation reactions in production.

[31] QSL, 2016, 'Developments in the Queensland export sugar industry', <*http://www.qsl.com.au/developments-queensland-export-sugar-industry/fast-facts*>.

Pharmaceuticals regulations

Regulation of pharmaceuticals in Australia is overseen by the federal government in relation to the quality, safety, listing and pricing, patent protection, clinical trials, and efficacy of therapeutic goods supplied in Australia through the following:

- Therapeutic Goods Administration (TGA)
- Australian Register of Therapeutic Goods (ARTG)
- Advisory Committee on Prescription Medicines
- Good Manufacturing Practice (GMP)
- Advisory Committee on the Safety of Medicines
- Pharmaceutical Benefits Scheme (PBS)
- Pharmaceutical Benefits Advisory Committee (PBAC)
- IP Australia
- Federal Drugs Administration (FDA) USA
- Medicine Australia
- Pharmaceutical Inspection Cooperation Scheme (PICS)
- European Medicines Agency (EU).

The advertising of therapeutic goods, including complementary medicines, is subject to the advertising requirements of the *Therapeutic Goods Act 1989*, which adopts the *Therapeutic Goods Advertising Code* (TGAC) and the supporting Regulations, the *Competition and Consumer Act 2010* and other relevant laws.

The state governments play an important role in the control of pharmaceutical product distribution through their scheduling systems. The industry is also subject to self-regulation by Medicine Australia through an internationally recognised code of conduct.

Companies who export or have multinational operations are also subject to regulations of various countries and unions (such as the FDA in the USA and EMA in the European Union), along with other sovereign agencies, depending on location of exports or operations.

Complementary medicines regulations

Complementary medicines are regulated under the *Therapeutic Goods Act 1989*. In addition, the Australian Regulatory Guidelines for Complementary Medicines (ARGCM) provides detail on the regulation of complementary medicines and assists sponsors to meet their legislative obligations. Business will also need to consider whether their product needs to be listed or registered with the Therapeutic Goods Administration (TGA).

The TGA inspects manufacturers on an ongoing basis for compliance with good manufacturing practice and undertakes monitoring of safety, quality and efficacy of listed, registered and included therapeutic goods once they are on the market.

Therapeutic goods available on, and sold through, international websites are not regulated by the TGA.

Alcoholic product retail regulations

The retail sale of alcohol products is heavily regulated, requiring retailers and hospitality venues to obtain licences to sell alcohol within the hours stipulated under the licences and to develop and implement management plans to identify and control risks associated with the sale of alcohol.

Regulated occupations in the industry

Regulated occupations have legal (or industry) requirements or restrictions to perform the work. Regulated occupations require a licence to practice from, or registration by, a professional association or occupational licensing authority.

There are some occupations specific to this industry sector that require licensing and/or registration before employment. The industry also employs a wide range of trade licenced occupations, including electricians, plumbers and forklift operators.

Challenges and opportunities in the sector

Australian food, beverage and pharmaceutical industry sector operates in a dynamic environment shaped by a range of policy frameworks including international trade policies and biofuel policies, environmental challenges, and market factors such as food production, trade and food prices. The challenges and opportunities for growth that relate to these factors are discussed below.

GOVERNMENT POLICIES

Food manufacturing, along with the agriculture sector, is at the forefront of government policy agenda in Australia, prioritising it as a growth sector. Opportunities in the sector are provided by increasing significance of global food security and higher food demand in expanding markets, such as those in the Asia Pacific region. The Australian Government facilitates the sector's growth through a range of initiatives including the following:

- The Food and Agribusiness Industry Growth Centre – Food Innovation Australia Limited (FIAL)
- Agricultural Competitiveness White Paper
- MTP Connect.

Further global trade liberalisation through new Free Trade Agreements will enable increased 'tariff-free' access to a diverse range of overseas markets.

In addition, state governments have a focus on the agriculture and food sectors as critical contributors to local growth and export, leading to policies for state-based industry strategies and action plans.

The challenge for individual companies is to unlock commercial benefits from these government programs and agreements by becoming export ready, culturally literate and market savvy.

The food manufacturing sector can contribute alongside the forestry sector to the huge opportunity that Australia has to use renewable fuels in its energy sector. The sectors will benefit from clear government policies that support:

- hybrid systems based on production residues to deliver useful heat or electricity or gas for transportation and industrial heat
- subsidies to promote growth.

There is a need for a coherent energy policy as price rises for gas and electricity are undermining the competitiveness of the food and grocery manufacturing sector. The Australian Food and Grocery Council (AFGC) highlighted that '… Australian producers had little or no capacity to pass through

higher utility costs'.[32] AFGC's then CEO, Gary Dawson, further stated, 'Food and grocery processing is the lifeblood of many regional economies and higher gas costs have a direct impact on the profitability and competitiveness of food companies. If a food processing plant shuts down there is a direct flow on effect to farmers supplying that plant when they lose their key customer'.[33]

For the pharmaceutical sector, there is an ongoing work on changes to the regulation of therapeutic goods. A new legislation, the *Therapeutic Goods Amendment (2016 Measures No. 1) Bill 2016*, is expected to be passed in 2017 to provide improvements in registration approval processes and listing times. This means that Australian patients will get faster and earlier access to lifesaving, innovative medicines.

The TGA is currently undertaking reforms to the regulatory framework for complementary medicines. The reform aims to improve the regulatory controls for complementary medicines manufactured, supplied and/or exported from Australia to increase consumer protection and stimulate business innovation.[34]

The federal government legalised the use of medicinal cannabis through the *Narcotic Drugs Amendment Bill 2016* and states and territories regulate its cultivation, with Victoria having already harvested its first cannabis crop for medicinal use by people with epilepsy. These regulatory set ups offer new opportunities for agriculture and the manufacture of medicinal cannabis in Australia.

CLIMATE IMPACTS ON AGRICULTURAL CROP AND FOOD SUPPLY

The future of Australian food production, for many food categories, is reliant on the agricultural crop health and productivity where arable land and water resources become increasingly difficult constraints to crop production, and where the frequency and severity of climate variations may increase due to the effects of climate change.

There are opportunities for many food processing sectors to increase collaboration with breeders, horticultural and animal farms, and with research teams. This is to support decisions and develop more resilient crop varieties and large-scale farming systems for increased productivity, efficiency and optimisation of available resource utilisation.

MARKET AND TRADE

By 2050 the world's population is expected to reach 9.1 billion, 34 per cent higher than today. Global demand for food, feed and fibre is expected to grow by 70 per cent.[35]

Australia is well located to take advantage of the opportunities provided by higher food consumption in the Asia Pacific region in the future. However, there will be a need for a change to food production to fully capture these opportunities. At the industry level, this will require greater adaptation of our products to more diversified markets and targeted marketing of different product qualities to market segments where there is the greatest potential for value-adding.

The global food trends include:[36]

[32] Australian Food & Grocery Council, 2014, 'Gas market reform and increased supply urgently needed to reduce damaging impacts of higher gas prices', viewed April 2017, *<http://www.afgc.org.au/2014/07/gas-market-reform-and-increased-supply-urgently-needed-to-reduce-damaging-impacts-of-higher-gas-prices/>.*
[33] Ibid
[34] Therapeutic Goods Administration, 2017, 'Reforms to the regulatory framework for complementary medicines: assessment pathways', viewed April 2017, *<http://www.tga.gov.au/consultation/consultation-reforms-regulatory-framework-complementary-medicines-assessment-pathways>.*
[35] FAO, 2009, 'How to Feed the World in 2050', viewed April 2017, *<http://www.fao.org/fileadmin/templates/wsfs/docs/expert_paper/How_to_Feed_the_World_in_2050.pdf>.*
[36] Agrifood Skills Australia, 2015, *Environmental Scan 2015*.

- demand for transparency in food labelling and clear definitions for 'natural' and 'nutritious' food
- increasing demand for new flavours, more unusual fresh and nutritionally enhanced 'superfoods' as the interest in nutrition converges with the popularity of reality television cooking shows, and with growing incomes in developing nations, where well off individuals are prepared to pay a premium for quality food and ingredients created in clean environments
- a growing focus on healthier food options within Australia and Asia's middle-class, particularly on products that have reduced sugar, salt, fat, and are gluten-free:
    - people are becoming increasingly health conscious and interested in functional foods and complementary medicines as a way of managing aging health concerns such as weight and high cholesterol
    - this also includes the growing market for fermented foods and drinks
- growing attitudes towards alternative ingredients such as macro-algae (seaweed), micro-algae (spirulina and chlorella) and insects as a form of protein, omega oils, and mineral sources available in functional foods and complementary medicines
- growing importance of provenance and transparency for the Millennial generation (15–35 years) who are tech-savvy, experience-driven and less brand loyal than older consumers
- rapid growth in ready-meals because of non-traditional work patterns, changing family structures and declining importance of formal meal times
- repositioning and value-adding of traditional frozen foods (seafood and vegetables) to emphasise their superior nutritional content
- greater importance of minimising, reusing and recycling production waste
- a growing focus on preventing overconsumption – both in food, alcohol and packaging.

In addition, growing demand from Asian consumers continues to generate substantial sales for Australian vitamins and dietary supplements. The sales are also supported by the strong brand equity of the Australian leading players. Likewise, the market for intrinsically healthy foods and functional foods is experiencing remarkable growth and consumer interest.

The medicinal cannabis market, supported by the new regulations, offers new opportunities in Australia. Medical marijuana is already a rapidly growing business in Israel, the USA and Canada and many of those global companies are now positioning themselves for entry in Australia. Twenty-five companies have applied for licences to grow and manufacture medicinal cannabis in Australia in early 2017.[37]

Key points on the industry's international trade

Australia is a net exporter of processed food and beverage. Exports of processed food and beverages, excluding meat and seafood sectors, increased by 7.8 per cent to $25.9 billion in 2015–2016, with vegetables, fruits and nuts and beverage exports recording the highest growth. Imports increased by 13.1 per cent to $13.6 billion.[38] Imported products with the highest aggregate value at a national level were flour mill and cereal food products. Australian wine exports grew at the strongest rate in more than a decade in 2015, partly due to the depreciation of Australian currency and the subsequent boost to global competitiveness. The value of Australian wine exports increased by 7.8 per cent, while the volume increased by 4.9 per cent.[39] Despite the strong export growth, the average value of Australian wine exports per litre increased by only 3 per cent from AU$2.60 to AU$2.67. This is consistent with the industry commentary that overseas markets remain fiercely competitive

[37] ABC News, 22 February 2017, 'Medicinal cannabis market offers new opportunities for agriculture,' viewed April 2017, *<http://www.abc.net.au/news/2017-02-22/medicinal-cannabis-new-agricultural-opportUnity/8287346>.*
[38] ABARES, Agricultural commodity statistics 2016.
[39] Wine Australia, 2015, *Wine Export Approval Report*.

and the Australian dollar depreciation has not been a windfall for local producers as they try to build overseas sales.[40]

Conversely, Australia has a high dependence on imported medicinal and pharmaceutical products, particularly active ingredients. Imports increased by 8.6 per cent to $11.2 billion in 2016. Exports went up by 41 per cent to 3.4 billion in 2016 after a progressive drop during the previous years.[41] The pharmaceutical sector is moving to more competitive production processes, including automation and robotics as means of defining a competitive advantage in production, and supporting competition against international companies in both the domestic and export markets.

