Industry Skills Australia

SKILLS GAP ASSESSMENT

Australian Omnichannel Logistics

January 2025

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Industry Skills Australia

ACKNOWLEDGMENTS

We would like to thank all interview participants for so generously contributing their time and expertise.

We also thank reviewers for taking the time and effort to review the project report. Reviewers were Industry Skills Australia, Mr Ian Ryan from the Logistics and Defence Skills Council of Western Australia, Dr. Brian K Chikwava, a Lecturer in Business Studies and Qualified Training and Assessor and South Metropolitan TAFE. We sincerely appreciate all valuable comments and suggestions, which helped us to improve the quality of the report.

EXECUTIVE SUMMARY

Omnichannel logistics has been identified[1] as an emerging industry in Australia as consumers returned to physical stores after the COVID-19 pandemic and continue significant online purchasing. Industry Skills Australia (ISA) has commissioned this project to investigate the skills gaps for workers in omnichannel logistics and recommend changes to National Training Packages.

Omnichannel logistics is defined as the '*synchronisation of inventory, logistics and distribution across sales channels to meet consumer demand. Every facet of the supply chain is involved, including the retailer, manufacturer, distributor and wholesaler*'[2]. It is characterised by the breaking down of barriers between physical, online and mobile channels to deliver goods and customer service seamlessly.

Industry 4.0 which comprises advanced technologies in the workplace such as automation, artificial intelligence and cloud technology - is currently impacting the transport and logistics industry significantly. These technologies are essential to omnichannel logistics as they provide integrated online information and communication systems to enable the orchestration of fast order fulfillment across all online and physical channels. Many of the skills and knowledge required for omnichannel logistics relate to Industry 4.0 technologies.

Through research and interviews with 29 industry representatives, this project found the following categories of skills and knowledge are required for omnichannel logistics:

- assess and plan omnichannel capability and select appropriate technology
- introduce and support the use of integrated systems for omnichannel logistics
- use integrated systems and advanced technology for omnichannel logistics
- increased focus on last mile delivery and customer service
- support for reverse logistics across all channels.

Mapping of the required skills and knowledge against the national Training Packages rendered the following findings and recommendations.

Table 1.

Findings and recommendations

Findings	Recommendation
Existing Units of competency cover many of the skills and knowledge needed but rarely include explicit references to omnichannel logistics, which may make them less visible	1. Existing, relevant Units of Competency are incorporated into qualifications that relate to the job roles impacted and contextualised to omnichannel logistics.

[1] Transport and Logistics Industry 2024 Workforce Plan. (2024). Retrieved from https://isa-files.azureedge.net/2024-07/Transport%20and%20Logistics%20Industry%202024%20Workforce%20Plan.pdf#page=11
[2] Industry Skills Australia. (2024, October 24). *Omnichannel Logistics*. https://www.industryskillsaustralia.org.au/our-industries/omnichannel-logistics

Findings	Recommendation
or harder to identify as relevant to industry needs.	2. The following existing relevant skills sets are contextualised to omnichannel logistics: • AVISS00080 - Remotely Piloted Aircraft Operations in Excluded Category Sub-2 kg Skill Set • BSBSS00091 - Capture and Present Big Data Skill Set • BSBSS00126 Contact Centre Skill Set • ICTSS00107 - Introductory Help Desk Skill Set • ICTSS00120 - Artificial Intelligence Skill Set • ICTSS00160 - Cyber Security for Advanced Roles Skill Set • TLISS00157 - Road Transport Driver Skill Set • TLISS00191 - Establish Digital Supply Chain Skill Set Note: Contextualisation is whereby '*Registered Training Organisations may contextualise units of competency to reflect local skill needs. Contextualisation could involve additions or amendments to the unit of competency to suit particular delivery methods, learner profiles, or specific enterprise requirements. Any contextualisation must ensure the integrity of the outcome of the unit of competency is maintained.*'[3]
Gaps were found in the Training Package content for the following areas: • unified inventory management systems • orchestrating omnichannel order fulfillment • using artificial intelligence to analyse data and gain insights • managing and operating reverse logistics across all channels	3. Develop skills sets for working with automation and Industry 4.0 technologies to support omnichannel logistics focused on: • managing integrated online systems for omnichannel logistics including a new unit on orchestrating omnichannel order fulfillment. This is required to address new roles identified: Omnichannel Fulfillment Officer, Omnichannel Manager, Ecommerce Fulfillment Officer • working with automation and Industry 4.0 in smart warehouses and distribution centres (at different levels of complexity from basic through to advanced)

[3] TAE Training and Education Training Package, Companion Volume Implementation Guide (Version 5.0). https://vetnet.gov.au/Pages/download.aspx?url=https://vetnet.gov.au/Public%20Documents/TAE_V5_CVIG.pdf (page 40).

Findings	Recommendation
	• implementing reverse logistics in transport and logistics.

Current Training Package content provides an opportunity to contextualise and provide relevant training for the quickly emerging needs of omnichannel logistics. New, advanced Industry 4.0 technology presents an opportunity for workers to gain new skills and capabilities to work in this exciting industry.

ABOUT INDUSTRY SKILLS AUSTRALIA

Industry Skills Australia (ISA) has been appointed by the Australian Government as the Jobs and Skills Council for the Transport and Logistics industry sectors, which includes Aviation, Maritime, Rail, Transport and Logistics, the emerging Omnichannel Logistics and Distribution, and Air and Space Transport and Logistics sectors.

Owned and led by industry, ISA is committed to building a world-class supply chain workforce to increase productivity, create better jobs and build opportunities for individuals.

ISA will do this through:

- leveraging our more than 30-year history with the transport and logistics industry,
- undertaking research and data analysis to inform workforce planning,
- advocating for a workforce development approach in tackling industry skills issues, and
- developing priority training package products.

1. Context

Omnichannel logistics is a rapidly growing area within the transport and logistics sector in Australia. Omnichannel logistics is defined as the '*synchronisation of inventory, logistics and distribution across sales channels to meet consumer demand. Every facet of the supply chain is involved, including the retailer, manufacturer, distributor and wholesaler*'[4]. It is characterised by the involvement of all channels – physical, online and mobile – to provide seamless customer service.

The growth of omnichannel distribution globally is expected to increase by 7% annually from $600 billion in 2019 to $840 billion by 2025. Currently, Australia's online spending stands at $63.6 billion in 2023 which is 16.8% of total retail spending[5]. Post COVID-19, online shopping in Australia has become an integral part of the economy with retailers creating a smoother experience between online and physical stores to encourage consumers back to physical stores[6]. The growth of omnichannel logistics requires an urgent examination of the skills needed for the industry in Australia.

ISA has engaged South Metropolitan TAFE (SM TAFE) to conduct a skills gap analysis for the omnichannel logistics industry in Australia.

It is worth noting that occupational shortages are sometimes discussed together with skills gaps, however, they are two distinct concepts. Skills gaps are where existing workers do not have the skills for the required positions and occupational shortages are where the demand for workers for a particular occupation is greater than the supply of suitable workers[7].

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[4] Ibid.
[5] Australia Post. (2024). Inside Australian Online Shopping. https://ecommerce-report.auspost.com.au/
[6] Ibid.
[7] Australian Government, Department of Transport and Regional Services. (2006). *Skills shortages in Australia's regions, Working Paper no. 68.* https://www.bitre.gov.au/sites/default/files/wp_068.pdf

This project is focussed on the skills gaps for omnichannel logistics.

1.1 Purpose and aims

The purpose of this project is to identify potential changes to nationally endorsed training products related to the skills and knowledge required for omnichannel logistics.

The aims of the project are to:

1. Identify key roles within the transport and logistics sector that are impacted by the shift towards omnichannel logistics, as well as new roles emerging in the field.
2. Identify training gaps and needs, leading to recommendations for modifying existing training products.

The project involved Australia-wide consultation and engagement and reviewed all parts of the supply chain from point of manufacturing or importation through to delivery to customer.

This report offers recommendations to adapt training packages and tailor training products for the omnichannel logistics industry. These recommendations are primarily intended for Jobs and Skills Councils to action.

1.2 Methodology

The project methodology consisted of:

1. Desktop research
2. Semi-structured interviews
3. Mapping of the skills and knowledge required in omnichannel logistics against Training Package content to identify gaps

The desktop research covered the development of omnichannel logistics in Australia and the related unique skills required as reported in academic articles, web pages, news articles, reports and job advertisements. It also identified stakeholders and employers to approach for interviews.

Approximately 70 organisations were approached for interview over a two-month period from July to August 2024. In addition, ISA developed a project web page and called for expressions of interest to be interviewed for the project, the Service and Creative Skills Australia (SaCSA) Jobs and Skills Council consulted their industry partners, and the Supply Chain and Logistics Association of Australia (SLCAA) also promoted the project on their social media page.

A total of 29 interviews were conducted. Most interviews were between 45 – 60 minutes and conducted online. All interviewees received the notes of the interview to review and any changes were implemented.

Error! Reference source not found. and **Error! Reference source not found.** describe the sample of in terviewees.

Approximately half of the interviews were with representatives from employing organisations. The next largest group were representatives from industry advocacy bodies across a wide range of sectors within transport and logistics. The sample also included two researchers, two training providers and one union representative.

The most represented industry areas were transport and logistics, customs clearance and freight forwarding. Four interviews were held with technology provider companies. Interviews were also held with some large employers in grocery, furniture and mail distribution sectors. Several consultants and researchers were also interviewed as industry experts. The majority of interviews were with people from organisations that had a national or international focus. Most employers interviewed were from large organisations. The sample size seemed to be sufficient to make valid findings for the questions posed because data saturation was reached with additional interviewees providing no new information. However, there were very few interviewees from the retail sector.

Table 2.

Descriptive statistics of survey sample

Organisation type	**n**	**%**		**Employers' coverage**	**n**	**%**
Employer	16	52		National	13	45
Advocacy body	8	21		International	11	38
Researchers	2	17		NSW	3	10
Training Organisation	2	7		WA	2	7
Union	1	3		***Total***	***29***	
Total	***29***					
Industry area	**n**	**%**		**Employers' number of employees**	**n**	
Customs clearance, freight forwarding (some contract logistics)	5	17		Small (< 20)	2	
Transport and logistics	5	17		Medium (20 – 199)	3	
Technology provider	4	14		Large (200 <)	9	
Furniture	3	10		Individual consultants	2	
Transport	3	10		***Total***	**16**	
Parcel and mail distribution	2	7				
Training	2	7				
Aviation logistics	1	3				
Grocery	1	3				
Health safety environment risk management	1	3				
Industrial goods	1	3				
Workforce development	1	3				
Total	**29**					

Table *3.*

Project interview sample

	Business type	Industry	Coverage	Size	Position
1	Employer (Consultancy)	Health, safety, environment risk management	International	Large	Senior Consultant
2	Employer (Consultancy)	Transport and logistics	International	Small	Senior Consultant
3	Employer (Consultancy)	Workforce development	NSW	Small	Industry Consultant
4	Employer	Aviation logistics	International	Large	General Manager Operations
5	Employer	Customs clearance	National	Medium	Director
6	Employer	Customs clearance and freight forwarding	International	Large	Vice President
7	Employer	Customs clearance and freight forwarding; Logistics	International	Medium	Director
8	Employer	Technology provider	International	Large	Senior Consultant
9	Employer	Technology provider	International	Medium	Senior Manager
10	Employer	Technology provider	International	Large	Senior Manager
11	Employer	Technology provider	International	Small	CEO
12	Employer	Furniture	National	Large	Senior Manager
13	Employer	Grocery	National	Large	Director & Senior Manager
14	Employer	Industrial goods	National	Large	Transport Operations Manager
15	Employer	Parcel and mail distribution	International	Large	Senior Manager - Human Resources (x2)
16	Employer	Parcel and mail distribution; Customs clearance; Logistics	International	Medium	Senior Manager
17	Advocacy body	Customs clearance and freight forwarding	National	Small	Regional Manager

	Business type	Industry	Coverage	Size	Position
18	Advocacy body	Customs clearance and freight forwarding	National	Small	General Manager and Board Member
19	Advocacy body	Furniture	National	Small	CEO
20	Advocacy body	Furniture	National	Small	CEO and Director
21	Advocacy body	Training	WA	Small	Training Consultant
22	Advocacy body	Transport	WA	Small	Senior Manager and Senior Consultant
23	Advocacy body	Transport and logistics	National	Small	CEO
24	Advocacy body	Transport and logistics	National	Small	Consultant
25	Research	Transport and logistics	National	Large	Researcher
26	Research	Transport and logistics	National	N/A	Researcher
27	Training Provider	Transport	NSW & ACT	Small	Owner
28	Training Provider	Training	NSW	Large	Senior Manager
29	Union	Transport	National	Small	Senior Manager

Following the interview stage, the data from the interviews was analysed by assigning codes to interviewees' comments and grouping together 'like' ideas and comments. The interview data was then analysed and compared with desktop research to reach conclusions about the skills and knowledge that are needed in omnichannel logistics.

