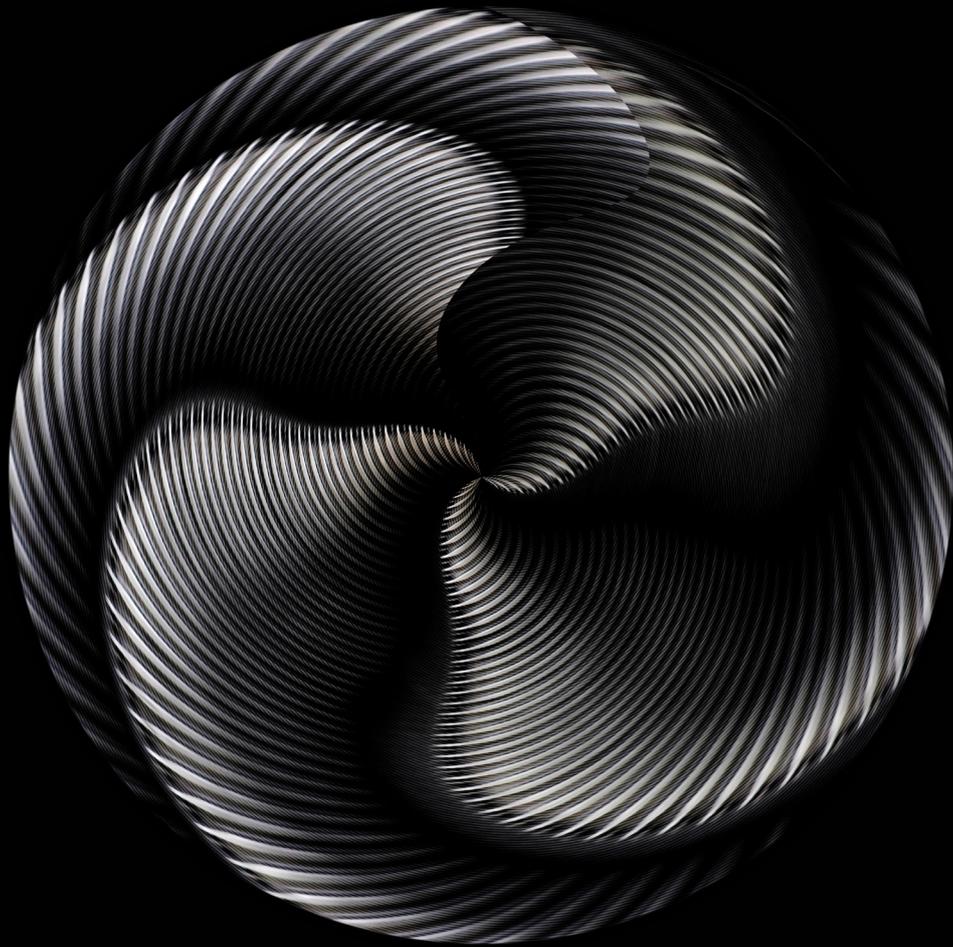


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Access Economics



The future of work

Occupational and education trends in
supply chain and logistics in Australia

Prepared by Deloitte Access Economics, January 2018

145,000



Size of Australia's supply chain and logistics workforce in 2016-17

2.1%



Forecast annual growth in supply chain and logistics workers between 2016-17 and 2021-22 (compared to 1.5% p.a. for overall Australian workforce)

Supply chain and logistics snapshot

48%



Lifetime wage premium from having postgraduate qualification* (relative to no post-school qualification)

\$164,360



Forecast income of supply chain and logistics workers with postgraduate qualification* in 2021-22

* Postgraduate qualification in Management and Commerce field of education.

As parts of the supply chain become increasingly digitised, there are significantly increased volumes of data which can be used in supply chain and logistics management to drive efficiency improvements.



64% of supply chain executives considered data analytics as an important disruptive technology.

- Columbus 2015

A business's supply chain and logistics function requires a good understanding of logistics systems, strategic management and how to use data to make better operational decisions. This involves the creation of customer-responsive and sustainable strategies across the value chain.

In this context, Deloitte Access Economics has been commissioned to examine how occupational and education trends are developing across the supply chain and logistics workforce in Australia.

This report seeks to provide forward looking insights on how the nature of work and study in supply chain and logistics are evolving as a result of ongoing changes to the economic, business and labour market landscape.

The research presented in this report has been developed through a mix of analysis of publicly available data and information sources, targeted consultations with academics and university program directors, and employment forecasting using Deloitte Access Economics' macroeconomic modelling framework.

How are broader trends specifically affecting the supply chain and logistics area?

Technology and big data

Supply chain and logistics is a broad discipline, with organisations in all industries across the Australian economy requiring supply chain management capabilities.