Many food and beverage manufacturing companies are engaged in exporting products directly from Australia or through an agent. A few are currently involved in other international relationships, such as importing goods or services or being involved in an international supply chain or outsourced part of their process. Many see opportunities and plan to expand overseas in the coming years. The most significant challenges for the manufacturing sector, including food and beverage, in doing business overseas includes:[42]

- high domestic costs in Australia
- adverse exchange rate movements
- increased international competition
- risk of financial or economic crisis in key overseas markets
- 'red tape' in Australia.

Additional challenges include:

- compliance and auditing costs related to international food safety standards and labelling requirements
- increased manufacturing competitiveness through production efficiency improvements, for example: lean and automation.

RESEARCH, INNOVATION AND APPLIED TECHNOLOGY

Technology is considered the greatest driver of future growth. Businesses in the food, beverage and pharmaceutical sector are adopting cloud technologies for strategic, 'transformation' purposes, to increase transparency and improve business models; use data and analytics to improve decision-making related to consumer insight, brand and product management and pricing; focus on product innovations (including healthier or functional foods); and increased customer acquisition and alternative sales and distribution channels.

Industry is supporting specific research and innovation organisations seeking to maximise industry potentials. Two such organisations include:

- The Food Agility Cooperative Research Centre (CRC), with 54 signed partners across food, technology and research sectors supported by various governments, research providers, industry networks and regional development centres. 'The CRC will integrate the agile culture and processes of the digital economy through a whole-of-value-chain lens for fresh and processed food.'[43]

[40] Winetitles Media, 2016, *Australian and New Zealand Wine Industry Directory 2016*, 34th annual edn.
[41] ABS International Trade in Goods and Services, Australia, Dec 2016 Cat No 5368**.**
[42] Austrade, 2016,' Industry profile report: manufacturing', *Australia's International Business Survey*, viewed April 2017, *<http://www.austrade.gov.au/ArticleDocuments/5729/AIBS2016_IR_Manufacturing.pdf.aspx>.*
[43] Food Agility, 2017, 'Overview', viewed April 2017*, <http://www.foodagility.com/overview>.*

- The Australian Packaging Covenant Organisation, with the aim to change the culture of business to design more sustainable packaging and increase recycling rates. The covenant is an agreement between government and industry to find and fund solutions to address packaging sustainability issues.[44]

In pharmaceuticals and many other sectors, the introduction of automated processes through robotics is a means of creating a competitive advantage as productivity and output increase and employment costs decrease. This also allows for a more effective application of Just-in-time (JIT) production principles and minimised stock holdings.

By using industrial robots, food processors can improve quality, achieve greater accuracy and precision, eliminate contamination, increase productivity and improve workplace safety and risk of injury. Through advanced technology, such as new advanced visual inspection systems, the food processing industry can now address serious issues such as quality control, improved efficiency and productivity, worker safety, traceability and operating simplicity.

Breakthroughs continue in the R&D centres of both ingredient suppliers and equipment manufacturers. For food researchers, the objectives are to support the efficient and sustainable conversion of agricultural food materials into value-added ingredients and products.

Emerging food processing technologies include innovative approaches such as:[45,46]

- megasonics processing in the palm oil. olive, coconut and soybean industries
- gluten-free barley beer (BARLEYmax)
- long-chain omega3 oil from canola
- ready-to-eat high pressure thermal processed (HPTP) meals
- advances in safe, high-quality stabilised fruits and vegetables
- emerging non-thermal separation technologies
- novel membrane technologies
- next-gen extrusion processing
- component separation using chromatography
- pasteurisation using pulsed electric field
- sterilisation using cool plasma and high-pressure processing
- homogenisation and fortification using micro-fluidisation.

The opportunities for sourcing healthy foods, nutritional components and functional food development are extensive in Australia. Further research on materials unique to Australia, such as those listed below, will be able to provide scientific evidence of health benefits, confirm usable food ingredients, and offer further opportunities in a competitive environment:[47]

- bovine cartilage powder
- whey protein powder
- freeze-dried young barley grass or other fruit/vegetable powders

[44] Australian Packaging Covenant, 2017, 'About APC, viewed April 2017, *<http://www.packagingcovenant.org.au/pages/about-apc.html>.*

[45] Food & Beverage Industry News, 2016, 'CSIRO takes food manufacturing innovation to IFT16', viewed April 2017, *<https://foodmag.com.au/csiro-takes-food-manufacturing-innovation-to-ift16/>.*

[46] Department of Industry, Innovation, Science, Research and Tertiary Education, 2011, 'The potential role of enabling technologies in the future of the Australian food industry', viewed April 2017, *<http://www.industry.gov.au/industry/IndustrySectors/nanotechnology/Publications/Documents/WorkshopReport_Food.pdf#page13>.*

[47] Australian Trade Commission, 2016, 'Health and functional foods to Japan', viewed April 2017, *<http://www.austrade.gov.au/Australian/Export/Export-markets/Countries/Japan/Industries/Food-and-beverage-health-and-functional-foods>.*

- fish and shark-liver oil (EPA)
- herbs and spices derived from native plants that have proven health benefits.

There is also a substantial drive to enhance food and beverage packaging. Developments include barrier packaging, anti-microbial packaging, active packaging and smart packaging.

The Monash University-based Food Innovation Centre was funded in 2016 by the Victorian government to provide food and fibre businesses with access world-class product and packaging design and development services, sensory evaluation, consumer testing, visualisation, The Centre also provides new insights into Chinese consumer needs, regulatory requirements and better access to platforms to fast track export opportunities.[48] Likewise, RMIT Food Research and Innovation Centre received government funding assistance in 2016 to serve as an incubation facility for small to medium-size businesses, enabling them to test new product concepts, develop prototypes and turn their ideas into high value products and services.[49]

In the pharmaceutical sector, a first Centre for Commercialisation of Regenerative Medicine (CCRM) is being established in Melbourne to focus on developing technology, supporting new companies' creation and accelerating the commercialisation of regenerative medicine technologies and cell-based therapies.50

Challenges exist around the adoption/implementation of new technologies by food manufacturing firms, the commercialisation of food science and technology for food products, and consumer acceptance of 'designed' foods. Consumers indicate a preference for their views to be considered sufficiently early in the product development process. They also demand to be provided with enough information to be able to make safe and informed choices. However, there are examples of technologies, such as high-pressure pasteurisation, that have persevered through some initial resistance and are starting to have an impact on both the product development and plant operation sides of the food and beverage industry.

[48] Premier of Victoria, 2016, 'Food innovation centre opens new pathways to Asia', viewed April 2017, <*http://www.premier.vic.gov.au/food-innovation-centre-opens-new-pathways-to-asia/*>.
[49] Premier of Victoria, 2016, 'Innovation hub to grow Victoria's food and fibre', viewed April 2017, <*http://www.premier.vic.gov.au/innovation-hub-to-grow-victorias-food-and-fibre/*>.
[50] Premier of Victoria, 2016, 'Victorians to benefit from new regenerative medicine', viewed April 2017, <*http://www.premier.vic.gov.au/victorians-to-benefit-from-new-regenerative-medicine/*>.

C. EMPLOYMENT

Employment outlook

The Department of Employment projects that total employment in the food, beverage and pharmaceutical industry sector will grow by 2 per cent over the five years to November 2020 (Table 3).[51]

Positive employment growth is anticipated in all sub-sectors, except the sugar and confectionery manufacturing sector and the pharmaceutical and medicinal product sector, where employment will drop by 4.4 per cent and 4.2 per cent, respectively, in the next five years to 2020. A significant increase in employment is expected in fruit and vegetable processing and grain mill and cereal product manufacturing. While some sub-sectors within these sectors may anticipate high or some employment growth, others – such as the wine industry – allegedly do not plan for increased employment.

Table 3: Department of Employment Industry Projections – Five years to November 2020.[52]

INDUSTRY SECTOR	EMPLOYMENT LEVEL	EMPLOYMENT PROJECTIONS		
	Nov. 2015	Nov. 2020	Growth	
	('000)	('000)	('000)	(%)
Food manufacturing	**147**	**152.3**	**5.3**	**3.6**
Food product manufacturing,	30.7	31.5	0.8	2.5
Dairy product manufacturing	11.7	12.2	0.6	4.9
Fruit and vegetable processing	7.4	7.9	0.6	7.6
Grain mill and cereal product manufacturing	3.8	4.1	0.3	7.6
Bakery product manufacturing	63.4	66.0	2.7	4.2
Sugar and confectionery manufacturing	14.2	13.6	-0.6	-4.4
Other food product manufacturing	15.8	17.0	1.2	7.6
Beverage manufacturing	33.5	33.2	-0.3	-0.8
Pharmaceutical and medicinal product manufacturing	18.2	17.4	-0.8	-4.2
Total	**198.7**	**202.9**	**4.2**	**2.1**

[51] The Department's projections are based on based on the forecasts and projections set out in the Mid-Year Economic and Fiscal Outlook (MYEFO).