Those skills and knowledge were then mapped against all existing Units of Competency to identify the extent to which they were covered by current training.

2. Industry background

2.1 Omnichannel logistics

Omnichannel logistics has been described as the harmonisation of inventory, logistics, and distribution across all sales channels to fulfil customer demands. It is the '*synchronization and combination of all product sales, distribution, and return channels accessible to a customer -[It] goes further than a multichannel system in which the customer is exposed to many channels but must buy and return through the same channel. Omnichannel systems empower the customer to browse in all channels and select any channel for purchase, product receipt, and return'*[8]. All channels are integrated and share real-time data about product availability and customers, allowing customers to move seamlessly between channels and receive a consistent experience throughout their shopping journey. Omnichannel logistics enable customers to shop in any manner they choose such as:

- instore purchase
- instore purchase for home delivery
- buy online for delivery
- buy online for pickup instore
- buy through mobile app or chatbot
- return instore or by post

Key elements of an omnichannel distribution strategy are:

- Integration of sales channels including online, offline, mobile, and social media, into a seamless and consistent experience for the customer. This means the customer can access the same products, pricing, and promotions, regardless of the channel used.
- Real-time inventory management where all inventory systems across different channels are integrated, enabling customers and staff to access accurate and up-to-date information on product availability and delivery times.
- Multiple fulfillment options including instore pickup, home delivery or pick up from a locker, allowing customers to choose the most convenient option.
- Seamless, personalised and consistent customer service across all channels where customers' information is tracked, and they have easy access to all information about the status of their order[9].

Omnichannel logistics is relevant to a wide range of goods and services including groceries, fashion and footwear, homewares and office supplies.

[8] DHL. (2024). *Omnichannel.*
[9] FarEye. (2024, October 24). *What are omnichannel logistics? What are some top omnichannel logistics challenges?* https://fareye.com/resources/blogs/omni-channel-logistics

Retailers can have a large network of sales channels through their own physical, online and social media stores, mobile applications, and third-party online marketplaces such as eBay and Amazon[10]. Some are also incorporating other brands into their channels through dropshipping arrangements which further adds to the complexity of logistics[11]. The customer has an omnichannel experience when they can view, browse, purchase, receive and return goods sold by a retailer, through any of the channels offered.

Omnichannel capability and experiences are seen as increasingly required to yield customer loyalty and lifetime value[12].

> *'The most frequent ideas in omnichannel logistics include unified inventory management, coordinated supply chain, seamless customer experience, flexible fulfillment options, integrated demand forecasting, real-time data integration, unified warehousing, optimised transportation, and advanced technology utilisation.'*
>
> Interviewee

2.2 Digitisation, automation, robotics and Industry 4.0

Omnichannel logistics is enabled by broader developments impacting transport and logistics such as digitisation, automation, robotics, and other Industry 4.0 technologies[13]. Industry 4.0 refers to the 'fourth industrial revolution' where manufacturing industry technologies and processes are digitised and connected, and data exchange technologies enable integration across the entire production value chain[14]. Industry 4.0 technologies enable the orchestration of personalised order fulfillment across different channels with increased accuracy and speed.

Figure 1: Automated storage and retrieval system (ASRS)

[10] :Codica (2023, November 15). *Top Online Marketplaces in Australia 2024: All You Need to Know About Leaders*. https://www.codica.com/blog/top-online-marketplaces-in-australia/
[11] Inside Retail. (2024, February 02). *Dropshipping: Fashion's favourite fulfilment method?* https://insideretail.com.au/digital/dropshipping-fashions-favourite-fulfilment-method-202402
[12] Inside Retail (2023, August). *Top 25 retailers.* https://insideretail.com.au/wp-content/uploads/2023/08/IRAU_AUG23_REPORT_TOP25RETAILERS.pdf
[13] Strategy&. (2024, October 16). *Industry 4.0: How digitization makes the supply chain more efficient, agile, and customer-focused.* https://www.strategyand.pwc.com/gx/en/insights/2016/digitization-more-efficient.html
[14] Department of Climate Change, Energy, the Environment and Water, (2024, October 24). *Industry 4.0.* https://www.energy.gov.au/business/equipment-guides/industry-40

This is done through the integration and interconnection of digital, online systems that provide critical tools such as unified inventory, customer relationship, sales, warehouse and transport management and automated, fast (same day or next day) order fulfillment.

Modern warehouses are 'smart' with interconnected technology. They often store products in high bays and racks to maximise the available physical space and use robots to retrieve products and bring them to stations where human workers pick and pack orders. Many of the skills and knowledge for omnichannel logistics relate to these new Industry 4.0 technologies.

Omnichannel logistics also includes the fulfillment of online orders instore. This can vary from being only a small part of the store operations with Retail Workers picking from store inventory that is also available to walk in customers to being 'dark stores' that are essentially set out just like a regular physical store but instead of walk-in customers there are Personal Shoppers picking and packing online orders. The 'dark stores' or online fulfillment centres can also incorporate a high degree of automation[15].

Error! Reference source not found. outlines some of the Industry 4.0 automation and technologies c urrently impacting transport and logistics.

Figure 2. Automated guided vehicles (AGCs) being used to move materials in a warehouse

[15] iTnews. (2023, June 29). *Woolworths sheds light on 'dark store' ecommerce operations.* https://www.itnews.com.au/news/woolworths-sheds-light-on-dark-store-ecommerce-operations-597372

Table 3.

Logistics areas and related Industry 4.0 Technologies[16]

Area	Supporting Technologies	Enabling Technologies
Picking	• Exoskeletons (lifting) • Automated Guided Vehicles (AGVs) (picking) • Automated Storage and Retrieval Systems (ASRS) (picking) • Drones (picking) • Collaborative robots (picking) • Handheld Computers (picking orders information) • Wearable Scanners (barcodes, RFID tags) • Voice-Direct Headsets (voice picking) • Smart Glasses (pick-put to light) • Activity Trackers (steps, heartrate)	• Smart Fast Rotation Storage Systems • Smart Traslo-elevators • Smart Mini-Loaders • Order Management Systems (OMS) • Inventory Management Systems (IMS) • Picking Route Management Systems (PRMS) • Scheduling Management Systems (SMS)
Packaging	• Collaborative Robots (inspection, kitting and packing) • Labelling Systems	• Industrial Robots (inspection, kitting and packing) • Order Management Systems (OMS)
Storage	• Exoskeletons (moving) • AGVs (moving) • ASRS (moving) • Drones (moving) • Collaborative Robots (load-n'-unload) • Smart Sensors (beacon tags)	• Smart Fast Rotation Storage Systems • Smart Trasloelevators • Smart Mini-Loaders • Inventory Management Systems (IMS)
Material Handling	• Exoskeletons (moving) • AGVs (moving) • ASRS (moving) • Drones (moving) • Collaborative Robots (load-n'-unload)	• Auto-ID Technologies (RFID) • Smart Lifts and Forklifts • Wearable Scanners • Warehouse Management Systems (WMS)

[16] Cimini, C., Lagorio, A., Romero, D., Cavalieri, S., & Stahre, J. (2020, July). *Smart logistics and the logistics operator 4.0.* https://www.sciencedirect.com/science/article/pii/S2405896320335837

Area	Supporting Technologies	Enabling Technologies
	• Smart Sensors (beacon tags) • Wearable Scanners	• Inventory Resources Planning (IRP)
Traceability	• Smart Containers • Visual Analytical Tools	• Auto-ID Technologies (RFID tags) • Internet of Things/Industrial IoT Devices • Track & Trace Systems • GPS Systems • Blockchain
Logistics Flow and Stocks Management	• Smart Cargo-Handling Gears • Smart Containers • Virtual Assistants • Visual Analytical Tools	• Smart Conveyors • Warehouse Management Systems (WMS) • Transportation Management Systems (TMS) • Big Data Analytics

Figure 3. Drones are used in warehouses to count, scan and manage inventory

2.3 Emerging trends

The future of the transport and logistics industry will see increasing adoption of advanced technologies such as blockchain, 5G mobile network and artificial intelligence analytics. These technologies will improve transparency, interconnectedness and an ability to harness meaning from the vast amounts of data from the underlying integrated systems used in transport and logistics.

Blockchain technology provides transparency, security and efficiency for maintaining the integrity of goods in transport and logistics. It is a digital record-keeping technology consisting of a 'decentralised data network of computers with equal rights. All participants can access all information and add to the database. Every data set represents a single block, each of which cannot be modified'[17]. Blockchain's digital record-keeping technology enables the origin of goods and their component parts to be traced. As society and consumers increasingly demand sustainable and ethical manufacturing, blockchain allows the authenticity of goods to be easily and quickly verified. Blockchain also enables the integrity of goods to be maintained. For example, blockchain can be used to track and authenticate the supply of pharmaceuticals to achieve higher safety standards[18]. Blockchain makes it easier for the many different parties involved in transport and logistics to coordinate and finance transactions. Different companies in different parts of the supply chain can see when an event happens and act on that. For example, a simple transaction of goods ordered, fulfilled and received and paid for using blockchain can occur faster and with fewer mistakes such as missing shipments or duplicate payments[19].

The implementation of the fifth generation (5G) of mobile technology – is predicted to accelerate the application of automation and other Industry 4.0 technologies. 5G will not only increase the speed but will significantly increase connectivity meaning that robotic, wearable, sensor, Internet of Things (IoT) and other automation technologies in warehouses and transport and logistics will have even more devices connected to provide increased real time visibility and coordination[20].

There are many ways that artificial intelligence (AI) is already being used and can further be used to assist and improve omnichannel logistics. AI enables the processing of very large 'big data' sets to analyse patterns, create predictive models and make adaptations[21]. For example, sales and other relevant data (e.g. seasonal changes, location, consumer sentiment) can be used to predict demand for certain products and therefore manage inventory and manufacturing by suppliers. AI is already being used in route optimisation for transport by incorporating delivery locations, traffic conditions, fuel efficiency and driver behaviour to dynamically plan delivery routes. AI can be used for warehouse design to optimise the most efficient and safe ways to store stock to optimise space and for fast retrieval. The insights provided by AI will be new because such large amounts of data have not been analysed before.

2.4 Case examples

The following examples show how automation and Industry 4.0 technologies are being adopted in omnichannel logistics in Australia:

[17] Freight Connections, DHL Freight. (2023, June, 14). *Blockchain in Logistics: Security and Transparency for the Supply Chain.* https://dhl-freight-connections.com/en/solutions/blockchain-in-logistics-security-and-transparency-for-the-supply-chain/
[18] DHL Group. (2023, August 3). *How blockchain technology streamlines the supply chain in logistics*. https://www.dhl.com/discover/en-in/logistics-advice/logistics-insights/how-blockchain-technology-streamlines-the-supply-chain-in-logistics
[19] Harvard Business Review. (2020, May-June). *Building a transparent supply chain*. https://hbr.org/2020/05/building-a-transparent-supply-chain
[20] DHL Group. (2023, February 23). *5G and what it means for logistics.* https://www.dhl.com/discover/en-au/logistics-advice/logistics-insights/5g-and-logistics
[21] Maersk. (2024, January 3). *How can generative AI drive logistics transformation?* Link.

Woolworths' supermarket eStore[22]

Woolworths supermarkets have two 'eStores' where two stores are co-located: one is for walk in customers and the other is only for staff to fulfill online orders. In the online order store, automated technology retrieves order items and brings them via conveyor belts to a station where a staff member picks the items into crates and takes them to the delivery area. This applies for approximately 80% of order items. The remaining 20% of order items are items not stored in the area reserved for online orders and so staff have to enter the other store and pick from the same shelves and stock used by walk in customers. This is an example of how automation is being incorporated in a company that is providing customers with orders through a variety of channels.

Autostore robotic cube technology[23]

Davcor is an Australian company that designs, manufactures and distributes locks. They were a relatively small company with 62 employees doing about 1,000 picks a day. Davcor implemented an automated storage and retrieval system developed by Autostore where autonomous robots move on top of an aluminium grid of tubs containing stored products. The robots move across the cube grid and retrieve the tubs via cables. The faster moving products are naturally stored at the top of the grid and slower moving products towards the bottom. The tubs are then transported to stations where staff members pick the products and pack them for delivery. The tubs are also replenished at these stations. The award-winning[24] Autostore robotic system has delivered a return on investment within two years for Davcor with savings on leasing, energy, staff and stock loss.