Supply chain and logistics functions can include procurement within a company, managing and organising production, and product supply including warehousing and distribution. The growing importance of digital technology means that there is an increasing reliance on data-driven insights in order to improve supply chain efficiency and effectiveness, facilitating a shift away from linear supply chains towards more complex and dynamic 'value web' supply chains. These webs of connected suppliers, distributors and consumers enable collaboration and knowledge exchange, driving greater innovation and efficiencies throughout the value chain (Deloitte, 2015).

Globally, new technologies are creating new challenges and opportunities for the supply chain and logistics area. For example, autonomous vehicles are already being utilised for business purposes, such as large mining companies including Rio Tinto and BHP Billiton operating and upgrading driverless trucks, trains and drills on their remote iron ore mines (Simonite, 2016). Drone technology is being adopted in the distribution of goods to consumers and businesses – with applications such as express delivery and unmanned cargo transport (Joshi, 2017) – and across a range of industries including in retail, defence and agriculture. Sensor technology and the Internet of Things can also assist with live tracking and monitoring of distribution processes, seeing applications such as optimising delivery routes and simplifying distribution networks (Kotlik, Greiser, & Brocca, 2015).

Box A: Technology and supply chain and logistics opportunities

Supply chain and logistics management plays an important role in driving efficiencies across a business's value chain, and professionals in this area are therefore employed across all industries in the economy. As part of our research, Deloitte Access Economics spoke with Professor Booi Kam, the Program Director of Supply Chain and Logistics Management at RMIT University, in relation to future opportunities in the supply chain and logistics area.

According to Booi, demand for logistics skills is likely to rise in the future, with a shift towards more decentralised supply chains and an increased role for data analytics.

With new technologies such as drones, driverless vehicles, 3D printing and sensor technology seeing increased deployment across various supply chain functions, there will be greater opportunities for supply chain professionals to adapt business operations in procurement, production and distribution to effectively and efficiently utilise these digital tools. In light of this diverse range of developments, there is an advantage for supply chain and logistics practices to apply these skills and knowledge to different technological and industry contexts.

Booi believes that even as traditional supply chain models are disrupted by new technologies, the underlying goals of the supply chain practice remain unchanged: "getting the right goods, to the right people, at the right time and place". Organising these functions in the digital era would require a hybrid of business, IT and engineering, and industry-specific skills. As business models continue to evolve in an increasingly digitised economy, a range of employment opportunities will open up to supply chain professionals with a suitable mix of skills.



"As business models continue to evolve in an increasingly digitised economy, a range of employment opportunities will open up to supply chain professionals with a suitable mix of skills."

– Professor Booi Kam,
RMIT University

These technological developments are providing significant opportunities for applying data analytics to improve supply chain and logistics operations across functions such as demand forecasting, inventory management and supply chain visualisation. The use of data analytics to inform these decisions is increasingly being recognised as best practice in supply chain management. For example, Unilever recently topped Gartner's Supply Chain Top 25 rankings of global supply chain leaders, in part due to the company's "Center of Excellence for supply chain within which analytics is a key area of focus [and its] platform-for-analytics approach that helps in solving critical business problems" (Viswanathan, 2016).

Previous research has found that **64% of supply chain executives considered data analytics as an important disruptive technology in their area, with reported benefits such as improved customer service, faster reactions to supply chain issues and greater efficiency** (Columbus, 2015). As discussed in Box A, this means that supply chain and logistics management is increasingly becoming a hybrid discipline that combines data analysis with business decision making, incorporating skills such as IT and engineering in addition to business and operational skills.

Consumer behaviour

In addition, the evolution of the supply chain is also being accelerated by consumer-driven change, where customers are increasingly moving away from traditional 'bricks and mortar' retailers to online purchases and e-commerce. Supplying goods from the retailer to the consumer for online commerce involves different transport and logistics considerations to in-person purchases,

such as requiring efficient delivery services and customer management processes. The entry of Amazon will significantly disrupt the Australian retail landscape, with online retail spending in Australia currently only accounting for 7% of total retail expenditure, compared to 12% in the US and 17% in the UK (Deloitte Access Economics, 2017a).

Which supply chain and logistics occupations are relevant for our analysis?

In order to provide a snapshot of the workforce growth potential associated with the supply chain and logistics area, Deloitte Access Economics has identified a series of occupations that could represent job opportunities for workers with skills and qualifications in the supply chain and logistics field.¹ Since our research aims to evaluate further study in the supply chain and logistics area, the specified occupations are targeted towards roles that would be suitable for employees who have completed postgraduate study, rather than entry-level roles with lower skills and qualification requirements.

The following occupations have been identified using the Australian and New Zealand Standard Classification of Occupations (ANZSCO) as representing potential employment opportunities in the supply chain and logistics area:

- Importers Exporters and Wholesalers
- Manufacturers
- Production Managers
- Supply Distribution Managers
- General Manager (Transport, Postal and Warehousing industry).