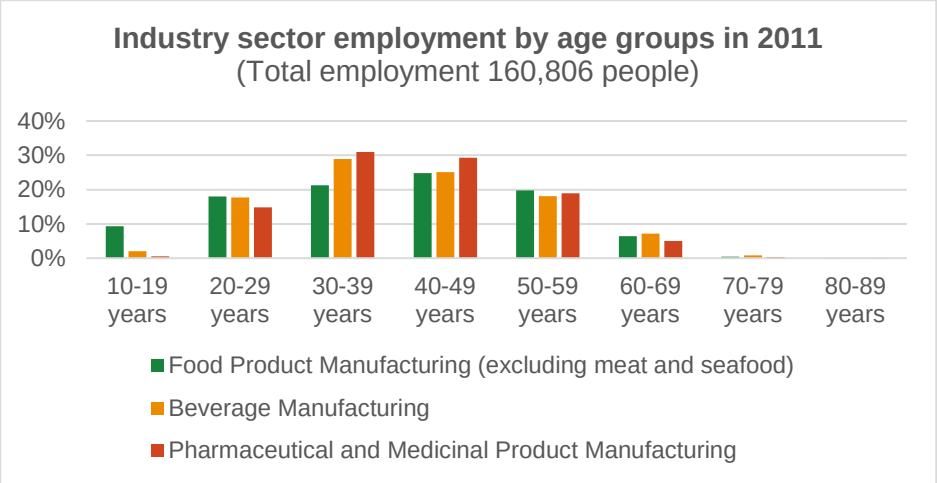
[52] Department of Employment, 2016, 'Industry employment projections – five years to November 2020', viewed April 2017, *<http://lmip.gov.au/default.aspx?LMIP/EmploymentProjections>.*

Description of workforce supply

The food, beverage and pharmaceutical manufacturing industry sector is a significant employer of people in regional and remote areas. ABS statistics indicate that the industry workforce in all sectors is aging and reaching retirement age in high numbers, presenting businesses with the challenge of an oncoming wave of retirement – i.e. skill shortages in the industry (Figure 1). Based on ABS data, about 26 per cent of the industry sector workforce (42,399 people) was aged 50 years and over in 2011. About 5 to 8 per cent of this group (the over-60s) is expected to have retired from the workforce by 2015 and an additional 19 per cent (the over-50s) is likely to retire over the next five years. The coming workforce retirement is likely to bring significant job vacancies across the sector and will mean significant efforts from employers to replenish these skills, particularly given challenges with attracting young people to the industry.

A key aspect of all the industry sectors is an aging workforce and the need to provide new job entrants with suitable pathways into a wine or food industry career.

Figure 1: Industry sector employment by age groups in 2011.[53]



Current employing occupations in the food, beverage and pharmaceutical industry sector include professions that are shown in Figures 2 to 4 below.

[53] 2011 Census of Population and Housing.

Figure 2: Occupations and their relative number in the food product manufacturing sector.[54]

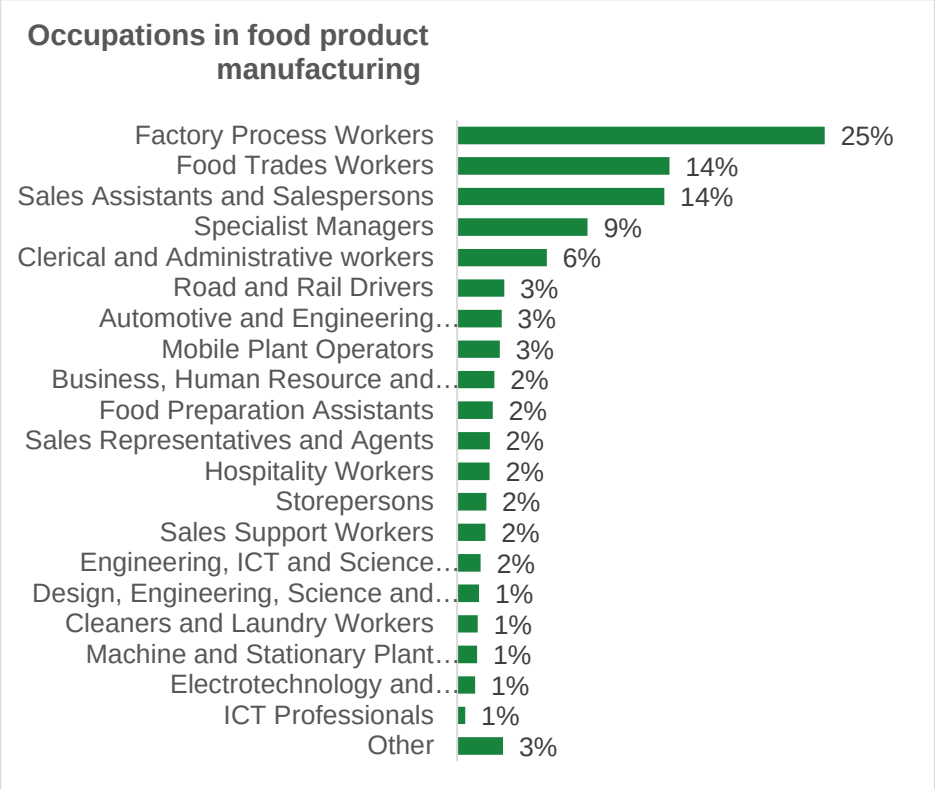


Figure 3: Occupations and their relative number in the beverage product manufacturing sector.[55]

[54] 2011 Census of Population and Housing.
[55] 2011 Census of Population and Housing.

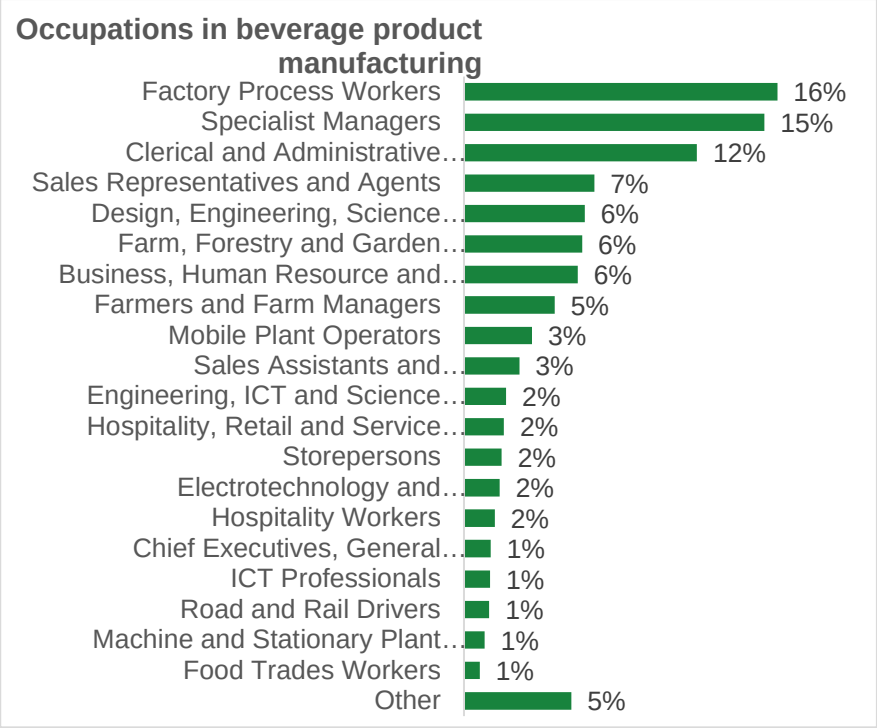
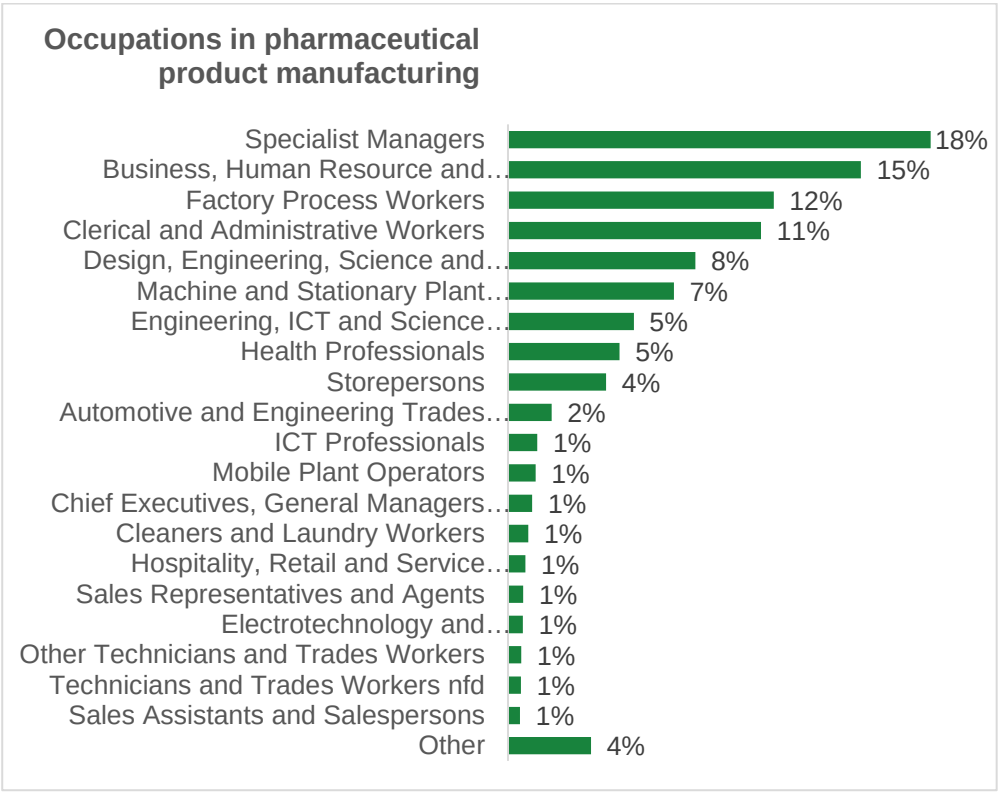


Figure 4: Occupations and their relative number in the pharmaceutical product manufacturing sector.[56]



As shown, a significant portion of the workforce occupies roles that are specific to the industry sub-sectors, including factory process workers such as food/beverage process workers, packers, product

[56] 2011 Census of Population and Housing.

assemblers and product quality controllers, and food trade workers such as bakers and pastry cooks. Also, a significant portion of the workforce is employed to undertake more general roles such as specialist managers (i.e. business administration managers, marketing and sales managers, production managers, supply and distribution managers), clerical and administrative work, and sales. The sector also employs a large number of people for a range of other jobs such as automotive and engineering trade workers and drivers. Professionals such as chemists, food and wine scientists, life scientists, medical laboratory scientists and industrial, mechanical and production engineers are key occupations in the industry as well.

For most of the technical skills and specific knowledge required in the industry sectors, learning occurs mainly on-the-job through workforce development activities provided by employers. This is because gaining industry-specific qualifications before employment remains a limited opportunity for young people and other potential new entrants. Thus, external supply of skilled workers is consistently low in the industry. In these conditions, the responsibility for attracting/engaging young people and existing workers to the sectors, and in specialist training, resides solely with employers.

To secure skilled employees, or recruit for positions with a general character (i.e. administrative workers, managers, drivers or engineering trade workers), employers need to compete in the labour market with other employers and industry sectors on the available workforce.