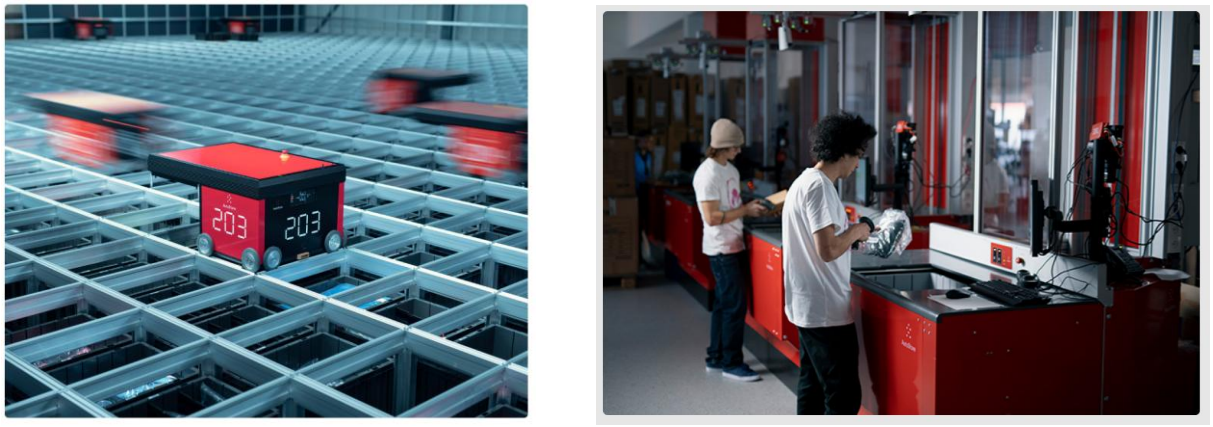

Figure 4. Autostore robotic cube technology and workstations[25]

22 iTnews. (2023, June 29. *Woolworths sheds light on 'dark store' ecommerce operations*. https://www.itnews.com.au/news/woolworths-sheds-light-on-dark-store-ecommerce-operations-597372

[23] Autostore. (2024, October 17). *Davcor Group Automates with AutoStore: Achieves ROI in 2 Years and Cuts Energy Costs by 85%.* https://www.autostoresystem.com/cases/warehouse-automation-at-davcor-big-benefits-to-a-small-company
[24] Autostore. (2024, January 9). *AutoStore wins Australian Supply Chain & Logistics Award 2023*. https://www.autostoresystem.com/news/autostore-wins-australian-supply-chain-logistics-award-2023
[25] Autostore. (2024, October 24). *The world's fastest AS/RS solution.* https://www.autostoresystem.com/

3. Skills and knowledge

Through desktop and interview research, this project found five categories of skills and knowledge that are required by, and unique to, omnichannel logistics:

1. Assess and plan omnichannel capability and technologies
2. Introduce and support the adoption of integrated systems for omnichannel logistics
3. Use integrated systems and other Industry 4.0 technologies for omnichannel logistics
4. Meet demand for increased last mile delivery and customer service
5. Support reverse logistics across all channels.

Within each category, more detailed skills and knowledge were also identified.

Table 4.

Skills and knowledge for omnichannel logistics and job roles impacted

Skills and knowledge unique to omnichannel logistics	Job roles impacted
1. Assess and plan omnichannel capability and technologies	
Network planning and analysis of where to establish distribution centres, fulfillment centres, dark stores, physical stores for an optimal fulfillment network. May use digital twins.	Engineer, Business Analyst, Supply Chain Analyst, Managers, IT Systems Manager, Customer Experience Manager
Critically assess business and select appropriate technologies or automation for integrated omnichannel fulfillment.	Business Analyst, Managers, IT Systems Manager
2. Introduce and support the adoption of integrated systems for omnichannel logistics	
Change management as new technology and business processes are developed or introduced.	Managers (Warehouse, Store, Transport, Distribution Centre etc), Business Analyst
Integrate digital systems for inventory, sales, orders and purchasing, delivery, transport and returns across all channels.	IT Systems Manager, Business Analyst, Managers, IT Support, Supply Chain Analyst, Logistics Coordinator
Information technology support for integrated systems across multiple channels including cybersecurity.	IT Support, Data Scientist, Cybersecurity Specialist
3. Use integrated systems and other Industry 4.0 technologies for omnichannel logistics	
Manage inventory across all channels and sites - demand planning, purchasing, replenishment, storage - using real time, accurate data.	Inventory Manager, Inventory Control Specialist, Demand Planner, Warehouse Manager, Store Manager, Procurement Manager, Customer Experience Manager

Skills and knowledge unique to omnichannel logistics	Job roles impacted
Orchestrate and optimise order fulfillment across all channels using integrated online systems.	Omnichannel Manager, Supply Chain Manager, Ecommerce Fulfillment Officer, Fulfillment Systems Operator, Omnichannel Fulfillment Officer, Logistics Coordinator
Work with automation and Industry 4.0 technologies in and around warehouses and distribution centres, e.g. automated storage and retrieval systems, goods to person station, voice picking, handheld devices, drones, scanning, automated sortation and artificial intelligence.	Warehouse Worker, Picker and Packer, Store Person, Forklift Driver, Warehouse Manager
Maintain Industry 4.0 Technologies.	Maintenance Technicians, Maintenance Managers, Warehouse Supervisor, Operations Manager
Fulfil online orders from physical stores including for instore pickup or delivery.	Customer Service Staff, Store Manager, Omnichannel Manager, Logistics Coordinator
Provide customer service across all channels.	Customer Experience Manager, Customer Service Staff
Analyse data from all channels to optimise business processes across all channels – involving big data, real-time data integration and predictive modelling.	Business Analyst, Supply Chain Analyst
4. Meet demand for increased last mile delivery and customer service	
Use integrated, online transport management systems to identify and optimise sustainability of transport operations e.g. route optimisation, carbon emissions, load planning.	Sustainability Manager, Transport Manager
Last mile delivery planning, management and coordination, locations, third party contractors	Transport Manager, Delivery Driver
Last mile delivery: safely and efficiently pick up goods from a range of business locations/sites including physical stores and deliver to a range of locations including residential addresses	Delivery Driver, Store Person, Store Manager, Omnichannel Manager, Transportation Management Systems Operator
Last mile delivery customer service including problem solving and risk management.	Delivery Driver, Transport Manager, Customer Experience Manager
5. Support reverse logistics across all channels	

Skills and knowledge unique to omnichannel logistics	Job roles impacted
Manage returns and provide reverse logistics across all channels ensuring seamless customer experience - includes driver pick up from customer, goods inspection and acceptance policy	Returns Manager, Returns Specialist, Delivery Driver

The skills and knowledge are discussed in this report in an order that loosely aligns to supply chain activities from fulfillment to delivery and then product return. However, this order does not reflect the frequency with which the skills and knowledge were raised in the interviews or found in the desktop research. **Error! Reference source not found.** shows the number of interviewees' comments coded for each group of skills and knowledge. This shows that skills and knowledge for *working with automation and Industry 4.0 technologies* were by far the most commented on by interviewees. The numbering in the graph relates to the sections in this report where each skill and knowledge group is discussed in more detail.

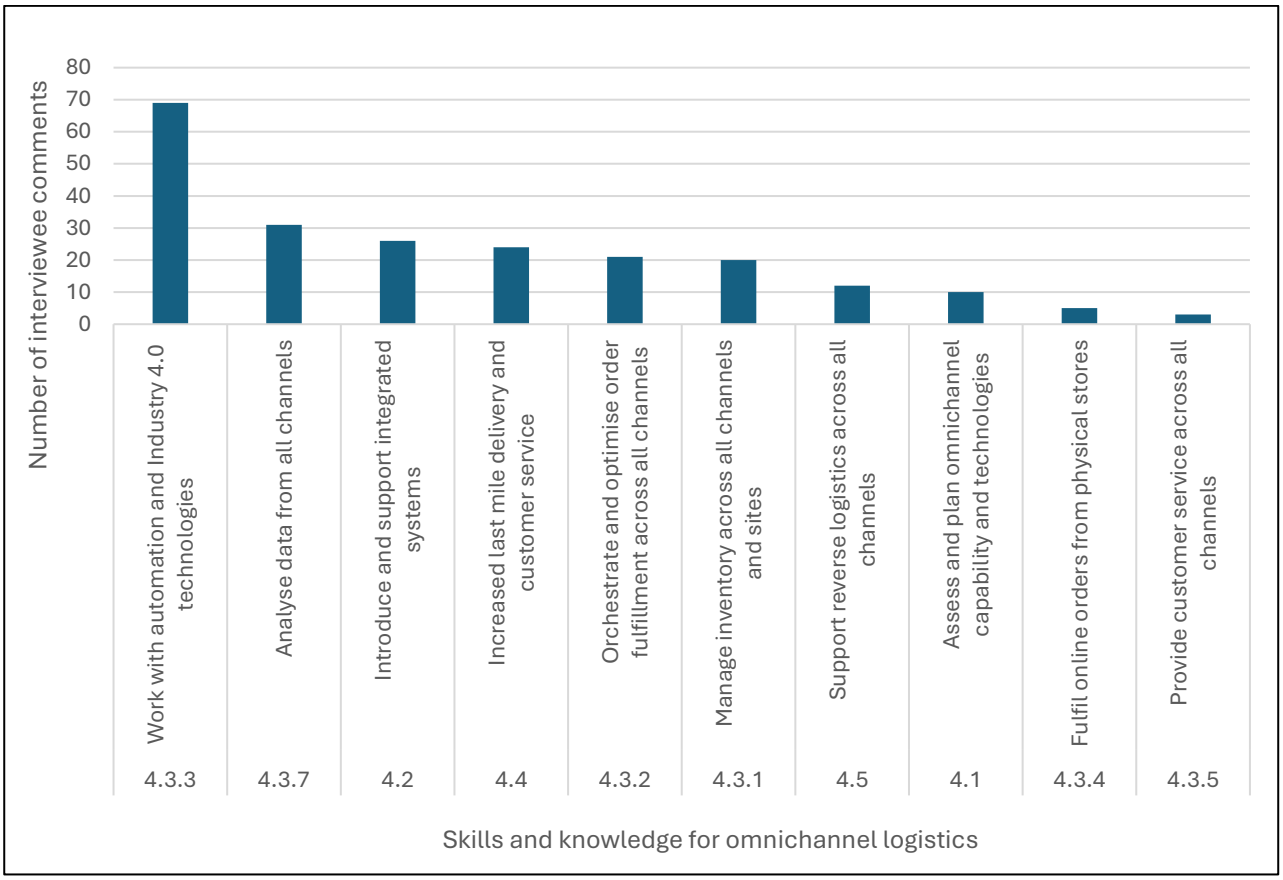

Figure 5. Distribution of interviewee comments coded into each group of skills and knowledge

4. Skills gap analysis

Training Packages are a key part of Australia's vocational education and training (VET) system. They provide frameworks for VET qualifications to address the skills needs of various industries in Australia. They are nationally accredited, which means they are developed and maintained as occupational standards, ensuring consistency and quality. Qualifications and Statements of Attainment issued under nationally endorsed Training Packages are recognised across Australia.

Training Package content at training.gov.au was searched extensively for the skills and knowledge identified through the research as being required by omnichannel logistics. The search was conducted using a tool developed by ISA that enabled searches on all Training Package content published on training.gov.au. Each search result was analysed by reviewing whether it covered the identified skills and knowledge required by omnichannel logistics.

4.1 Assess and plan omnichannel capability and technologies

Interviewees described the need for skills and knowledge to assess business needs and plan the network of physical and online sales channels, warehouses and distribution centres to provide omnichannel customer services.

Interviewees stressed the importance of critical thinking skills for all levels of staff. Operational staff contribute valuable detailed knowledge of operations and processes as part of teams looking at developing or selecting a new technology.

Also required are skills and knowledge to assess and plan the level of automation and which technologies will be used for both internal logistics (or intralogistics) and logistics within the network of stores, warehouses and fulfillment centres. These technologies enable the flow of both physical goods and information.

The required skills and knowledge relate to determining where and when to build distribution centres, fulfillment centres, dark stores, and physical stores. This also includes considerations for automation levels, staff training and transport networks to incorporate[26]. This goes beyond business analysis, focusing on integrating previously separate channels to operate seamlessly together to optimise customer service. Skills and knowledge about blockchain and its application to transport and logistics will also be required in the near future.

Some of the interviewees' comments were:

> **What's needed are skills in critical thinking around deliverability, time and optimisation – what does it look like across those sort of things – supply chain, understanding 3PL, tech choices – breaking down the barriers of what was previously thought impossible.**

[26] McKinsey & Company. (2019, April 24). *Automation in logistics: Big opportunity, bigger uncertainty*. https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/automation-in-logistics-big-opportunity-bigger-uncertainty

Assessing a solution vs status quo. Big investment in tech, need the demand to fuel the business case. Look at the solution – manufacturer's device. How does that match with co-worker development and on boarding?

Multi levels – working with, leveraging and choosing which automation and what avenues companies will follow – return on investment decision. Matter of timing and layers of decisions around take up of technology.