D. SKILLS OUTLOOK

Anticipating future skills needs in the food, beverage and pharmaceutical product industry is crucial to prepare for and to meet the new demands of food sustainability and product markets in Australia. Leading indicators of the current and future skills needs in the sector include:

- trends and/or estimates of workforce supply, skill shortages, employment growth or growing occupations
- future changes in workplace and job design that are driven by innovation at the business and/or industry level as a result of economic, technological, social and environmental factors as well as introduction of new policies and legislations.

This section identifies the priority skills needs in the food, beverage and pharmaceutical product manufacturing over the next four years (2017–2020) through an analysis of new and estimated future demands placed upon the industry. The section focuses on the skills needs that can benefit from improvement or development of national skills standards as opposed to market adjustment mechanisms designed to balance the supply and demand for a skilled workforce.

The industry expects that the priority skills projects identified in this section will be undertaken over 2017 and 2018 so that the skills can be developed and available before 2020. Refer to *Attachment A – IRC Training Product Review Plan 2017–2020* for the proposed schedule of priority skills projects and units of competency to be checked for currency and possibly reviewed as part of the four-year cycle.

The industry is currently undertaking the Retail Baking Project, which was funded and emerged from the 2016 Work Plan. The project is expected to be completed by the end of 2017. Refer to *Attachment B – Active IRC Projects* for the list of units that are have been developed and reviewed to date.

The 2017–2020 outlook for skills needs and priorities in the food, beverage and pharmaceutical product industry is shaped by a range of development trends and factors as outlined below.

FOOD AND BEVERAGE

Industry-specific priority skills

Priority skill 1	**Skill description**
Wine production, cellar door sales and cellar operations	Updated capability in the production of wine, cellar door sales and cellar operations. **Relevant occupations** Wine-making assistants, vineyard staff, sales assistants, cellar door staff, cellar production staff, customer service staff, managers and supervisors across all operations. **Drivers** The existing units of competency and qualifications no longer accurately align to industry expectations and the definition of outcomes within existing units of competency are insufficient to support the quality outcomes required by industry. There has been no significant review over the past 10 years, with re-endorsement based on units of competency

rolling over with minor updates. Individuals completing a training program based on the current units of competency and qualifications are no longer graduating with the level of skills industry requires and expects. The industry is less confident in the current training package elements and is reluctant to support them in their current form.

Small to medium-sized cellar door sales and cellar operations businesses are catering more for experiential tourism and providing gastronomic experiences.

Cellar operations and cellar door sales skills are embraced by other non-wine industries, including beer brewing and spirit distilling, so there is a need to consider these industries and their requirements within the existing units of competency to the extent that there is no detraction from the needs of the wine industry.

Training package solution[57]

Improvement of 2 existing qualifications in wine industry operations, including the removal of the overlap across the Certificate II and III.

Improvement of 135 units, including non-wine industry sub-sectors covering technology, operations, laboratory, people and 7 skill sets.

Development of 1 new qualification, 7 new units and 4 new skill sets.

Priority skill 2	**Skill description**
Food safety and advanced food safety auditing skills	Ability to plan, prepare for, conduct, and report on an internal/external audit against a food safety and quality management program and in line with current food safety regulations and practices. Knowledge of the current regulatory requirements, HACCP and quality assurance and food safety management systems. High level skills to manage food safety risks. **Relevant occupations** Food auditors, food and beverage employees involved in food safety management. **Drivers** The food industry is one of the most highly regulated industries. Changing and rigorous regulations place a greater need for compliance on all operators across all food and beverage sectors both internal to organisations and external through government departments and regulators. Food Standards Australian New Zealand (FSANZ) introduced the latest revised Food Standards Code in March 2016. Each state and territory also have their own regulations, as does the federal government when dealing with imports of foods. Food imports is an area regularly impacted by changing regulations in response to changing biosecurity risks.

[57] For full list or relevant qualifications and units of competency, refer to Attachment A.

Training package solutions

Review of 75 food, science and technology units of competency and 2 qualifications.

Priority skill 3

Traceability of product

Skill description

Capability to track any food and beverages through all stages of production, processing and distribution where movements can be traced one step backwards and one step forward at any point in the supply chain, as well as the identification of all food inputs including:

- raw materials
- additives
- other ingredients
- packaging.[58].

Relevant occupations

Food-processing staff, food safety auditors, supply chain operational staff, supervisors, managers.

Drivers

Increased presence of the Australian food and beverage businesses in the global marketplace and international expansion of businesses demands abilities to deal with global supply chain management and logistics including full traceability, especially in times of product recall.

Food Standards Australian and New Zealand (FSANZ) through food standards, place requirements on producers to be able to provide details about food on premises and its source on request and provides a Code that covers the 'one step back and one step forward' elements of traceability among other related elements.

Many food and beverage producers have introduced systems into their product lines to enable the end user to track product from the farm or production line to the table including all input products. Labelling is used to track prepared chicken from the farm[59] as is stamping on meat and RFID technology to track entire shipments along the supply chain. The complexity of tracking systems increases.

> 'Traceability enables food businesses to target the product(s) involved in a food safety problem, thereby minimising disruption to trade and reducing potential public health risks.'[60]

Not only will an effective product traceability system assist in isolating and preventing contaminated products reaching consumers in the event of a product recall, it will also help Australian food businesses in the

[58] FSANZ, 2017, 'Food traceability', viewed April 2017, <*http://www.foodstandards.gov.au/industry/safetystandards/traceability/Pages/default.aspx*>.

[59] Food & Beverage Industry News, 26 June 2016, 'Aussie poultry producer introduces labelling tracking food from paddock to plate', viewed April 2017, <*https://foodmag.com.au/aussie-poultry-producer-introduces-labelling-tracking-food-from-paddock-to-plate/*>.

[60] Holmes, L., 7 December 2012, 'The importance of traceability in your supply chain', *Food & Beverage Industry News*, viewed April 2017, <*https://foodmag.com.au/the-importance-of-traceability-in-your-supply-chain/*>.

development of sound risk management strategies and protect their brands.

Training package solution

Development of food and beverage-specific Training Package components in support of food traceability. The number of units to be imported/developed are to be identified during the review and Case for Change development.

Review of 4 technology (FDFTEC) units of competency.

Priority skill 4

Innovation in product development and food packaging

Skill description

Capability to implement and manage innovation in the development of products responsive to customer demands, industry challenges and potential opportunities.

Innovative approach to packaging to support new product development and other industry opportunities.

Occupations affected

Managers, supervisors, production staff, sales and marketing personnel, logistics personnel.

Drivers

Higher business targets for efficiency, productivity and competitiveness achieved through innovative new products and packaging addressing industry-wide challenges while realising business opportunities.

Existing new product development and packaging innovation to maximise opportunities in new markets, supply channels and food and beverage categories. New process and technological developments in food and beverage product-making based on chemistry and microbiology discoveries off opportunities for existing food manufacturers.

Training package solutions

Review work roles across 5 existing qualifications.

Review 19 units of competency.

Development of up to 4 units of competency to address gaps in work roles as determined by review.

Priority skill 5

Food and beverage fermentation

Skill description

Technical capabilities for the development and manufacture of fermented food and beverages.

Occupations affected

Production staff, supervisors.

Drivers

Low-cost entry to market and growing demand for functional fermented food and drink products, small home-based and medium-sized businesses have started to appear in greater numbers. Occupational standards are required to support the growth in industry and ensure consistent and safe products are produced.

Consumers seeking fermented products also include those who are health conscious and others who need the products for health reasons.

Training package solutions

Review of 1 unit.

Development of 1 new qualification for food and beverage fermentation

Use of existing units (to be determined as part of the development process) and the development of new units – additional units to be identified for food fermentation at the time of functional review and development of Case for Change as part of the focus on new innovative segments and will include:

- types of fermentation
- fermented food and drink products and their preparation
- health benefits
- caring for their cultures.

Priority skill 7	Skill description
Work health and safety (WHS)	Skills across all WHS areas, including risk management.

Relevant occupations

WHS officers, managers, supervisors, production staff, other organisational staff.

Drivers

Work health and safety remains a focus across the sector. Risk management skills and knowledge across all occupations will be needed as processes and procedures change within production and other aspects of the industry.

Training package solutions

Review of 5 units of competency.

Update qualifications and units covering risk management across all occupations – units to be identified during the development of the Case for Change.

Cross-industry priority skills

Priority skill 6	Skill description
Higher-level strategic planning and management skills across the	Ability to develop strategic approaches and planning for value creation to increase exposure to value-added foods, such as 'ready-to-consume' produce in the key growth categories and to reduce exposure to the volatility of the food commodity price cycle.

food and beverage industry	Ability to design new capital structure strategies to achieve new funding sources and establish a stable capital base that supports plans to drive growth. Higher-level supply chain and logistics management skills, including risk management, to achieve lean, fast, reliable, transparent and collaborative relationships with key suppliers, customers and other companies, including competitors and research organisations, both domestically and internationally. Knowledge of local regulations in overseas markets as well as understanding of local culture, language and business practices. A requirement to develop skills around improved financial acumen and strategic planning, especially within the wine industry. **Related occupations** Managers **Drivers** Increased demand for Australia's quality food and beverage products from international markets (especially Asian markets) as well as domestic markets, which involves greater interaction with global supply chains and stronger online presence of business to sell and promote products. Growing adoption in some food industry sectors of vertical integration and other approaches, including marinated meats, red meats cooked in-store in the same manner of cooked chickens, and new cuts of meat[61] to add value to current operations. Examples of product diversification exist where food processors, particularly meat processors, are moving beyond traditional fresh foods into ready-made meals, providing prepared meals using various cuts of meat and vegetables.[62] The Food and Agribusiness Sector Competitiveness Plan identified '… innovative, cost effective and differentiated offerings that meet the wants and needs of Australian and International markets and consumers' as a key requirement for the sector'.[63] **Training package solution** Review of 15 units of competency across all qualifications. Identification of imported units of competency suitable for inclusion in skill sets and where suitable units are not identified, the development of new units of competency. Units to be identified during the review process and the development for a Case for Change.

[61] Beef Central, 2016, 'Top 10 Australian read meet food service / retail trends for 2016', viewed April 2017, <*http://www.beefcentral.com/trade/top-10-australian-red-meat-food-serviceretail-trends-for-2016/*>.

[62] ABC News, 7 December 2016, 'Rapid growth in ready-meals helps Andrews Meat Industries diversify food processing business in western Sydney', viewed April 2017, <*http://www.abc.net.au/news/2016-12-07/andrews-meat-industries-diversify-food-ready-made-meals/8099590?WT.mc_id=newsmail&WT.tsrc=Newsmail*>.

[63] Industry Growth Centre, 2016, *Food and Agribusiness – Sector Competitiveness Plan 2016,* pp.10–11.

Priority skill 8	Skill description
Advanced supply chain management skills to support the food and beverage industry	Ability to operate supply chain software tools, including basic software programming and development, to execute supply chain transactions, managing supplier relationships and controlling associated business processes. Ability to plan hardware operations, control and manage supply chain hardware systems. **Relevant occupations** Supply chain operational staff, supervisors, managers. **Drivers** Increased presence of the Australian food businesses in the global marketplace and international expansion requires abilities to deal with global supply chain management and logistics, including full traceability, enhanced inventory management and warehouse management. Many food producers have introduced systems into their product lines to enable the end user to track the product from the farm or production line to the table. Labelling is used to track prepared chicken from the farm,[64] as is stamping on meat and Radio-frequency identification (RFID) technology to track entire shipments along the supply chain. The complexity of tracking systems increases. Supply chain management is driven by two key technologies: software technology and hardware technology.[65] Software technology includes: • transaction processing • supply chain planning and collaboration • order tracking and delivery coordination • supply chain analytics. Hardware technology includes: • distribution and fulfilment operations, including automated equipment and robotics, bar code scanners and RFID • transportation such as Global Positioning Systems (GPS) and telematics and other possibilities such as drones. **Training package solution** Develop qualification/s for global supply chain management and logistics for the food and beverage industry, including rapid expansion of fast-moving consumer goods (FMCG) channels and online retailing, specifically for food and beverage production. The number of units to be

[64] Food & Beverage Industry News, 26 June 2016, 'Aussie poultry producer introduces labelling tracking food from paddock to plate', viewed April 2017, *<https://foodmag.com.au/aussie-poultry-producer-introduces-labelling-tracking-food-from-paddock-to-plate/>.*

[65] Myerson, P., August 2016, 'Supply chain technology brings the world closer together', *Industry Week,* viewed April 2017, *<http://www.industryweek.com/supply-chain/supply-chain-technology-brings-world-closer-together>.*

imported and/or developed are to be identified during the review and Case for Change development.

Priority skill 9	Skill description
Online sales and customer service skills for the food and beverage industry	Ability to understand market demands and respond with appropriate product development and other relevant marketing strategies, including brand development, to address emerging demand of existing and new markets. Ability to develop, implement and manage a suitable online presence to both promote and sell product across diverse markets including utilisation of online sales and payment systems. Building the skills around the back-end set-up of websites to sell online with ease of purchase for the user ensuring capability to assess online sales and secure access. Ability to respond to the needs of a diverse customer base with varying expectations through refined customer service skills, including knowledge of food and beverage products and online retailing, to enable appropriate interactions with international export markets. In addition, a focus on dealing with customer complaints and online enquiries. **Relevant occupations** Managers, supervisors, sales personnel, marketing personnel, customer service personnel. **Drivers** Opportunities exist for Australian producers across the food and beverage sectors to expand existing domestic markets and enter new international markets, particularly in the Asian regions. To realise opportunities, Australian producers need to develop capability in sales, marketing and customer service. **Training package solutions** Review of units across 7 qualifications. Develop/update Training Package components covering skills for online sales of food products, cultural competency and awareness of international market preferences for food products, presentation and transportation.

PHARMACEUTICALS

Industry-specific priority skills

Priority skill 1	Skill description
Pharmaceutical production skills across a range of functions and employment levels	Organisational capability development in the production of pharmaceutical products across varied occupational levels and functions. **Relevant occupations** Production staff, supervisors, packing staff, transport and logistics staff, suppliers (including technical service staff).

	Drivers The current units of competency, skill sets and qualifications no longer represent the skills needs of the pharmaceutical industry. Industry has provided feedback that because of this misalignment, there is limited formal vocational training using these qualifications despite there being a need for training. **Training package solutions** Review of the 5 existing qualifications and 22 units of competency. Development of new Training Package components and the potential rationalisation of qualifications, with the number to be determined during the review and development of the Case for Change.
Priority skill 2 Good Manufacturing Practice (GMP)	**Skill description** Capability to understand and apply GMP within pharmaceutical manufacturing. **Relevant occupations** Production staff, supervisors and managers. **Drivers** Pharmaceutical manufacturing is highly specialised, requiring differing degrees of training based on the complexity of the process. A more specialised process, such as Aseptic manufacturing, will have a focus on specialist training provided either in-house or by equipment suppliers where equipment may be specialised and the processes more complex. As the manufacturing process becomes less complex or specialised, the training requirements become more generic. The transference of skills is not easily achieved across the industry; however, GMP does provide a common base for production staff across the industry and is considered entry-level training.[66] **Training package solutions** Review of occupational standards to identify industry requirements for GMP and a review of the 5 qualifications and 22 units to identify GMP elements. Gaps identified during the review process will identify additional development work.
Priority skill 3 Pharmaceutical auditing and compliance skills	**Skill description** Auditing capability across the entire sector including all industry suppliers to ensure understanding and compliance to all relevant regulations through the end-to-end process. **Relevant occupations** Production staff, managers, supervisors, packing staff, transport and logistics staff, suppliers (including technical service staff).

[66] Face-to-face meetings with Melbourne-based companies.

Drivers

Further investment in compliance to meet the global trend towards transparency reporting, additional government requirements regarding the registration of medicines, recent scandals regarding bribery and corruption increasing the internal and external regulatory focus on payments, and increased scrutiny of relationships with third parties.

Australian manufacturers are required to comply with the Therapeutic Goods Administration (TGA) in Australia but as there is an extensive export market, they are also required to comply with regulatory requirements of target markets, including the Food and Drug Administration (FDA) in the USA, the European Medicines Agency (EMA) in the European Union, and the Pharmaceutical Inspection Cooperation Scheme (PICS). Satisfying the needs of all agencies is complex, with regular and extensive auditing across the industry. Internal auditors are required to ensure compliance, which, in turn, requires suitable training. All bodies that deal with the manufacturer along the supply chain, including suppliers of support services are also expected to understand and comply with relevant regulations.

Skills will need to adapt and respond to changing government policies and regulations, industry code of practices and WHS procedures.

Training package solutions

Review of occupational standards and alignment with existing units of competency and qualifications where possible. Where gaps exist, additional Training Package componenets will be developed. The number of units to be developed will be determined during the review of occupational standards, mapping and development of the Case for Change.

Cross-industry priority skills

Priority skill 4	Skill description
Advanced sales, marketing and customer service to support the pharmaceutical industry	Marketing and sale capabilities including market research, social media and marketing and brand development skills to promote health credentials to consumers and the broader community. Capability in the implementation and ongoing management and use of online portals for both wholesale and retail markets covering both the domestic and export markets. Retail knowledge of pharmaceutical products, sustainable productions systems and the health benefits of different pharmaceutical products. Skills required include: • use of online payment systems • marketing capability for marketing products using online systems, including knowledge of market preferences for products, presentation and transportation both domestically and internationally • refined customer service skills, including online retailing and communication particularly at the customer interface, to enable

appropriate interactions with domestic and international export markets.

Relevant occupations

Sales staff, marketing staff, managers.

Drivers

Growth strategies include expansion into new therapeutic areas, increases in sales and marketing capacities (integrating research and market access functions as well as building up market access and external affairs capabilities), the introduction of new products in portfolio pipelines and New Chemical Entities (NCEs), and restructuring to increase efficiencies and manage costs.

Developing countries present growth opportunities for the Australian pharmaceutical industry. Key will be the capability to produce and supply low-cost solutions in order to compete with global manufacturers and meet the cost sensitivities of the new markets.[67]

Training package solutions

Review of occupational standards and alignment with existing units of competency and qualifications where possible. Where gaps exist, additional Training Package components will be developed. The number of units to be developed will be determined during the review of occupational standards, mapping and development of the Case for Change.

Priority skill 5

Advanced leadership, management and risk management skills

Skill description

Ability to develop strategic approaches and planning for value creation to produce in the key growth product categories.

Ability to design alternative funding strategies to establish a stable capital base that supports plans to drive growth.

Higher-level skills in global supply chain and logistics management, including corporate risk management, to achieve lean, fast, reliable, transparent and collaborative relationships with key suppliers, customers and other companies, including competitors and research organisations both domestically and internationally.

Ability to plan and implement investment projects.

Knowledge of local regulations in overseas markets, as well as understanding of local culture, language and business practices.

Relevant occupations

Specialist managers, supervisors.

Drivers

Reliance on relationships and partnerships with other manufacturers, government, research bodies, customers and competitors is seeing a

[67] Medtech, December 2016, 'Biotechnology and pharmaceutical: sector competitiveness plan', *MTP Connect*, p.16.

strengthening of the priority on strategic alliances and joint ventures introducing additional risks to operations. Such relationships bring a higher level of planning to the organisation along with the need for a more sophisticated to leadership and management to extend beyond the individual organisation.

Training package solution

Review of 2 qualifications.

Development of skill set/s and units of competency as identified during the review and development of the Case for Change.

E. TRAINING PRODUCT REVIEW PLAN 2017–2020

The IRC Training Product Review Plan 2017–2020 for the Australian food, beverage and pharmaceutical product manufacturing industry sector is provided in Attachment A.

Time-critical projects

The criteria for outlining time-critical projects within the *FDF10 Food Processing Training Package* include workplace safety issues, regulatory needs, biosecurity issues (disease outbreak), and qualifications under VET Student Loans courses list that can benefit from improvement or development of national skills standards.

Proposed project	Time-critical issues
FOOD AND BEVERAGE	
Food safety and advanced food safety auditing skills	*Regulatory needs* The food industry is one of the most highly regulated industries. Food Standards Australian New Zealand (FSANZ) introduced the latest revised Food Standards Code in March 2016, which requires implementation. Food imports are also an area regularly impacted by changing regulations in response to changing biosecurity risks.

Proposed projects that will involve review or development of new units for qualifications under VET Student Loans include the following.

Proposed project	Improving VET Student Loans qualifications
FOOD AND BEVERAGE	
Food safety and advanced food safety auditing skills	FDF50311 Diploma of Food Science and Technology
Innovation in product development and food packaging	FDF50110 Diploma of Food Processing
PHARMACEUTICALS	
Pharmaceutical production skills across a range of functions and employment levels	FDF50210 Diploma of Pharmaceutical Manufacturing
Advanced leadership, management and risk management skills	FDF50210 Diploma of Pharmaceutical Manufacturing

Interdependencies

No training packages or IRCs' interdependencies were identified for the proposed projects in the training product review plan.

Existing Projects:

The following priority projects listed in the 2016–2019 Food, Beverage and Pharmaceutical IRC are currently being undertaken:

- Retail baking project
- Sugar project
- Rice processing project.