"Human critical" tasks [include] critical thinking, analytics, etc – what does good look like? Need skills in analysis of systems and which technology to use – managerial coordination, analysis and understanding systems. Critical thinking skills are very important now.

The mapping table (Table 5.) shows there are many units and several qualifications across several Training Packages that cover the business process, ICT, engineering design and supply chain knowledge aspects of planning and implementing an omnichannel logistics network and technology.

Also covered are skills and knowledge required to understand and plan for Industry 4.0 technologies in an industrial workplace.

While there is no explicit mention of 'omnichannel' or 'multiple channels' on training.gov.au (outside of one unit focussing on merchandising strategy which is not relevant to logistics), there are many references highlighting the importance of aligning ICT solutions with business needs and objectives. Given that omnichannel logistics is a key business driver, training could address it as a business need or objective that ICT solutions should align with. In this way, the existing training can be contextualised to omnichannel logistics.

A search for these units in the qualifications that prepare workers for the job roles impacted showed that almost none are included in the identified qualifications (also Table 6).

This means that almost all the units identified as being relevant to omnichannel skills and knowledge will need to be imported into the qualifications for the roles impacted. The qualifications that relate to the job roles impacted range from Australian Qualifications Framework (AQF) levels 3 through to 7 whereas the qualifications the units are already included in range from AQF levels 4 through to 8. This indicates a parity between the units needed to cover omnichannel logistics and the qualifications for the job roles impacted.

Table 5.

Mapping skills and knowledge to 'Assess and plan omnichannel capability and technologies' to Training Packages and job role qualifications

A. Skills and knowledge unique to omnichannel logistics	B. Training Package content for omnichannel logistics	C. Job roles impacted	D. Qualifications related to job roles	Presence of Training Package components for omnichannel logistics (column B) in job role qualifications (column D)
Network planning and analysis of where to establish distribution centres, fulfillment centres, dark stores, physical stores for an optimal fulfillment network. May	ICTSAD502 Model data processes MEM29012 Access and use a digital twin for operational purposes TLIL4070 Work effectively in the transport and logistics industry TLIP0008 Implement and monitor logistics planning and processes TLIP5004 Develop a transport and logistics business plan TLIX0011X Establish blockchain in supply chains TLIX0014X Manage customer focussed supply chain	Business Analyst	BSB60120 Advanced Diploma of Business BSB60420 Advanced Diploma of Leadership and Management	All absent
		Customer Experience Manager	BSB30120 Certificate III in Business	All absent
		Distribution Centre Manager / Transport Manager / Warehouse Manager	BSB50420 Diploma of Leadership and Management	All absent
		IT Systems Manager	ICT60220 Advanced Diploma of Information Technology	All absent
		Logistics Engineer	TLI50422 Diploma of Materiel Logistics	All absent

A. Skills and knowledge unique to omnichannel logistics	B. Training Package content for omnichannel logistics	C. Job roles impacted	D. Qualifications related to job roles	Presence of Training Package components for omnichannel logistics (column B) in job role qualifications (column D)
use digital twins.		Store Manager	SIR40316 Certificate IV in Retail Management SIR50116 Diploma of Retail Leadership	All absent
		Supply Chain Analyst	Tertiary qualifications	Not applicable.
Critically assess business and select appropriate technologies or automation for integrated omnichannel fulfillment.	BSBCRT411 - Apply critical thinking to work practices ICTAUT401 Design business process automation solutions ICTICT524 - Determine ICT strategies and solutions for organisations ICTNPL412 - Apply business acumen to network planning ICTNWK529 Install and manage complex ICT networks	Business Analyst	BSB60120 Advanced Diploma of Business BSB60420 Advanced Diploma of Leadership and Management	All absent
		Distribution Centre Manager / Transport Manager / Warehouse Manager	BSB50420 Diploma of Leadership and Management	All absent
		IT Systems Manager	ICT60220 Advanced Diploma of Information Technology	All absent except for ICTNPL412

A. Skills and knowledge unique to omnichannel logistics	B. Training Package content for omnichannel logistics	C. Job roles impacted	D. Qualifications related to job roles	Presence of Training Package components for omnichannel logistics (column B) in job role qualifications (column D)
	ICTSAS439 - Analyse ICT system capacity and implement enhancements MEM234009 Design computer-integrated manufacturing systems MEM29001 Work in Industry 4.0 MSS405065 Develop the application of enterprise control systems in an organisation TLIX0009X Employ digital supply chain risk management practices TLIX0010X Enable traceability in supply chains	Store Manager	SIR40316 Certificate IV in Retail Management SIR50116 Diploma of Retail Leadership	All absent

4.2 Introduce and support the adoption of integrated systems for omnichannel logistics

The skills and knowledge required in this section relate to the introduction and implementation of integrated online systems to enable omnichannel logistics and ongoing support.

Interviewees frequently described the challenges that new technology and systems posed for some workers in the industry and the need to have supports in place for staff to transition to new technology and systems. Difficulties in transition were sometimes attributed to the age of the workforce and the level of formal educational attainment of workers. Some strategies reported to be effective in supporting the transition were to involve workers in the process of developing and implementing new technology, to upskill workers in the new technologies[27] and, to have a champion leading the changes.

Interviewees provided the following relevant comments:

Dramatic and difficult transitions taking place.

Some staff are not rooted in technology – reluctant to engage in the technology.

Automation – people need to understand the use of automation, what it brings to them, the value it creates.

Logistics workforce is generally not qualified beyond high school – though very capable and skilled. Now expected to step up and deal with this technology when their own roles have changed. They must navigate a data information system. It is an aging workforce, upskilling to cope with the digitisation environment - moving from the manual.

Support for the implementation of integrated online systems in omnichannel logistics was reported to require skills and knowledge in information technology and cyber security. Interviewees described the need for information technology skills and knowledge to embed the technology, integrate it with existing technologies and systems, establish processes for converting operational data into meaningful measures and provide support for the systems if they fail.

Different channels may also have different legacy systems and processes that need to change to enable omnichannel logistics. For example, physical stores and warehouses catering for online only sales may have

[27] Harvard Business Review. (2022, February 11). *Research: How do warehouse workers feel about automation?* https://hbr.org/2022/02/research-how-do-warehouse-workers-feel-about-automation

different inventory management systems. Meeting cybersecurity and interoperability standards was raised as an important issue by interviewees and also identified in research[28].

Some of the interviewees' comments were:

We have a wide range of digital systems – wi-fi, temperature controlled areas, fire systems, sprinkler systems. Then back into the physical information technology systems - these platforms need to be ultra reliable – network, cyber security.

Support for new tech and when things go wrong. Information technology support people not fully across the technology and systems.

If you can vertically integrate –will need data scientists, engineers, mainframes and cloud network, logistics and 3PL companies linked to a cloud system.

There is a barrier between operational technology (OT) and information technology (IT). It's a change management situation – uncomfortable – need to have them come together. C-suite people should be able to see operational technology live data. Once IT and OT merged it has a big impact.

Cyber security is pinnacle – ransom ware, firewalls, encryption is important, user management system, data sharing is encrypted, scanning privileges to be applied, everything is tagged – privileges and authority.

The mapping table (Table 6.) shows there are many units across several Training Packages that cover the business, ICT and industry-related skills and knowledge needed to introduce and support the adoption of integrated, online systems for transport and logistics.

The *TLISS00191 Establish Digital Supply Chain Skill Set* includes units specifically focused on leading digital supply chain implementation, supporting staff through technological, cultural and organisational change and developing staff members' digital capabilities. Other units cover change management from human resources and ICT viewpoints that are not specific to any industry but can be applied to the context of adopting Industry 4.0 technologies for omnichannel logistics.

Technical aspects of integrating the ICT systems are covered in units from the ICT Training Package that address developing complex ICT systems and systems integration. Many units across the ICT and MEM Training Packages cover skills and knowledge to support integrated systems including the *ICTSS00160 Cyber Security for Advanced Roles Skill Set* and *ICTSS00107 Introductory Help Desk Skill Set.*

[28] Cimini, C., Lagorio, A., Romero, D., Cavalieri, S., & Stahre, J. (2020, July). *Smart logistics and the logistics operator 4.0.* https://www.sciencedirect.com/science/article/pii/S2405896320335837

However, there was little mention of ‘integrated’ and ‘integration’ aside from in relation to ICT systems. Contextualisation of the existing training will be required to cover integration across all channels at a business process level.

A search for the units in the qualifications that prepare workers for the job roles impacted (also Table 6.) show that many are absent from the qualifications. The qualifications range from AQF levels 3 to 7 whereas the units are included in other qualifications that are mostly at the AQF levels 4 to 6. This means that the units will be suitable for importing into the qualifications relating to the job roles impacted.

Table 6.

Mapping skills and knowledge to 'Introduce and support the adoption of integrated systems for omnichannel logistics' to Training Packages and job role qualifications

A. Skills and knowledge unique to omnichannel logistics	B. Training Package content for omnichannel logistics	C. Job roles impacted	D. Qualifications related to job roles	Presence of Training Package curriculum for omnichannel logistics (column B) in job role qualifications (column D)
2. Introduce and support the adoption of integrated systems for omnichannel logistics				
Change management as new technology and business processes are developed or introduced.	BSBLDR601 Lead and manage organisational change BSBLDR811 Lead strategic transformation BSBTEC403 Apply digital solutions to work processes ICTICT520 Confirm transition strategy for new systems PSPMGT003 Manage change TLISS00191 - Establish Digital Supply Chain Skill Set	Business Analyst	BSB60120 Advanced Diploma of Business BSB60420 Advanced Diploma of Leadership and Management	All absent except for BSBLDR601
		Distribution Centre / Transport / Warehouse Manager	BSB50420 Diploma of Leadership and Management	All absent
		Store Manager	SIR40316 Certificate IV in Retail Management SIR50116 Diploma of Retail Leadership	All absent

A. Skills and knowledge unique to omnichannel logistics	B. Training Package content for omnichannel logistics	C. Job roles impacted	D. Qualifications related to job roles	Presence of Training Package curriculum for omnichannel logistics (column B) in job role qualifications (column D)
Integrate digital systems for inventory, sales, orders and purchasing, delivery, transport and returns across all channels.	BSBESB406 Establish operational strategies and procedures for new business ventures ICTNWK529 Install and manage complex ICT networks ICTSAS521 Perform integration tests ICTTEN521 Integrate network systems and equipment ICTTEN821 Manage solution architecture and impacts MEM07040 Set multistage integrated processes MEM29002 Commission a cyber-physical system PSPMGT008 Formulate business strategies	Business Analyst	BSB60120 Advanced Diploma of Business BSB60420 Advanced Diploma of Leadership and Management	All absent except for ICTNWK529
		Distribution Centre / Transport / Warehouse Manager	BSB50420 Diploma of Leadership and Management	All absent except for ICTNWK529
		IT Systems Manager	ICT60220 Advanced Diploma of Information Technology	All absent except for ICTNWK529, ICTTEN821
		IT Support	ICT30120 Certificate III in Information Technology ICT40120 Certificate IV in Information Technology	All absent except for ICTNWK529, ICTTEN821, ICTSAS521
		Store Manager	SIR40316 Certificate IV in Retail Management	All absent except for ICTNWK529

A. Skills and knowledge unique to omnichannel logistics	B. Training Package content for omnichannel logistics	C. Job roles impacted	D. Qualifications related to job roles	Presence of Training Package curriculum for omnichannel logistics (column B) in job role qualifications (column D)
			SIR50116 Diploma of Retail Leadership	
		Logistics Coordinator	TLI40324 Certificate IV in Supply Chain Operations	All absent
		Supply Chain Analyst	Tertiary qualifications	Not applicable.
IT support for integrated systems across multiple channels including cybersecurity.	CPPSEC5006 Develop strategies to implement advanced technology security systems ICTAUT501 Manage robotic process automation ICTCLD502 - Design and implement highly-available cloud infrastructure ICTICT316 Implement new technology	IT Support	ICT30120 Certificate III in Information Technology ICT40120 Certificate IV in Information Technology ICT50220 Diploma of Information Technology	All present except for CPPSEC5006, MEM07039, MEM29009
		Cybersecurity Specialist	Tertiary qualification	All absent

A. Skills and knowledge unique to omnichannel logistics	B. Training Package content for omnichannel logistics	C. Job roles impacted	D. Qualifications related to job roles	Presence of Training Package curriculum for omnichannel logistics (column B) in job role qualifications (column D)
	ICTNWK539 - Design and implement integrated server solutions ICTSAD510 Manage risks when implementing new technologies ICTSAS439 - Analyse ICT system capacity and implement enhancements MEM07039 Write programs for industrial robots MEM29009 Prepare, configure and test collaborative robots for industrial operations ICTSS00107 - Introductory Help Desk Skill Set ICTSS00160 Cyber Security for Advanced Roles Skill Set	Data Scientist	Tertiary qualification	All absent

4.3 Use integrated systems and other Industry 4.0 technologies for omnichannel logistics

The skills and knowledge in this area are about the *use of* integrated online systems and Industry 4.0 technologies to carry out omnichannel logistics. Many job roles are involved as the systems permeate every aspect of omnichannel logistics and include staff at all levels. This group of skills and knowledge will be discussed in more detail as the composite skills and knowledge are diverse.