F. IRC SIGN-OFF

This IRC Skills Forecast and Proposed Schedule of Work was agreed as the result of a properly constituted IRC decision.

Signed for and on behalf of the **Food, Beverage and Pharmaceutical IRC** by its appointed Chair

Anne M Astin PSM PhD

(Name of Chair)

Signature of Chair

Date: 28 April 2017

ATTACHMENT A

IRC Training Product Review Plan 2017–2020 for the Food, Beverage and Pharmaceuticals Industry Sector

Relevant training package: *FDF10 Food Processing*

Contact details: Skills Impact Ltd, 559A Queensberry Street, North Melbourne, VIC, 3051

Date submitted to Department of Education and Training: 28 April 2017

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
2017	Wine production, cellar door sales and cellar operations	FDF20411 Certificate II in Wine Industry Operations FDF30411 Certificate III in Wine Industry Operations Diploma of Food and Wine Management – new Qualification	FDFFS2001A Implement the food safety program and procedures FDFOHS2001A Participate in OHS processes FDFOP2063A Apply quality systems and procedures FDFOP2064A Provide and apply workplace information FDFBP2001A Operate the bottle supply process FDFBP2002A Operate the carton erection process FDFBP2003A Operate the carton packing process FDFBP2005A Operate the electronic coding process FDFBP2009A Operate the bottle capsuling process FDFBP2010A Operate manual bottling and packaging processes

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFLAB2003A Perform basic packaging tests and inspections FDFOP2004A Clean and sanitise equipment FDFCEL2001A Perform oak handling activities FDFCEL2003A Operate the ion exchange process FDFCEL2004A Perform single column lees stripping (continuous still brandy) operations FDFCEL2009A Perform first distillation (pot still brandy) operations FDFCEL2011A Perform heat exchange operations FDFCEL2015A Perform must draining operations FDFCEL2016A Operate the crushing process FDFCEL2017A Prepare and make additions and finings FDFCEL2018A Carry out inert gas handling operations FDFCEL2019A Carry out transfer operations FDFCEL2020A Prepare and wax tanks **Wine grape growing** FDFWGG2001A Bench graft vines FDFWGG2002A Carry out potting operations FDFWGG2003A Hand prune vines FDFWGG2004A Undertake irrigation systems maintenance activities

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFWGG2008A Train vines FDFWGG2011A Install irrigation components FDFWGG2013A Deliver injection requirements FDFWGG2015A Support mechanical harvesting operations FDFWGG2019A Perform vertebrate pest control activities FDFWGG2021A Operate nursery cold storage facilities FDFWGG2022A Take and process vine cuttings FDFWGG2023A Carry out basic canopy maintenance FDFWGG2024A Pick grapes by hand FDFWGG2025A Plant vines by hand AHCCHM101A Follow basic chemical safety rules AHCCHM201A Apply chemicals under supervision AHCSOL201A Determine basic properties of soil and/or growing media FDFBP2004A Operate the bottle sealing process FDFBP2006A Operate traditional sparkling wine processes FDFBP2007A Operate the tirage and transfer process FDFBP2008A Perform packaging equipment changeover FDFBP2011A Operate the palletising process FDFOP2003A Clean equipment in place

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFOP2011A Conduct routine maintenance FDFOP2030A Operate a process control interface FDFCD2001A Conduct winery and or site tours FDFCD2002A Promote wine tourism information FDFCD2003A Evaluate wines (standard) FDFCD2004A Perform cellar door stock control procedure FDFCD2005A Sell cellar door products and services FDFCD2006A Conduct a standard product tasting FDFCEL2002A Perform fermentation operations FDFCEL2005A Operate the pressing process FDFCEL2006A Operate clarification by separation (centrifugation) process FDFCEL2007A Prepare and monitor wine cultures FDFCEL2008A Perform dual column distillation (continuous still brandy) operations FDFCEL2010A Operate the fine filtration process FDFCEL2012A Handle spirits FDFCEL2013A Operate the pressure leaf filtration process FDFCEL2014A Operate the rotary vacuum filtration process

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFCEL3001A Perform second distillation (pot still brandy) operations FDFLAB2001A Perform basic analytical tests FDFLAB2002A Perform basic microbiological tests FDFLAB2004A Prepare laboratory solutions and stains FDFLAB2005A Prepare and pour culture media FDFLAB2006A Record laboratory data FDFLAB2007A Standardise laboratory solutions FDFLAB2008A Analyse laboratory data FDFLAB2010A Prepare product or show samples FDFLAB2012A Maintain aseptic environment FDFWGG2005A Maintain callusing environment FDFWGG2006A Obtain and process rootlings FDFWGG2007A Tend containerised nursery plants FDFWGG2009A Operate specialised canopy management equipment FDFWGG2010A Field graft vines FDFWGG2012A Identify and treat nursery plant disorders FDFWGG2014A Operate the irrigation system FDFWGG2016A Install and maintain vine trellis FDFWGG2017A Recognise disorders and identify pests and diseases

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFWGG2018A Operate vineyard equipment FDFWGG2020A Carry out hot water treatment FDFWGG3013A Operate spreading and seeding equipment FDFOP1003A Carry out manual handling tasks FDFOP2005A Work in a socially diverse environment FDFOP2013A Apply sampling procedures FDFOP2016A Work in a food handling area for non-food handlers FDFOP2061A Use numerical applications in the workplace FDFOP2065A Work in confined spaces in the food and beverage industries FDFPPL2001A Participate in work teams and groups FDFWIN2001A Perform effectively in a wine industry workplace FDFWIN2002A Identify and control risks in own work FDFBP3001A Operate the bottle filling process FDFBP3002A Operate the labelling process FDFBP3003A Operate the softpack filling process FDFCD3001A Evaluate wines (advanced) FDFCD3002A Conduct a specialised product tasting FDFCD3003A Coordinate winery hospitality activities

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFCEL3002A Operate the continuous clarification by separation (flotation) process FDFCEL3003A Operate the concentration process FDFCEL3004A Perform de-aromatising, de-alcoholising or de-sulphuring operations FDFCEL3005A Perform rectification (continuous still) operations FDFFS3001A Monitor the implementation of quality and food safety programs FDFLAB2009A Perform packaging quality control procedures FDFLAB2011A Use basic laboratory equipment FDFLAB3001A Use computer technology for laboratory applications FDFLAB3002A Perform non-routine or specialised tests FDFLAB3003A Perform routine troubleshooting procedures FDFLAB3004A Check and maintain readiness of wine testing equipment FDFLAB3005A Perform instrumental tests or procedures on wine samples FDFOHS3001A Contribute to OHS processes FDFOP3002A Set up a production or packaging line for operation FDFOP3003A Operate interrelated processes in a production system FDFOP3004A Operate interrelated processes in a packaging system

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFPPL3001A Participate in improvement processes FDFPPL3002A Report on workplace performance FDFPPL3004A Lead work teams and groups FDFPPL3005A Participate in an audit process FDFTEC3001A Participate in a HACCP team FDFTEC3002A Implement the pest prevention program FDFTEC4008A Apply principles of food packaging FDFWGG3001A Apply chemicals and biological agents FDFWGG3002A Coordinate canopy management activities FDFWGG3003A Coordinate crop harvesting activities FDFWGG3004A Coordinate nursery activities FDFWGG3005A Perform field nursery activities FDFWGG3006A Coordinate hand pruning activities FDFWGG3007A Implement an irrigation schedule FDFWGG3008A Operate a mechanical harvester FDFWGG3009A Monitor and maintain nursery plants FDFWGG3010A Implement a soil management program FDFWGG3011A Perform shed nursery activities FDFWGG3012A Monitor and control vine disorders and damage

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			Total for review 135
			Analyse food production operations (**New**)
			Apply biological science principles to food production (**New**)
			Assess and analyse the influence of region and winemaking on classic grape varieties (**New**)
			Manage basic small winemaking processes (**New**)
			Manage the annual cycle for the production of wine grapes (**New**)
			Manage the evaluation process for regional foods (**New**)
			Manage the techniques of food processing and preservation (**New**)
			Total new units 7
			General financial understanding for the wine industry (**New**)
			Ability to analyse figures and make sales decisions for the wine industry (**New**)
			Project management for the wine industry (**New**)
			Social media and marketing and leadership for the wine industry (**New**)
			Total new skill sets 4
2017	Food safety and advanced food safety auditing skills	FDF40311 Certificate IV in Food Science and Technology FDF50311 Diploma of Food Science and Technology	FDFAU4001 Assess compliance with food safety programs FDFAU4002 Communicate and negotiate to conduct food safety audits FDFAU4003 Conduct food safety audits

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFAU4004 Identify, evaluate and control food safety hazards FDFCH4001 Carry out sampling and interpret tests for cheese production FDFCH4002 Produce acid-coagulated soft cheese FDFCH4003 Produce a range of rennet-coagulated cheeses FDFCH4004 Produce acid and heat coagulated cheese FDFFS2001 Implement the food safety program and procedures FDFFS3001 Monitor the implementation of quality and food safety programs FDFFS4001 Supervise and maintain a food safety plan FDFFS4002 Supervise and verify supporting programs for food safety FDFFST4001 Apply food processing technologies FDFFST4002 Monitor the development and implementation of a food QA system FDFFST4003 Apply digital technology in food processing FDFFST4004 Perform microbiological procedures in the food industry FDFFST4005 Document processes and procedures for a food product FDFFST4006 Apply food preservation technologies FDFFST4007 Establish operational requirements for a food processing enterprise

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFFST4008 Preserve food in cans or sealed containers FDFFST4009 Label foods according to legislative requirements FDFFST4010 Apply sensory analysis in food processing FDFFST4011 Apply the principles of nutrition to food processing FDFFST4012 Apply water management principles to the food industry FDFFST4020 Monitor manufacturing of market milk and related products FDFFST4021 Carry out sampling and testing of milk at receival FDFFST4022 Review standards and procedures for the preparation of milk for processing FDFFST4030 Review standards and procedures for the processing of chocolate and sugar-panned products FDFFST4031 Review standards and procedures for the processing of aerated confectioneries FDFFST4032 Review standards and procedures for the production of gums and jellies FDFFST4033 Review standards and procedures for the production of chocolate products FDFFST4034 Review standards and procedures for the processing of chocolate FDFFST4035 Review standards and procedures for the processing of high and low boil confectionery