4.3.1 Manage inventory across all channels and sites - demand planning, purchasing, replenishment, storage - using real time, accurate data

An integrated (or unified) online inventory management system (sometimes referred to as a warehouse management system) that provides accurate, reliable, real time inventory visibility is critical to omnichannel logistics. It differs from traditional inventory management in that inventory is tracked across multiple sales channels (physical stores, distribution centres, dark stores, online sales, third party online presences and mobile applications) and integrated into one source of truth.

Warehouse workers use, or work alongside machines with scanning technology to track, sort, pick, pack and move inventory. Workers must also process returns into the integrated inventory system. An integrated online inventory management system can also provide automated stock management features and much more data than previously siloed systems. Demand Planners and Specialist Inventory Managers require new skills and knowledge to use the automated functions and data to manage inventory across all channels.

Interviewees provided the following relevant comments:

Single most important thing is you need to have accurate live inventory visibility – what's in my stores, in my warehouses, third party stores, what's coming inbound from suppliers – so you know what's 'available to promise' and 'available to sell'. Live – knowing level of stock, location, and length of time for shipping/delivery - need to be able to make promises you can keep – as there is no cost to the customer to change.

Tech is available to democratise the ability to see all the stock - someone can be in the store online and, specify how they want to pick up or get [their order] delivered from somewhere else. The online platform is increasing the visibility of stock and inventory accuracy to sell from another location.

Seeing how your business and product is flowing – complete transparency within/outside of warehouse, within a truck, real time location services.

Table 7.

Mapping skills and knowledge to 'Manage inventory across all channels' to Training Packages and job role qualifications

A. Skills and knowledge unique to omnichannel logistics	B. Training Package content for omnichannel logistics	C. Job roles impacted	D. Qualifications related to job roles	Presence of Training Package curriculum for omnichannel logistics (column B) in job role qualifications (column D)
Manage inventory across all channels and sites - demand planning, purchasing, replenishment, purchasing, storage - using real time, accurate data.	MEM11015 Manage warehouse inventory system MEM29001 Work in Industry 4.0 TLIP0011 Monitor warehouse operations TLIX0004X Administer inventory systems TLIX0013X Maintain stock control and receivals TLIX0014X Manage customer focussed supply chain TLIX0015X - Manage fundamental aspects of supply chains	Customer Experience Manager	BSB30120 Certificate III in Business	All absent except for TLIX0014X
		Inventory Control Specialist / Inventory Manager	TLI30321 Certificate III in Supply Chain Operations TLI40324 Certificate IV in Supply Chain Operations	All present except for MEM11015 MEM29001 TLIX0014X
		Procurement Manager	BSB40120 Certificate IV in Business	All absent
		Warehouse Manager	BSB50420 Diploma of Leadership and Management	All absent except for MEM2900, TLIX0014X
		Store Manager	SIR40316 Certificate IV in Retail Management SIR50116 Diploma of Retail Leadership	
		Demand Planner	Tertiary qualifications	Not applicable.

Table 7. highlights several units that cover inventory management skills and knowledge combined with computer systems, ICT systems, inventory management systems and some of the technologies used e.g. scanning, mobile devices and applications.

However, there is no mention of 'omnichannel', 'unified inventory' and only one mention of 'different channels'. Given the critical nature of unified inventory management systems to omnichannel logistics - this is a gap in current Training Package content.

Gap:

No coverage of the 'unified' aspect of inventory systems in omnichannel logistics and the skills and knowledge required to implement, manage and use them.

The mapping in Table 8 also shows that many of the units will need to be imported into qualifications that prepare workers for the roles impacted.

4.3.2 Orchestrate and optimise order fulfillment across all channels using integrated online systems

Some interviewees described omnichannel logistics as requiring skills and knowledge to orchestrate and synchronise order fulfillment from a variety of different sites or sources. These were described as new, specialist Systems Operator roles where workers operate and monitor the integrated online systems that fulfill orders through automation alongside human-operated processes. A significant component of this role involves monitoring digital information about the operation of these systems.

The skills and knowledge described by interviewees may relate to supply chain "control towers" which are cloud-based solutions that use advanced technologies such as artificial intelligence, machine learning and the Internet of Things to pro-actively manage the entire supply chain and improve its performance[29]. There are different types of control towers with fulfillment being one of them[30]. It may be that the skills and knowledge reported by interviewees relate to the use of control towers to enhance visibility and operations oversight where needed in the supply chain.

Interviewees provided the following relevant comments:

> **An operational role in front of screens. They are managing the flow of systems actions – managing separate parts of the system so they all come to the staging area at the same time – all for one order. Health checking, making sure all the different discrete areas are coming together. They focus [on] goods-to-person area, manual area, full pallets, - all for one order – they all have to get to the staging area at the same time. Recruit on ability to handle many things at the same time.**

[29] Accenture. (2024, October 17). *Supply chain control tower - from visibility to value.* https://www.accenture.com/au-en/insights/consulting/supply-chain-control-tower
[30] ShipBob. (2024, October 17). *Learn How Supply Chain Control Towers Work (+ If You Need One).* https://www.shipbob.com/au/blog/supply-chain-control-tower/

Supervisors – demands increasing – e.g. the weekend is approaching and there is a need to ensure product is available for customers. Instead of supervising people to move more product through the supply chain - they are supervising systems rather than people to turn inventory over. Their role becomes more one of supervising a control centre.

Cross-Channel Planning and Coordination Knowledge: Comprehensive understanding of the supply chain and its components. Knowledge of various sales channels (online, physical stores, mobile apps) and their integration. Familiarity with supply chain planning tools and software. Skills: Strong project management skills to coordinate activities across multiple channels. Excellent communication and collaboration skills to work with different departments. Strategic planning skills to align supply chain operations with business goals.

Related to this were skills and knowledge that interviewees described as being required by managers for intra-day coordination and management of people and resources to fulfil orders that can be for other distribution centres or 'dark stores' or direct to customers. Managers need to be able to quickly respond to changes that occur within a day to ensure orders are fulfilled by deploying resources where needed ('flexing').

Other interviewees identified that knowledge of lean manufacturing processes is increasingly relevant to the new demands of omnichannel logistics. Interviewees provided the following relevant comments:

'Intra-day planning adjustment/flex. Need to effectively plan your day, plan your resources. Intra-day problem solving skill set. One of the most required skills sets. And – be able to lead, manage and inspire a team.'

'[That] the whole thing needs to operate on a rhythm is more important. If something goes wrong up the supply chain then it's impact is more important. Transport planner role, distribution centre planner (how to pick, when to pick), Store management: picking, direct to boot, click and collect. Where need to flex up to meet orders. Could be shift manager, operations manager, store manager, DC manager – they all have a different edge to them now.'

'People internally have been put through a lean program – putting them through lean training mindset – i.e. people who have some knowledge about how things are done but also lean, six sigma process excellence. More efficient process – Lean 6 sigma technical skills.'

Table 8.

Mapping skills and knowledge to 'Orchestrate and optimise order fulfillment across all channels' to Training Packages and job role qualifications

A. Skills and knowledge unique to omnichannel logistics	B. Training Package content for omnichannel logistics	C. Job roles impacted	D. Qualifications related to job roles	Presence of Training Package curriculum for omnichannel logistics (column B) in job role qualifications (column D)
Orchestrate and optimise order fulfillment across all channels using integrated online systems.	AMPMGT809 Analyse data for business decision making MEM29001 Work in Industry 4.0 MSS405056 Use three or six sigma processes to determine and improve process capability TLIL0001 Apply effective staff and resource allocation TLIP0010 Monitor a supply chain operation	Logistics Coordinator	TLI40324 Certificate IV in Supply Chain Operations	All absent except for TLIL0001, TLIP0010
		Ecommerce Fulfillment Officer / Omnichannel Fulfillment Officer	New role	To be developed
		Omnichannel Manager	New role	To be developed
		Supply Chain Manager	TLI50224 Diploma of Logistics	All absent
		Transportation Management System Operator	New role	To be developed

The mapping table (Table 8.) shows units that cover skills and knowledge for managing people and resources efficiently in a supply chain that incorporates Industry 4.0 technologies. These units cover management-level skills and knowledge for supervising and controlling processes within integrated online systems.

However, there is no coverage of operating and monitoring integrated online systems to carry out and directly control or influence orchestrated order fulfillment across all channels. The skills and knowledge needed are more operational than managerial. They are for Systems Operators focused on operating integrated, automated systems that carry out the order fulfillment processes. This is a gap in the current Training Package content.

Process control training has been developed for similar systems operator roles in other industries such as mining, food production and meat processing:

- RIIPRO302D - Perform process control room operations
- FBPOPR1014 - Monitor process operation
- AMPA2035 - Operate new technology or process

The unit FBPOPR2068 - Operate a process control interface is also relevant and may be applied to transport and logistics.

Gap:

The remote operation of integrated online systems to coordinate order fulfillment across all channels.

The units identified as covering omnichannel skills and knowledge are also largely absent from the existing qualifications for the job roles of Logistics Coordinator and Supply Chain Manager and would need to be imported into those qualifications. The units are in qualifications that have AQF levels 4 to 8 which shows that they are of a suitably advanced level to be imported into existing or new training for the job roles impacted.

4.3.3 Work with automation and Industry 4.0 technologies in warehouses and distribution centres e.g. automated storage and retrieval systems, goods to person station, voice picking, hand held devices, drones, scanning, automated sortation and artificial intelligence.

As described earlier, a large number of Industry 4.0 technologies are being adopted into the transport and logistics industry and warehouses and distribution centres are becoming increasingly automated / ‘smart’ as a result.

Robots, drones, automated storage and retrieval systems, wearable scanners, and virtual assistants are examples of some of the technology that workers need to know how to use and ‘co-work’ with in warehouses / storage facilities.

The importance of digital skills for all workers was often raised by interviewees. These were described as the ability to understand technological devices and systems and interact with digital information on computers, tablets, mobile phones and other devices. It also includes knowledge of how to apply and work with machines with artificial intelligence. These skills are relevant to all levels of workers from operational staff through to managers interpreting information from artificial intelligence on company performance.

Workers' skills and knowledge include technical knowledge of the devices and systems, interpersonal and methodological skills such as:

- leadership – inspiring diverse teams
- collaboration – especially across different channels
- communication – especially when there are issues regarding automation and technologies
- multi-skilling as workers' roles change with increased automation and to incorporate all channels
- having a systems perspective and understanding one's role in that system
- problem solving – especially as more complex solutions are required to meet customers' expectations for a seamless omnichannel experience

Interviewees provided the following relevant comments:

From a general education/training point of view – there is a need (TAFEs or unis) to understand what's happening re the technology – general teaching in what does a fully automated distribution centre look like, feel like – and what skills do I need e.g. understanding the technology, the safety component, communication – e.g. when they see that something is not quite right they can speak out, I know I need to scan this product and that product etc and understanding the engineering behind the robot – how the robots work.

Need to be able to work in tandem with automated solutions – understand how to work with technology. Automation is not a full solution and will always require an element of human labour to support. [Our staff] need to understand how to work with technology.

The Warehouse Worker is now no longer picking from a piece of paper – now voice picking and handheld devices are used – to scan and may also tell them where it is in the warehouse. Now robots are being used – so no longer walking around the distribution centre. They need to adapt from paper to voice to AMR (autonomous mobile robot) that brings the goods to them.

Digitisation – parallel version of systems and logistics and using systems to make decisions operationally. E.g. Understanding the impact of shorter lead times, transparency of data, inventory.

For early career university graduates or [workers with] some training: artificial intelligence is pinnacle now. Not just ChatGPT – it's about industrial AI – this is much more regulated, already proven in industry – already validated technology. Already has all the norms that needs to be followed in industry – uses the strength of the larger AI that is available but filters so it can be applied in an industrial environment. Application knowledge or knowledge to engineer.

Analytics, best practice awareness, commercial acumen, systems perspective and articulation skills' – articulation skills help communication / relationship building.

The need for vocational workers to have digital skills for Industry 4.0 has been well documented[31]. Within this, it is also important to have training for digital skills at all levels - basic, general/intermediate and advanced/specialist, and soft skills such as communication and collaboration[32].

The mapping table (Table 9.) found many units across several Training Packages that cover the use of, and working with, automation in warehouses and distribution centres.

Some cover operating specific technologies such as drones, automated packaging and parcel sortation whereas other training is in more generic digital skills.

The *ICTSS00120 - Artificial Intelligence Skill Set* covers the skills and knowledge to implement AI in industrial workplaces including training and evaluating machine learning.

The skill levels range from operator through to manager / designer. The level of complexity varies from operation of automated equipment through to developing and training machine learning. There is also training for communication as part of a team to improve processes.

The many relevant units and the wide range of skill levels they address, presents an opportunity to develop skill sets that could provide training on working with automation that is tailored to different job role types such as Warehouse Worker, Warehouse Manager, Store Manager, Transport Manager and Picker Packer. Skills and knowledge for workers to work with automation and Industry 4.0 technologies was stressed by interviewees. Skill sets are recommended to ensure workers receive the targeted, relevant training in this crucial area.

[31] National Centre for Vocational Education Research. (2020). *VET's response to Industry 4.0 and the digital economy: what works.* https://www.ncver.edu.au/__data/assets/pdf_file/0034/9660436/VETs-response-to-Industry-4.0.pdf
[32] Innovation and Business Skills Australia. (2017). *Preparing for Industry 4.0 – will digital skills be enough?* https://ibsa.org.au/wp-content/uploads/2018/11/IBSA-Manufacturing-Preparing-for-Industry-4-will-digital-skills-be-enough.pdf

Skill sets are short courses that comprise a single unit of competency or a combination of units of competency from one or more national Training Packages. Skill sets are developed by grouping units of competency from the same or different Training Packages. Skill sets can be defined as part of Training Packages or developed by Registered Training Organisations (RTOs) and then registered as an accredited course. Skill sets can also be developed by RTOs and not registered but still offered.

The units identified as covering omnichannel skills and knowledge are also largely absent from the existing qualifications for the job roles impacted. While there is a wide range, many of the units are included in qualifications at AQF levels 3 and 4 which would make them suitable for importing into the qualifications for the job roles impacted by omnichannel logistics.

Table 9.

Mapping skills and knowledge to 'Work with automation and Industry 4.0 technologies in warehouses and distribution centres' to Training Packages and job role qualifications

Skills and knowledge unique to omnichannel logistics	Training Package curriculum for omnichannel logistics	Job roles impacted	Qualifications related to job roles	Presence of Training Package curriculum for omnichannel logistics in job role qualifications
Work with automation and Industry 4.0 technologies in warehouses and distribution centres e.g. automated storage and retrieval systems, goods to person station, voice picking, hand held devices, drones, scanning, automated	AMPMGT809 Analyse data for business decision making BSBCMM211 Apply communication skills BSBSTR301 Contribute to continuous improvement BSBXTW301 Work in a team FBPBPG3008 Operate an automated carton packing process FBPBPG3009 Operate an automated palletising process FBPOPR3019 Operate and monitor interrelated processes in a production or packaging system FSKDIG001 Use digital technology for short and basic workplace tasks ICPPRN2850 Use digital workflow ICTAII502 Train and evaluate machine learning models	Forklift Driver	TLI20421 Certificate II in Supply Chain Operations TLI21221 Certificate II in Driving Operations	All absent
		Picker and Packer, Store Person, Warehouse Operator	TLI20421 Certificate II in Supply Chain Operations	All absent
		Store Person, Warehouse Operator	TLI11321 Certificate I in Supply Chain Operations	All absent
		Warehouse Operator	TLI30321 Certificate III in Supply Chain Operations	All absent except for TLIW3006

Skills and knowledge unique to omnichannel logistics	Training Package curriculum for omnichannel logistics	Job roles impacted	Qualifications related to job roles	Presence of Training Package curriculum for omnichannel logistics in job role qualifications
sortation and artificial intelligence.	ICTDSN403 Apply innovative thinking and practices in digital environments MEM11020 Perform advanced warehouse computer operations MEM29001 Work in Industry 4.0 TLIB0006 Prepare and monitor automated operations TLIK0004 Apply knowledge of automated workplace fundamentals TLIP0011 Monitor warehouse operations TLIW3006 Operate computerised mail and parcels sorting equipment TLIX0010X Enable traceability in supply chains AVISS00080 - Remotely Piloted Aircraft Operations in Excluded Category Sub-2 kg Skill Set ICTSS00120 Artificial Intelligence Skill Set	Warehouse Manager	BSB50420 Diploma of Leadership and Management	All absent except for MEM29001, TLIP0011

4.3.4 Fulfil online orders from physical stores including for instore pickup or delivery

Omnichannel logistics enables orders received through any channel to be fulfilled from any location whether that be a physical store or distribution centre – whichever suits the customer and is most efficient. Retail Workers in physical stores are required to have new skills and knowledge to pick, pack and prepare online orders from the physical store. New skills and knowledge are required for working with integrated order and inventory management systems, picking goods for an online order from the store inventory, packaging and addressing goods into parcels and preparing goods for pick up instore by customers or last mile Delivery Drivers.

Interviewees provided the following relevant comments:

> **Stores are becoming more adaptable – can manage stock from all over the network – transfers from store, ship from warehouse. Sales teams have ability to maximize orders and sell from multiple locations – increasing ability to maximize the sale to the customer – can access inventory from different delivery channels. Increase staff satisfaction and hence staff retention.**

> **Instore – have two customers vying for product on the shelf – instore and online. How can the co-worker support and serve instore customers and picking orders to go with the customer or be delivered to them? Previously would have had a separate sales and delivery section. Now we want a person to coordinate and serve both tasks. Need to pivot from one to the other.**

The mapping table (Table 10.) shows that existing Training Package curriculum exists that covers the skills and knowledge needed to carry out order fulfillment from a physical store. There are units for both carrying out the processes and managing the processes. The training covers following organisational policies and procedures, correct manual handling, using ICT systems and organising transport.

These units cover the skills and knowledge needed but contextualisation for fulfilling online orders from physical stores is required. The training can be applied to online order fulfillment from a physical store as the aspects relating to online orders would be part of the organisation's systems and processes.

A search for these units in the qualifications that prepare workers for the job roles impacted show that all three units are absent from all the relevant qualifications (also Table 11). The units will need to be imported before they can then be contextualised. The units are currently included in other qualifications at AQF levels 2 to 3.

Table 10.

Mapping skills and knowledge to 'Fulfil online orders from physical stores' to Training Packages and job role qualifications

A. Skills and knowledge unique to omnichannel logistics	B. Training Package curriculum for omnichannel logistics	C. Job roles impacted	D. Qualifications related to job roles	Presence of Training Package curriculum for omnichannel logistics (column B) in job role qualifications (column D)
Fulfil online orders from physical stores including for instore pickup or delivery.	TLIA0015 Organise receival and despatch operations TLIA0019 Despatch stock TLIA0022 Pick and process orders	Customer Service Staff, Retail Worker	BSB30120 Certificate III in Business SIR30216 Certificate III in Retail	All absent
		Logistics Coordinator	TLI40324 Certificate IV in Supply Chain Operations	All absent
		Store Manager	SIR40316 Certificate IV in Retail Management SIR50116 Diploma of Retail Leadership	All absent
		Omnichannel Manager	New role	To be developed

4.3.5 Provide customer service across all channels

Omnichannel service staff communicate with customers through many channels, for example: instore, phone calls, live-chat, email, tweet, text, social media post, online forums. Workers are required to provide customer support and resolve queries across all these channels. Workers will need skills to work with unified customer relationship management systems that capture all touchpoints across all channels. They will also need skills to communicate and continue interactions across all channels no matter where the interaction first started[33]. The product range may also be different across channels for example more products are available online and workers whether they are in customer service in physical stores or call centres will need to be able to support queries about all products.

Interviewees provided the following relevant comments:

> ***'Bigger role now for customer: 'whereismo' i.e. where's my order? Timely customer operations – changing orders, customer appeasement.***

> ***Customer Experience – good part of marketing to be brought into – marketing, online, etc. more than just a basic customer service role, reach/engagements, heat maps. Gaps in the packages.***

The mapping table (Table 11.) highlighted many units, and a skill set, across several Training Packages, that cover basic and advanced customer service via online and other digital tools. The training covers use of digital technologies for internal and external communication and resolving complex customer queries.

While there was no mention of 'omnichannel' or 'multiple channels', there is some opportunity to introduce omnichannel business needs as part of the organisational policies and processes to be followed. Contextualisation of the existing training will cover the technology-specific skills and knowledge required for omnichannel logistics.

The units identified as covering omnichannel skills and knowledge are also largely absent from the existing qualifications for the job roles impacted. The qualifications that the units are currently included in range from AQF levels 2 to 5 and therefore most would be suitable for importing.

[33] IBM. (2024, October 29). *What is omnichannel customer service?* https://www.ibm.com/topics/omnichannel-customer-service

Table 11.

Mapping skills and knowledge to 'Provide customer service across all channels' to Training Packages and job role qualifications

A. Skills and knowledge unique to omnichannel logistics	B. Training Package curriculum for omnichannel logistics	C. Job roles impacted	D. Qualifications related to job roles	Presence of Training Package curriculum for omnichannel logistics (column B) in job role qualifications (column D)
Provide customer service across all channels.	BSBOPS304 Deliver and monitor a service to customers MEM16003 Provide advanced customer service SIRXCEG006 Provide online customer service SIRXCOM001 Communicate in the workplace to support team and customer outcomes TLII4001 Coordinate quality customer service TLIX0014X Manage customer focussed supply chain BSBSS00126 Contact Centre Skill Set	Customer Service Staff, Retail Worker	SIR20216 Certificate II in Retail Services SIR30216 Certificate III in Retail	All absent except for SIRXCEG006, SIRXCOM001
		Customer Service Staff, Customer Experience Manager	BSB30120 Certificate III in Business	All absent except for BSBOPS304, SIRXCEG006

4.3.6 Analyse data from all channels to optimise business processes across all channels – involving big data, real-time data integration and predictive modelling

The integrated online systems that enable omnichannel logistics provide very large amounts of data regarding customers, products, sales and supply chain performance. The data sets are known as 'big data' because of their extremely large size which is due to the ubiquitous and interconnected nature of the digital systems that comprise automation and Industry 4.0 technologies.

Interviewees described requiring data and business analysis skills to analyse data and gain insights to increase efficiency, build resilience, manage disruptions and increase sustainability. They raised the issue of needing to be able to work with artificial intelligence (AI) and interpret and understand the data analysis and the insights provided by AI. A hybrid of skills is required comprising operational knowledge of processes as well as knowledge of integrated online systems.

Skills requirements included:

- big data' analysis, data visualisation and communication and real time data integration for predictive analytics, demand forecasting and inventory management.
- integrating financial analysis with data and business processes so that the costs of operational changes were understood,
- working with AI to analyse data and gain insights
- using software programs for data and business analysis such as SQL, Python, R, Apache Hadoop, Apache Spark, Tableau, Power BI, QlikView; and integration platforms: Talend, Informatica, Apache Nifi.

Interviewees provided the following relevant comments:

What's needed are analytical skills at all levels – from digital literacy through to investment in sophisticated modelling and optimisation to leverage the data that is being created. Interesting training too to connect the financial parts of the business with the logistics – multilayered.

Connected to analyse big data chunks – presented as insights to management and leadership teams to inform decision making process. What is the data saying, where is it coming from, interpretation and how it is packaged up. Analysis will have a conclusion drawn and recommendations made. Will inform direction of the company.

Advanced modelling of ChatGPT code for software. Taken product data, put into ChatGPT systems which has coded the data and built a live system which now pre-empts bookings, etc. It's like we have many more pieces of information about a customer now and the system that ChatGPT builds from that requires interpretation i.e. what is it that we are being presented with here – is this an insight we didn't have access to before ChatGPT?

Massive skill gap: in finance in the supply chain – there aren't enough financial analysts in the supply chain – financial skills. The role is understanding the Profit and Loss (P&L) of the warehouse centre – can be broader if the company has more than one Distribution Centre (DC) – understanding the cost to serve the customer, cost per line, cost per order, Key Performance Indicators (KPIs).

Analytical skills – is this a new role or a requirement? Not new- just more important with the compression of time. Analysis needs to be better and more accurate - don't have fat in the system. Always be a role for analytical skills – inventory planning – time and efficiency reduces operating costs- increased optimization, changing all the time – also where we can save costs. Analyse processes – look at systems or process – can we redesign this – what does the data tell us and how can we use it to do things better. Whether it's to benefit customers or save own hours.

The mapping table (Table 12.) showed that there are many units across several Training Packages that cover the 'big data' and business analysis skills required in omnichannel logistics. In particular, the *BSBSS00091 Capture and Present Big Data Skill Set* and the unit *TLIX0019X Monitor digital supply chain services* contain very relevant skills and whilst there was no mention of 'omnichannel' - the issue of multiple sources of 'big data' in a digital supply chain is covered.