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFFST4036 Review standards and procedures for the processing of confectionery products FDFFST4040 Review product safety and quality processes for chilled or frozen poultry product manufacturing FDFFST4041 Review product safety and quality standards and procedures for cooked poultry product manufacturing FDFFST4042 Review product safety and quality procedures for egg based product manufacturing FDFFST4050 Review product safety and quality procedures for processing of fruit, vegetables & other produce FDFFST4051 Review product safety and quality procedures for fish and seafood products FDFFST4052 Review production system for manufacturing and processing of edible fats and oils FDFFST4053 Review processes for manufacturing, packaging and testing of beverage products FDFFST4054 Review product safety procedures for manufacturing of cereal products FDFWHS4002 Maintain work health and safety processes FDFOP2015 Apply principles of statistical process control FDFOP2030 Operate a process control interface

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFOP2061 Use numerical applications in the workplace FDFPPL4005 Establish process capability FDFTEC4003 Control food contamination and spoilage FDFTEC4004 Apply basic process engineering principles to food processing FDFTEC4007 Describe and analyse data using mathematical principles FDFTEC4009 Identify the physical and chemical properties of materials, food and related products FDFTEC4011 Participate in product recalls FDFAU4005 Audit bivalve mollusc growing and harvesting processes FDFAU4006 Audit a cook chill process FDFAU4007 Audit a heat treatment process FDFAU4008 Audit manufacturing of ready-to-eat meat products FDFFS5001 Develop a HACCP-based food safety plan FDFFST5001 Monitor refrigeration and air conditioning systems in food processing FDFFST5002 Identify and implement required process control for a food processing operation FDFFST5003 Construct a process control chart for a food processing operation

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFFST5004 Specify and monitor the nutritional value of processed food FDFFST5005 Identify the biochemical properties of food FDFFST5006 Apply food microbiological techniques and analysis FDFFST5007 Evaluate sampling plans in relation to food industry standards FDFFST5008 Develop a new food product FDFFST5023 Implement and review the production of milk fat products FDFFST5024 Implement and review the production of fermented dairy products and dairy desserts FDFFST5025 Implement and review the production of concentrated and dried dairy products FDFFST5026 Implement and review the production of ice creams and frozen dairy products FDFFST5027 Implement and review the production of milk and related products by the membrane system FDFFST5030 Develop, manage and maintain quality systems for food processing FDFTEC4005 Apply an understanding of food additives FDFTEC5001 Manage and evaluate new product trials FDFTEC5002 Manage utilities and energy for a production process

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			Total for review 74
2017	Traceability of product	Potential new qualification	FDFTEC4006A Apply an understanding of legal requirements of food production FDFTEC3003A Apply raw materials, ingredient and process knowledge to production problems FDFTEC4001A Determine handling processes for perishable food items FDFTEC4010A Manage water treatment processes ***Total for review 4*** Development of new units of competency – the number of units to be imported/developed are to be identified during the review and Case for Change development. Development of skill set/s as per review and Case for Change development.
2018	Innovation in product development and food packaging	FDF20211 Certificate II in Food Processing FDF30111 Certificate III in Food Processing FDF40111 Certificate IV in Food Processing FDF50111 Diploma of Food Processing	FDFOP2018 Operate a case packing process FDFOP2019 Fill and close product in cans FDFOP2020 Operate a form, fill and seal process FDFOP2021 Operate a fill and seal process FDFOP2022 Operate a high speed wrapping process FDFOP2023 Operate a packaging process FDFOP2024 Operate a cooling, slicing and wrapping process

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFFST4053A Implement and review manufacturing, packaging and testing of beverage products FDFOP2072 Operate a beer filling process FDFOP2073 Operate a beer packaging process FDFOP3002 Set up a production or packaging line for operation FDFOP3003 Operate interrelated processes in a production system FDFOP3004 Operate interrelated processes in a packaging system FDFFST5008 Develop a new food product FDFBP2012 Perform basic packaging tests and inspections FDFBP3001 Operate the bottle filling process FDFBP3002 Operate the labelling process FDFBP3003 Operate the softpack filling process FDFBP3004 Perform packaging equipment changeover ***Total for review 19*** Support food process and product innovation (**New**) manage the implementation of food process and product innovations (**New**) Initiate and lead a food processing industry innovation (**New**) Lead food processing industry innovative thinking and practice (**New**) ***Total new units 4***

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			Use of existing units (to be determined as part of the development process) and the development of new units
2018	Food and beverage fermentation	New qualification/s – to be determined through review and Case for Change development	FDFDP2006 Operate a fermentation process ***Total for review 1***
2018	Higher level strategic planning and management skills across the food and beverage industry		FDFPPL2001 Participate in work teams and groups FDFPPL3001 Participate in improvement processes FDFPPL3002 Report on workplace performance FDFPPL3003 Support and mentor individuals and groups FDFPPL3004 Lead work teams and groups FDFPPL3005 Participate in an audit process FDFPPL3006 Establish compliance requirements for work area FDFPPL4001 Manage people in the work area FDFPPL4002 Plan and co-ordinate maintenance FDFPPL4003 Schedule and manage production FDFPPL4004 Optimise a work process FDFPPL4006 Manage a work area within budget FDFPPL4007 Manage supplier agreements and contracts FDFPPL4008 Manage internal audits

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFPPL5001 Design and maintain programs to support legal compliance ***Total for review 15***
2018	Work health and safety and risk management across the food industry	Review of WHS and risk management components across all training package qualifications	FDFWHS1001 Work safely FDFWHS2001 Participate in work health and safety processes FDFWHS3001 Contribute to work health and safety processes FDFWHS4001 Identify, assess and control work health and safety risk in own work FDFWHS5001 Manage work health and safety processes ***Total for review 5***
2019	Advanced supply chain management skills to support the food and beverage industry	Develop qualification/s for global supply chain management and logistics for the food and beverage industry including rapid expansion of fast-moving consumer goods (FMCG) channels and online retailing specifically for food and beverage production	The number of units to be imported/developed are to be identified during the review and Case for Change development.
2019	Online sales and customer service skills for the food industry	Develop/update qualifications covering skills for online sales of food and beverage products, cultural competency and awareness of international market preferences for food products, presentation and transportation	Review of units across 7 qualifications. Develop/update units and skills sets covering skills for online sales of food products, cultural competency and awareness of international market preferences for food products, presentation and transportation.

PROPOSED FBP UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE			
YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
2019	Cross food industry generic operational skills not reviewed as part of a previous project		FDFOP1001 Pack or unpack product manually FDFOP1002 Operate automated washing equipment FDFOP1003 Carry out manual handling tasks FDFOP1004 Prepare basic mixes FDFOP1005 Operate basic equipment FDFOP1006 Monitor process operation FDFOP1007 Participate effectively in a workplace environment FDFOP1008 Take and record basic measurements FDFOP1009 Follow work procedures to maintain quality FDFOP1010 Communicate workplace information FDFOP2001 Work effectively in the food processing industry FDFOP2002 Inspect and sort materials and product FDFOP2003 Clean equipment in place FDFOP2004 Clean and sanitise equipment FDFOP2005 Work in a socially diverse environment

PROPOSED FBP UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE			
YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFOP2006 Operate a bulk dry goods transfer process FDFOP2007 Work in a freezer storage area FDFOP2008 Operate a bulk liquid transfer process FDFOP2009 Load and unload tankers FDFOP2010 Work with temperature controlled stock FDFOP2011 Conduct routine maintenance FDFOP2012 Maintain food safety when loading, unloading and transporting food FDFOP2013 Apply sampling procedures FDFOP2014 Participate in sensory analyses FDFOP2016 Work in a food handling area for non-food handlers FDFOP2017 Operate a blending, sieving and bagging process FDFOP2025 Manufacture extruded and toasted products FDFOP2026 Operate a forming or shaping process FDFOP2027 Dispense non-bulk ingredients FDFOP2028 Operate a mixing or blending process FDFOP2029 Operate a baking process FDFOP2031 Operate a coating application process FDFOP2032 Work in a clean room environment

PROPOSED FBP UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE			
YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFOP2033 Operate a depositing process
			FDFOP2034 Operate an evaporation process
			FDFOP2035 Operate an enrobing process
			FDFOP2036 Operate an extrusion process
			FDFOP2037 Operate a filtration process
			FDFOP2038 Operate a grinding process
			FDFOP2039 Operate a frying process
			FDFOP2040 Operate a heat treatment process
			FDFOP2041 Operate a mixing or blending and cooking process
			FDFOP2042 Operate a drying process
			FDFOP2043 Operate an homogenising process
			FDFOP2044 Operate a retort process
			FDFOP2045 Operate pumping equipment
			FDFOP2046 Operate a production process
			FDFOP2047 Operate a portion saw
			FDFOP2048 Pre-process raw materials
			FDFOP2049 Operate a reduction process
			FDFOP2050 Operate a separation process
			FDFOP2051 Operate a spreads production process

PROPOSED FBP UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE			
YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFOP2052 Operate a chocolate tempering process FDFOP2053 Operate a washing and drying process FDFOP2054 Operate a water purification process FDFOP2055 Freeze dough FDFOP2056 Operate a freezing process FDFOP2057 Operate a membrane process FDFOP2058 Operate a holding and storage process FDFOP2059 Operate a continuous freezing process FDFOP2060 Operate an automated cutting process FDFOP2062 Apply work procedures to maintain integrity of product FDFOP2063 Apply quality systems and procedures FDFOP2064 Provide and apply workplace information FDFOP2065 Work in confined spaces in the food and beverage industries FDFOP2066 Operate a wort production process FDFOP2067 Operate a brewery fermentation process FDFOP2068 Operate a beer maturation process FDFOP2069 Operate a beer filtration process FDFOP2070 Operate a bright beer tank process

PROPOSED FBP UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE			
YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFOP2071 Identify key stages and beer production equipment in a brewery FDFOP2074 Prepare and monitor beer yeast propagation process FDFOP3001 Control contaminants and allergens in the workplace FDFOP3005 Prepare food products using basic cooking methods FDFOP3006 Identify cultural, religious and dietary requirements for food products Sector: People FDFPPL2001 Participate in work teams and groups FDFPPL3001 Participate in improvement processes FDFPPL3002 Report on workplace performance FDFPPL3003 Support and mentor individuals and groups FDFPPL3004 Lead work teams and groups FDFPPL3005 Participate in an audit process FDFPPL3006 Establish compliance requirements for work area FDFPPL4001 Manage people in the work area FDFPPL4002 Plan and co-ordinate maintenance FDFPPL4003 Schedule and manage production FDFPPL4004 Optimise a work process