No training curriculum was found regarding working with artificial intelligence to analyse data and gain insights - this is a gap in the Training Package curriculum. Skills and knowledge to interpret and use 'big data' are critical for omnichannel logistics.

Gap:

No coverage of skills and knowledge in working with artificial intelligence to analyse data and gain insights.

The units that cover the skills and knowledge needed are currently included in qualifications at AQF levels 4 to 6. The units are largely absent from the VET qualifications for the role of Business Analyst.

Table 12.

Mapping skills and knowledge to 'Analyse data from all channels' to Training Packages and job role qualifications

A. Skills and knowledge unique to omnichannel logistics	B. Training Package curriculum for omnichannel logistics	C. Job roles impacted	D. Qualifications related to job roles	Presence of Training Package curriculum for omnichannel logistics (column B) in job role qualifications (column D)
Analyse data from all channels to optimise business processes across all channels – involving big data, real-time data integration and predictive modelling .	BSBDAT501 Analyse data FNSACC521 Provide financial and business performance information ICTDAT601 Develop data integration strategies ICTSAD501 Model data objects ICTSAD502 Model data processes MEM29012 Access and use a digital twin for operational purposes TLIX0015X Manage fundamental aspects of supply chains TLIX0019X Monitor digital supply chain services BSBSS00091 Capture and Present Big Data Skill Set	Business Analyst	BSB60120 Advanced Diploma of Business BSB60420 Advanced Diploma of Leadership and Management	All absent except for ICTSAD502, MEM29012
		Supply Chain Analyst	Tertiary qualifications	Not applicable.

4.4 Meet demand for increased last mile delivery and customer service

The increase in online shopping has resulted in an increased demand for last mile delivery services, where goods are transported from a distribution hub to their final destination — often a customer's home address[34]. Australian cities have seen a significant growth in last mile delivery of parcels[35] and Australia's last mile market is projected to grow at a compound annual growth rate of more than 10% over the next five years[36].

The growth in last mile delivery means that Transport Managers are required to contract, schedule and manage more deliveries, drivers and routes. Transport Managers require skills and knowledge in using integrated online transport management systems to meet increased demand for last mile delivery.

Interviewees described last mile Delivery Drivers as now being required to pick up parcels and goods from physical stores. These stores can be located in busy, congested areas and / or shopping centres. Last mile Delivery Drivers are also required to pick up returned goods from home addresses where this option is offered by a retailer. Drivers require skills and knowledge to apply safety and risk management assessments to these new, more urban and congested locations so that public, driver and vehicle safety are maintained.

Interviewees described last mile Delivery Drivers as also requiring more customer service and communication skills to represent the brand as they deliver goods and parcels directly to customers at home.

Interviewees also raised concerns that last mile Delivery Drivers are an occupational shortage area as they are in demand from the rideshare and food delivery sectors.

Interviewees provided the following relevant comments:

> **Years ago Australia Post was the only one that did B2C [business to customer delivery] – now there are transport companies doing B2C – casualisation of this workforce too.**

[34] DHL. (2022, July 25). *What is last mile delivery?* https://www.dhl.com/discover/en-au/logistics-advice/logistics-insights/last-mile-delivery0

[35] Transport for NSW, NSW Government. (accessed 2024, October 24). *Freight and Servicing Last Mile Toolkit.* (section 2). https://www.transport.nsw.gov.au/system/files/media/documents/2024/Freight-and-Servicing_Last-Mile-Toolkit_Master-Document_0.pdf

[36] Transport Asset Holding Entity, NSW Government. *Last mile trial.* https://www.tahensw.com.au/project/last-mile-trial

It's about ensuring the safety of the public -the important thing is that the responsible party, the driver, distribution centre or the buyer [retailer] etc - have they identified the risks and managed the risks to ensure public safety? Need training for drivers to be safety aware of any risks for theirs and public safety e.g. delivering when there is a sign re five dogs – leave a card? Controls – providing the safety – if there is nowhere to drop what do they do – risks from angry animal, no one home.

The driver is such a different person now – an online driver is quite different now - they are often met at the door – a lot of interaction – need drivers that can not only drive and deliver but also they are the face of your business. Can stick to a schedule and time but also, [as] the face of your business, are extremely important.

The mapping table (Table 13.) shows the generic skills and knowledge required to meet the increased demand for last mile delivery are covered by many units in the Transport and Logistics Training Package. However, 'last mile delivery', 'transport management system' and 'omnichannel logistics' are not mentioned in the training. The units that cover skills and knowledge for managing aspects of the digital supply chain can be contextualised to managing last mile delivery transport. The training for Delivery Drivers to manage safety and risk, and to provide customer service also requires contextualisation.

Contextualisation to the tasks and environments involved in last mile delivery work would include the application of skills and knowledge:

- to coordinate and manage last mile delivery by using integrated, online transport management systems
- to use integrated, online transport management systems to efficiently carry out last mile deliveries
- to manage safety and risk manage for self, the public and vehicle at shopping centres, residential addresses and other urban, congested areas when making last mile deliveries and pickups.

The units that cover the skills and knowledge needed are currently included in qualifications at AQF levels 2 to 5. The units are largely absent from the VET qualifications for the job roles impacted with the exception of *TLI21221 Certificate II in Driving Operations*. Many of the units required are already included in this qualification.

Table 13.

Mapping skills and knowledge to 'Meet demand for increased last mile delivery and customer service' to Training Packages and job role qualifications

A. Skills and knowledge unique to omnichannel logistics	B. Training Package curriculum for omnichannel logistics	C. Job roles impacted	D. Qualifications related to job roles	Presence of Training Package curriculum for omnichannel logistics (column B) in job role qualifications (column D)
4. Meet demand for increased last mile delivery and customer service				
Use integrated, online transport management systems to identify and optimise sustainability of transport operations e.g. route optimisation, carbon emissions, load planning.	TLIL5019 Implement and monitor transport logistics TLIP0008 Implement and monitor logistics planning and processes TLIU3011 Implement and monitor environmentally sustainable work practices TLIX0019X Monitor digital supply chain services	Sustainability Manager	BSB40120 Certificate IV in Business	All absent
		Transport Manager	BSB50420 Diploma of Leadership and Management	All absent except for TLIP0008
		Transportation Management System Maintenance Manager	Tertiary qualifications	Not applicable.
Last mile delivery planning,	TLIF4066 Implement and supervise transport regulations compliance systems	Delivery Driver	TLI21221 Certificate II in Driving Operations	All absent except for TLIF4066

A. Skills and knowledge unique to omnichannel logistics	B. Training Package curriculum for omnichannel logistics	C. Job roles impacted	D. Qualifications related to job roles	Presence of Training Package curriculum for omnichannel logistics (column B) in job role qualifications (column D)
management and coordination - more drivers, locations, third party contractors	TLIH0001 Apply efficient journey planning principles TLIX0016X Manage outsourced supply chain operations		TLI31222 Certificate III in Driving Operations	
		Transport Manager	BSB50420 Diploma of Leadership and Management	
Last mile delivery: safely and efficiently pick up goods from a range of business locations sites including physical stores and deliver to a range of locations including residential addresses	TLIF0009 Ensure the safety of transport activities (Chain of Responsibility) TLIF0080 - Implement and monitor the safety duties of transport activities (Chain of Responsibility) TLIF4066 Implement and supervise transport regulations compliance systems TLIH0003 Prioritise courier delivery operations TLIH0006 Plan and navigate routes TLIL2060 Complete induction to the transport industry	Delivery Driver	TLI21221 Certificate II in Driving Operations	All *present* except TLIF4066
		Omnichannel Manager	New role	To be developed
		Store Manager	SIR40316 Certificate IV in Retail Management SIR50116 Diploma of Retail Leadership	All absent
		Store Person	TLI11321 Certificate I in Supply Chain Operations TLI20421 Certificate II in Supply Chain Operations	All absent except TLIF0009, TLIH0003

A. Skills and knowledge unique to omnichannel logistics	B. Training Package curriculum for omnichannel logistics	C. Job roles impacted	D. Qualifications related to job roles	Presence of Training Package curriculum for omnichannel logistics (column B) in job role qualifications (column D)
	TLISS00157 Road Transport Driver Skill Set	Transportation Management System Operator	New role	To be developed
Last mile delivery customer service including problem solving and risk management.	SIRXCEG004 Create a customer-centric culture TLIF4066 Implement and supervise transport regulations compliance systems TLII0005 - Apply customer service skills	Customer Experience Manager	BSB30120 Certificate III in Business	All absent
		Delivery Driver	TLI21221 Certificate II in Driving Operations	All present except for SIRXCEG004
		Delivery Driver	TLI31222 Certificate III in Driving Operations	All absent except for TLII0005
		Transport Manager	BSB50420 Diploma of Leadership and Management	All absent

4.5 Support reverse logistics across all channels

Returns or 'reverse logistics' is the process of sending goods from the customer back to the seller or manufacturer for proper disposal or recycle for resale. Returns are an important part of online shopping and omnichannel logistics with nearly 76% of online shoppers reading the website's return policy before placing an order[37] and around 30% of online purchases being returned for goods such as fashion and apparel[38]. However, returns are financially and environmentally costly. The postage costs for customers to return goods have often been covered by sellers, however, more recently, sellers are introducing fees to try and reduce the number and costs of returns[39].

There are many steps involved in reverse logistics – see Figure 6. Key steps in reverse logisticsThe skills and knowledge needed relate to being able to support and process the return of goods purchased from any channel through any channel. Skills and knowledge are required for:

- applying the retailer's policy and processes for returns including knowledge of how consumer law affects the particular situation and goods being returned
- coordinating pickup of returned goods from customers if this is offered by the retailer
- processing return of goods through a channel different to the one that the goods were purchased from (for example, 'buy online, return instore')
- assessing or testing the returned goods for either resale or disposal, and
- returning the goods back into the unified inventory system if re-selling.

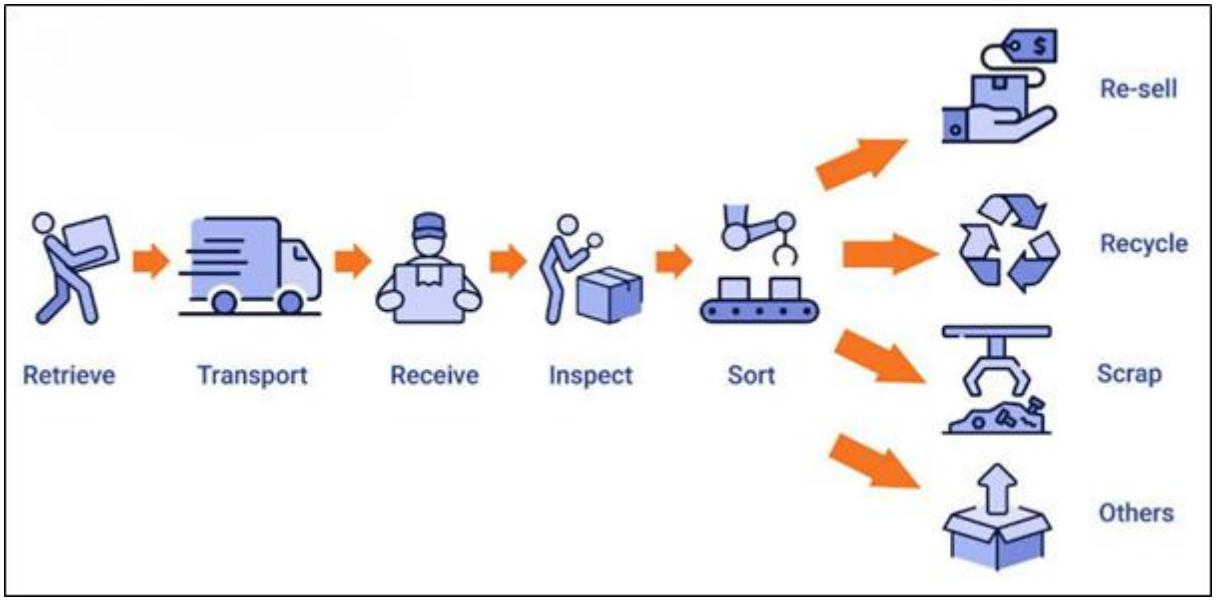

Figure 6. Key steps in reverse logistics[40]

[37] Australia Post. (2024). *2024 Inside Australian Online Shopping – eCommerce Industry Report*.
[38] ABC News. (2024, October 17). *Online retailers charge more for delivery and unwind free return policies.* https://www.abc.net.au/news/2024-08-21/online-retailers-are-now-charging-for-order-returns/104242492
[39] Ibid.
[40] Gosheny Global Multi Services Limited. (2024, October 17). *Why You Need to Build an Effective Reverse Logistics Strategy*. https://www.linkedin.com/pulse/why-you-need-build-effective-reverse-logistics-strategy/

Reverse logistics are an important part of product stewardship schemes and will continue to grow as sustainability, waste management, recycling and the circular economy are prioritised. Some retailers are embracing supply chain initiatives such as accepting goods back for recycling using reverse logistics[41].