PROPOSED FBP UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE			
YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFPPL4006 Manage a work area within budget FDFPPL4007 Manage supplier agreements and contracts FDFPPL4008 Manage internal audits FDFPPL5001 Design and maintain programs to support legal compliance ***Total for review 90***
2020	Beverage skills across various food and beverage sectors		FDFBV2001 Operate a deaeration, mixing and carbonation process FDFBV2002 Manufacture coffee (roast and ground) FDFBV2003 Operate an ice manufacturing process ***Total for review 3***
2020	Cheese-specific manufacturing skills		FDFCH3001 Coordinate cheese making operations FDFCH3002 Carry out processes for a range of artisan cheeses ***Total for review 2***
2020	Confectionery-specific manufacturing and processing skills		FDFCON2001 Examine raw ingredients used in confectionery FDFCON2002 Operate a boiled confectionery process FDFCON2003 Operate a chocolate conching process FDFCON2004 Operate a chocolate depositing or moulding process FDFCON2005 Operate a confectionery depositing process FDFCON2006 Operate a granulation and compression process

PROPOSED FBP UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE			
YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFCON2007 Operate a panning process FDFCON2008 Operate a chocolate refining process FDFCON2009 Operate a starch moulding process ***Total for review 9***
2020	Dairy-related manufacturing and processing skills		FDFDP2001 Operate a butter churning process FDFDP2002 Operate a butter oil process FDFDP2003 Operate a curd production and cutting process FDFDP2004 Operate a cooling and hardening process FDFDP2005 Operate a cheese pressing and moulding process ***Total for review 5***
2020	Fruit and vegetable processing skills		FDFFV2001 Apply hydro-cooling processes to fresh produce FDFFV3001 Conduct chemical wash for fresh produce FDFFV3002 Program fresh produce grading equipment ***Total for review 3***
2020	Grocery products and supplies related operating processes		FDFGPS2001 Operate a bleaching process FDFGPS2002 Operate a completing process FDFGPS2003 Operate a deodorising process FDFGPS2004 Operate a flake preparation process FDFGPS2005 Operate a fractionation process

PROPOSED FBP UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE			
YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFGPS2006 Operate a hydrogenation process FDFGPS2007 Operate an interesterification process FDFGPS2008 Operate a neutralisation process FDFGPS2009 Operate a soap splitting process FDFGPS2010 Operate a winterisation process FDFGPS2011 Operate a creamed honey manufacture process **Grain processing** FDFGR2001 Operate a liquid, mash or block stockfeed process FDFGR2002 Understand mill operations and technologies FDFGR2003 Operate a grain conditioning process FDFGR2004 Operate a grain cleaning process FDFGR2005 Operate a purification process FDFGR2006 Operate a scalping and grading process FDFGR2007 Operate a scratch and sizing process FDFGR2008 Operate a break roll process FDFGR2009 Operate a pelleting process FDFGR2010 Handle grain in a storage area FDFGR2011 Receive grain for malting FDFGR2012 Prepare malted grain

PROPOSED FBP UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE			
YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFGR2013 Blend and dispatch malt FDFGR3001 Work with micronutrients or additions in stockfeed manufacturing processes FDFGR3002 Demonstrate knowledge of animal nutrition principles FDFGR3003 Lead flour milling shift operations FDFGR3004 Control mill processes and performance FDFGR4001 Control power and automation for milling processes FDFGR4002 Supervise testing processes for wheat and flour FDFGR4003 Manage mill logistics and support services FDFGR4004 Supervise dust control procedures in a grain processing enterprise ***Total for review 32***
2020	Grain-processing skills		Review units: FDFGR2001 Operate a liquid, mash or block stockfeed process FDFGR2002 Understand mill operations and technologies FDFGR2003 Operate a grain conditioning process FDFGR2004 Operate a grain cleaning process FDFGR2005 Operate a purification process FDFGR2006 Operate a scalping and grading process

PROPOSED FBP UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE			
YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFGR2007 Operate a scratch and sizing process FDFGR2008 Operate a break roll process FDFGR2009 Operate a pelleting process FDFGR2010 Handle grain in a storage area FDFGR2011 Receive grain for malting FDFGR2012 Prepare malted grain FDFGR2013 Blend and dispatch malt FDFGR3001 Work with micronutrients or additions in stockfeed manufacturing processes FDFGR3002 Demonstrate knowledge of animal nutrition principles FDFGR3003 Lead flour milling shift operations FDFGR3004 Control mill processes and performance FDFGR4001 Control power and automation for milling processes FDFGR4002 Supervise testing processes for wheat and flour FDFGR4003 Manage mill logistics and support services FDFGR4004 Supervise dust control procedures in a grain processing enterprise ***Total for review 21***
2020	Plant-baking process skills		FDFPB3001 Operate a dough mixing process

PROPOSED FBP UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE			
YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFPB3002 Operate a final prove and baking process FDFPB3003 Operate a dough make up process ***Total for review 3***
2020	Poultry-processing skills		FDFPO2001 Operate a dicing, stripping or mincing process FDFPO2002 Operate an evisceration process FDFPO2003 Grade carcass FDFPO2004 Harvest edible offal FDFPO2005 Operate a marinade injecting process FDFPO2006 Operate a washing and chilling process FDFPO2007 Operate the bird receival and hanging process FDFPO2008 Operate a stunning, killing and defeathering process FDFPO2009 Work in an egg grading floor FDFPO2010 Operate egg grading and packing floor equipment FDFPO3001 Operate a chickway system FDFPO3002 Debone and fillet product (manually) ***Total for review 12***

PHARMACEUTICALS IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
2017	Pharmaceutical production skills across a range of functions and employment levels	FDF10210 Certificate I in Pharmaceutical Manufacturing FDF20211 Certificate II in Pharmaceutical Manufacturing FDF30210 Certificate III in Pharmaceutical Manufacturing FDF40210 Certificate IV in Pharmaceutical Manufacturing FDF50210 Diploma of Pharmaceutical Manufacturing	FDFPH2002 Operate a concentration process FDFPH2003 Operate an extraction process FDFPH2004 Operate a separation process using chromatography FDFPH2005 Operate an aseptic fill and seal process FDFPH2006 Operate an aseptic form, fill and seal process FDFPH2007 Coordinate a label store FDFPH2008 Operate a compressing process FDFPH2009 Dispense pharmaceutical raw materials FDFPH2010 Operate an encapsulation process FDFPH2011 Operate a granulation process FDFPH2012 Operate a liquid manufacturing process FDFPH2013 Operate a tablet coating process FDFPH2014 Operate a terminal sterilisation process FDFPH4003 Facilitate contamination control FDFPH4004 Participate in change control procedures FDFPH4005 Participate in validation processes FDFPH4006 Respond to non-conformance ***Total for review 17***

PHARMACEUTICALS IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
2018	Good Manufacturing Practice (GMP)		FDFPH1001 Follow work procedures to maintain Good Manufacturing Practice FDFPH2001 Apply Good Manufacturing Practice procedures FDFPH3001 Monitor and maintain Good Manufacturing Practice procedures FDFPH4001 Prepare and review workplace documentation to support Good Manufacturing Practice FDFPH4002 Facilitate and monitor Good Manufacturing Practice ***Total for review 5***
2018	Pharmaceutical auditing and compliance skills		Review of occupational standards and alignment with existing units of competency and qualifications where possible. Where gaps exist, development of additional units of competency, skills sets and qualifications. The number of units is to be determined during the review of occupational standards, mapping and development of Case for Change.
2019	Advanced sales, marketing and customer service	Review of occupational standards and alignment with existing qualifications where possible; where gaps exist, development of qualification	Review of occupational standards and alignment with existing Units of competency and qualifications where possible. Where gaps exist, development of additional units of competency, skills sets and qualifications. The number of units is to be determined during the review of occupational standards, mapping and development of Case for Change.

PHARMACEUTICALS IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
2019	Advanced leadership, management and risk management skills	Certificate IV in Pharmaceutical Manufacturing Diploma of Pharmaceutical Manufacturing	Development of skill set/s and units of competency as identified during the review and the development of the Case for Change.

ATTACHMENT B

Active IRC Projects for the Food, Beverage and Pharmaceuticals Industry Sector

Relevant training package: *FDF10 Food Processing*

Contact details: Skills Impact Ltd, 559A Queensberry Street, North Melbourne, VIC, 3051

Date submitted to Department of Education and Training: 28 April 2017

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
2017	Retail baking	FDF20510 Certificate II in Retail Baking Assistance FDF30610 Certificate III in Retail Baking (Bread) FDF30510 Certificate III in Retail Baking (Cake and Pastry FDF30710 Certificate III in Retail Baking (Combined) FDF40811 Certificate IV in Advanced Baking	**Development of new units of competency as follows:** Produce craft bread Produce cookies and biscuits Produce speciality bread products Produce speciality cake products Produce speciality pastry products Produce savoury bread products Produce special occasion cakes Plan schedule and produce retail baking production **Review of the following units of competency:** FDFRB1001 Finish products

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFRB2001 Form and fill pastry products FDFRB2002 Prepare fillings FDFRB2003 Produce meringue-based products FDFRB2004 Provide production assistance for bread products FDFRB2005 Provide assistance in cake, pastry and biscuit production FDFRB3001 Produce pastry FDFRB3002 Produce bread dough FDFRB3003 Produce sponge, cake and cookie batter FDFRB3004 Decorate cakes and cookies FDFRB3005 Bake bread FDFRB3006 Bake sponges, cakes and cookies FDFRB3007 Bake pastry products FDFRB3008 Store, handle and use frozen dough FDFRB3009 Retard dough FDFRB3010 Process dough FDFRB3011 Diagnose and respond to product and process faults (bread) FDFRB3012 Diagnose and respond to product and process faults (pastry, cake and cookies)

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFRB3013 Produce artisan breads FDFRB3014 Produce sweet yeast products FDFRB3015 Produce and decorate gateaux and tortes FDFRB3016 Plan and schedule production for retail bakery FDFRB3017 Participate in product development FDFRB4001 Apply marketing principles to retail bakery FDFRB4002 Control bakery operations to meet quality and production requirements FDFRB4003 Apply baking science to work practices FDFRB4004 Produce sourdough products FDFRB4005 Apply advanced finishing techniques for specialty cakes and desserts FDFRB4006 Explore and apply baking techniques to develop new products FDFRB4007 Evaluate and assess bakery product FDFRB4008 Set up sustainable baking operations FDFRB4009 Coordinate material supply for baking processes FDFRB4010 Prepare plated sweets and desserts FDFBK2003 Manufacture rye crisp breads FDFBK2004 Manufacture wafer products

FOOD AND BEVERAGE IRC			
YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			FDFBK2001 Operate a cooling and slicing process FDFBK2005 Operate a doughnut making process FDFBK2006 Operate a griddle production process FDFBK2002 Operate a pastry forming and filling process FDFBK2007 Operate a pastry production process