Interviewees provided the following relevant comments:

Reverse logistics: workers need to understand the circumstances that would accept goods to be returned to the manufacturer. The processes involved e.g. claims process. Could involve loss of revenue for the company. Need reverse logistics coordinators – who understand what to accept, what standards and also how did the damage occur and how to return. Specialist area: reverse logistics. Can arrange pick ups / process / how to return

Returning (reverse logistics) - Integrated returns management: Skills in managing returns across all channels, ensuring seamless customer experience. Efficient Reverse Logistics Processes: Expertise in using advanced tracking and data analytics to streamline reverse logistics. Customer-Centric Approach: Ability to design and manage returns processes that prioritise customer convenience and satisfaction.

The mapping table (Table 14.) does not show any training specifically on managing or processing reverse logistics and returns. The unit *TLIX0014X Manage customer focussed supply chain* was identified as being broadly relevant but would need to be contextualised to reverse logistics.

Given the growing importance of reverse logistics, it is recommended that new Training Package curriculum is developed to cover the skills and knowledge needed to develop, manage and work in reverse logistics.

The new training may include the unit *TLIX0014X Manage customer focussed supply chain* for management level roles. It would also need to cover skills and knowledge required by Customer Service Workers and workers in operational roles to answer customer queries and carry out returns from any channel. New curriculum may be required to cover consumer law as it relates to goods return as this was also not found in the current Training Packages.

Gap:

No coverage of skills and knowledge to develop, manage and operate reverse logistics.

[41] Zara. (2024, October 17). *Our used clothing donation programme.* https://www.zara.com/au/en/help-center/ClothesCollectionProgram

Table 14.

Mapping skills and knowledge to 'Manage returns and support reverse logistics across all channels' to Training Packages and job role qualifications

A. Skills and knowledge unique to omnichannel logistics	B. Training Package curriculum for omnichannel logistics	C. Job roles impacted	D. Qualifications related to job roles	Presence of Training Package curriculum for omnichannel logistics (column B) in job role qualifications (column D)
5. Support reverse logistics across all channels				
Manage returns and support reverse logistics across all channels ensuring seamless customer experience.	TLIX0014X Manage customer focussed supply chain	Returns Manager	New role	To be developed
		Returns Specialist	New role	To be developed

5. Recommendations

This project identified five categories comprising a total of 17 groups of skills and knowledge that are required for omnichannel logistics. Mapping of these against national Training Packages, found that almost all are already covered in existing Training Packages. Current Training Package curriculum covers the following categories and groups of skills and knowledge:

1. Assess and plan omnichannel capability and technologies
2. Introduce and support the adoption of integrated systems for omnichannel logistics
3. Work with automation and Industry 4.0 technologies in warehouses and distribution centres:
    a. Work with automation and Industry 4.0 technologies in warehouses and distribution centres
    b. Fulfil online orders from physical stores
    c. Provide customer service across all channels
4. Meet demand for increased last mile delivery and customer service

However, many of the Units of Competency are not currently included in the qualifications that relate to the job roles impacted by omnichannel logistics. They will need to be imported into existing qualifications before they can be contextualised to omnichannel logistics.

This project also found four groups of skills and knowledge that were not covered by any Training Package curriculum:

5. Unified inventory management systems
6. Orchestrating omnichannel order fulfillment
7. Working with artificial intelligence to analyse data and gain insights
8. Managing and operating in reverse logistics.

The following recommendations arise from this project's findings regarding the skills and knowledge needed for omnichannel logistics that are not currently covered by Training Package curriculum either because of not being present in the qualifications that relate to the job roles impacted or because there is a gap in the current curriculum. Appendix A summarises where existing units were found and can be imported and where gaps were found and require curriculum development.

5.1 Relevant units are imported into existing qualifications and contextualised to omnichannel logistics

This project found that many of the skills and knowledge required across a wide range of job roles are already covered by existing units in a range of Training Packages.

However, a search for the units within the qualifications that prepare workers for the job roles impacted by omnichannel logistics showed that many of the units are *not* currently packaged within these qualifications. Appendix A shows the job roles where additional training can be imported into the related qualifications to cover skills and knowledge for omnichannel logistics.

Analyses of the units reported earlier in this report showed that the qualifications they are already included in are within two AQF levels of the qualifications that relate to the job roles impacted by omnichannel logistics. These units would be suitable for importing subject to packaging rules.

5.2 Existing relevant skills sets are contextualised to omnichannel logistics

Several existing skills sets cover skills and knowledge required for omnichannel logistics but require contextualisation:

- AVISS00080 - Remotely Piloted Aircraft Operations in Excluded Category Sub-2 kg Skill Set
- BSBSS00091 - Capture and Present Big Data Skill Set
- BSBSS00126 - Contact Centre Skill Set
- ICTSS00107 - Introductory Help Desk Skill Set
- ICTSS00120 - Artificial Intelligence Skill Set
- ICTSS00160 - Cyber Security for Advanced Roles Skill Set
- TLISS00157 - Road Transport Driver Skill Set
- TLISS00191 - Establish Digital Supply Chain Skill Set

Jobs and Skills Councils should consider sharing these findings to encourage registered training organisations, in partnership with industry, to develop contextualised teaching, learning and assessment materials.

There are no Registered Training Organisations listed on training.gov.au as being scoped to deliver *TLISS00191 - Establish Digital Supply Chain Skill Set.* ISA should consider conducting a review to identify barriers to the delivery of this skill set by RTOs as this Skill Set is highly relevant to omnichannel logistics.

5.3 Develop skills sets for working with automation and Industry 4.0 technologies to support omnichannel logistics

Skills and knowledge for a range of workers to work with automation and Industry 4.0 technologies in omnichannel logistics are critical as the technology enables and underlies the industry. Skill sets are recommended to be developed to ensure that workers receive targeted training that covers both the wider contextual and operational aspects of the advanced technology in their workplace.

These skill sets would be a combination of existing units covering many of the skills needed by workers for omnichannel logistics contextualised to omnichannel logistics work tasks and environments, with some new units developed to cover areas not found by this project.

Skills sets would focus on:

- Managing integrated online systems for omnichannel logistics (including a new unit on operating and monitoring systems remotely for order fulfillment). This is required to address new roles identified: Omnichannel Fulfillment Officer, Omnichannel Manager, Ecommerce Fulfillment Officer.

- Implement, manage, and use unified inventory management systems. Working with automation and Industry 4.0 technologies in smart warehouses and distribution centres, working with artificial intelligence to analyse data and gain insights.
- Managing and operating reverse logistics across all channels (including new units to develop, manage and operate reverse logistics).

In conclusion, national Training Packages already contain Units of Competency that can be imported into the qualifications that prepare workers for occupations in omnichannel logistics and contextualised to the industry. There are also a number of existing Skill Sets that are relevant to omnichannel logistics and could also be used in training if contextualised. Some gaps were found that are not covered by any Training Package components such as the use of unified inventory systems, orchestrating and optimising online order fulfillment, using AI to analyse big data from all channels and implementing reverse logistics. Overall, the national Training Packages provide a sound basis for preparing workers for the immense opportunities in omnichannel logistics.

GLOSSARY

AMRs	Autonomous mobile robots
Big data	'Data sets that are too large or complex to be dealt with by traditional data-processing application software'[42].
Blockchain	'A decentralised data network of computers with equal rights. All participants can access all information and add to the database. Every data set represents a single block, each of which cannot be modified.'[43]
BOPIS	Buy online, pick up instore
BORIS	Buy online, return instore
Cyber security	'Measures used to protect the confidentiality, integrity and availability of information technology (IT) and operational technology (OT) systems, applications and data.[44]
Dark stores	A dark shop, also called a dark supermarket or a dotcom centre is a physical retail distribution space or warehouse that exclusively caters to online order fulfillment[45].
Dropshipping	A business model where a retailer sells products to customers but places the orders with suppliers who fulfill the orders and ship them directly to customers. The retailer does not hold the stock or fulfill the order themselves.
Industry 4.0	The 'fourth industrial revolution' consisting of the digitalisation of technologies manufacturing industry and processes. Relevant technologies include: 'smart sensors, big data analytics, advanced robotics, Internet of Things. Mobile devices, location detection technologies, advanced human-machine interfaces, 3D printing, multilevel customer interaction and customer profiling, cloud computing and data visualisation, and virtual and augmented reality'[46].
Internal logistics/	The organisation of the flow of information and materials within a given Intralogistics company

[42] Wikipedia (2024, 27 October). *Big data.* https://en.wikipedia.org/wiki/Big_data
[43] Freight Connections, DHL Freight. (2023, June, 14). *Blockchain in Logistics: Security and Transparency for the Supply Chain.* https://dhl-freight-connections.com/en/solutions/blockchain-in-logistics-security-and-transparency-for-the-supply-chain/
[44] Australian Signals Directorate. (2024, 27 October). *Glossary*. https://www.cyber.gov.au/learn-basics/view-resources/glossary/c
[45] Magestore. (2024, 27 October). *Dark stores in retail: Concept, benefits, challenges, strategies 2024.* https://www.magestore.com/blog/dark-store/
[46] Department of Climate Change, Energy, the Environment and Water. (2024, 27 October). *Industry 4.0.* https://www.energy.gov.au/business/equipment-guides/industry-40

Appendix A: Summary of findings and recommendations

	Job roles impacted		Omnichannel logistics skills and knowledge									
		New role	1. Assess and plan omnichannel capability and technologies' to Training Packages and job role qualifications	2. Introduce and support the adoption of integrated systems for omnichannel logistics	3. Manage inventory across all channels and sites - demand planning, purchasing, replenishment, storage - using real time, accurate data	4. Orchestrate and optimise order fulfillment across all channels using integrated online systems	5. Work with automation and Industry 4.0 technologies in warehouses and distribution centres e.g. automated storage and retrieval systems, goods to person station, voice picking, hand held devices, drones, scanning, automated sortation and artificial intelligence	6. Fulfil online orders from physical stores including for instore pickup or delivery	7. Provide customer service across all channels	8. Analyse data from all channels to optimise business processes across all channels	9. Meet demand for increased last mile delivery and customer service	10. Support reverse logistics across all channels
1	**Business Analyst**		IMPORT	IMPORT						GAP – require development		
2	**Customer Experience Manager**		IMPORT		GAP – require development				IMPORT			
3	**Distribution Centre Manager / Transport Manager / Warehouse Manager**		IMPORT	IMPORT	GAP – require development		IMPORT				IMPORT	
4	**Logistics Coordinator**			IMPORT		GAP – require development		IMPORT				
5	**Supply Chain Analyst**		IMPORT	IMPORT						GAP – require development		
6	**IT Systems Manager**		IMPORT	IMPORT								
7	**IT Support**			IMPORT								
8	**Cybersecurity Specialist**			IMPORT								
9	**Data Scientist**			IMPORT								
10	**Logistics Engineer**		IMPORT									
11	**Store Manager**		IMPORT	IMPORT	GAP – require development			IMPORT			IMPORT	
12	**Store Person**						IMPORT				IMPORT	
13	**Inventory Control Specialist / Inventory Manager / Procurement Manager**				GAP – require development							
14	**Ecommerce Fulfillment Officer / Omnichannel Fulfillment Officer**	Yes				GAP – require development						

	Job roles impacted		Omnichannel logistics skills and knowledge									
		New role	1. Assess and plan omnichannel capability and technologies' to Training Packages and job role qualifications	2. Introduce and support the adoption of integrated systems for omnichannel logistics	3. Manage inventory across all channels and sites - demand planning, purchasing, replenishment, storage - using real time, accurate data	4. Orchestrate and optimise order fulfillment across all channels using integrated online systems	5. Work with automation and Industry 4.0 technologies in warehouses and distribution centres e.g. automated storage and retrieval systems, goods to person station, voice picking, hand held devices, drones, scanning, automated sortation and artificial intelligence	6. Fulfil online orders from physical stores including for instore pickup or delivery	7. Provide customer service across all channels	8. Analyse data from all channels to optimise business processes across all channels	9. Meet demand for increased last mile delivery and customer service	10. Support reverse logistics across all channels
16	**Supply Chain Manager**					GAP – require development						
17	**Transportation Management System Operator**					GAP – require development					IMPORT	
18	**Warehouse Operator**						IMPORT					
19	**Forklift Driver**						IMPORT					
20	**Picker and Packer**						IMPORT					
21	**Retail Worker**							IMPORT	IMPORT			
22	**Delivery Driver**										IMPORT	
23	**Customer Service Staff**							IMPORT	IMPORT			
24	**Sustainability Manager**	Yes									IMPORT	
25	**Returns Manager**	Yes										GAP – require development
26	**Returns Specialist**											GAP – require development