The analysis that follows on future

workforce growth and the benefits of further study in the supply chain and logistics area are based on this list of occupations. We note that while these occupations have been identified on the basis of being relevant to job opportunities for individuals with supply chain and logistics skills and qualifications, not every worker employed in these occupations will necessarily have a specific supply chain and logistics qualification. This list of occupations therefore outlines the broad pool of potential employment opportunities in the supply chain and logistics area across different parts of the workforce, rather than a one-to-one representation of the jobs that employ supply chain and logistics graduates.



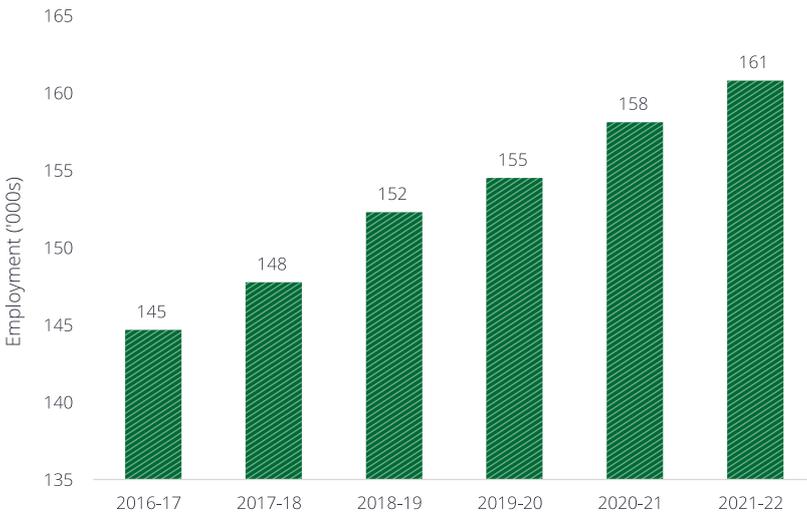
The evolution of the supply chain is also being accelerated by consumer-driven change, where customers are increasingly moving away from traditional 'bricks and mortar' retailers

1. The occupations have been identified at the 4-digit level based on the Australian Bureau of Statistics' detailed occupation descriptions in the *Australian New Zealand Standard Classification of Occupations: First Edition* (ABS 2006), as well as consultation with university academics and subject matter experts, and research published by relevant industry associations and other publicly available materials.

What is the future growth potential of the supply chain and logistics workforce?

The Australian supply chain and logistics workforce is forecast to see sound growth in the next five years. Aggregating the supply chain and logistics occupations identified above, Deloitte Access Economics projects the relevant workforce will grow from 145,000 persons in 2016-17 to 161,000 persons in 2021-22, an increase of around 16,000 workers at an annual average growth rate of 2.1% (Chart 1).²

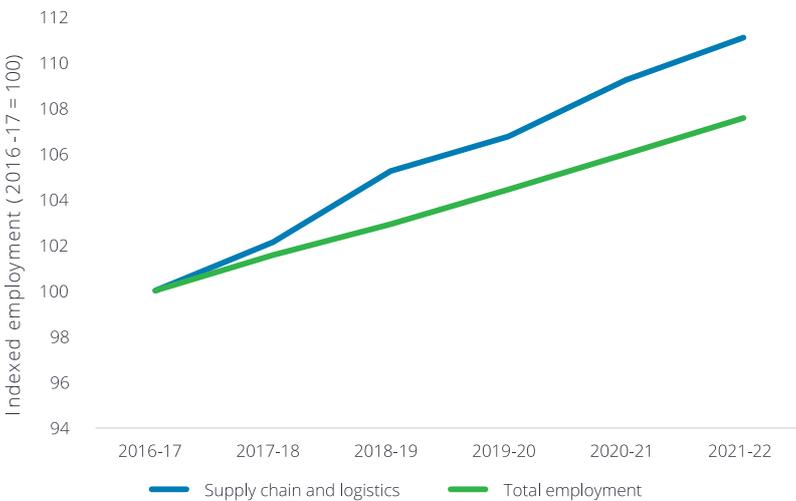
Chart 1: Supply chain and logistics employment forecasts, 2016-17 to 2021-22



Source: Deloitte Access Economics (2017)

The supply chain and logistics workforce is expected to see stronger growth than the Australian labour force as a whole, where employment is forecast to grow at an average of 1.5% per annum over the next five years (Chart 2).

Chart 2: Supply chain and logistics employment and total employment, 2016-17 to 2021-22



Source: Deloitte Access Economics (2017)

2. The supply chain and logistics workforce forecasts for this report have been produced using the Deloitte Access Economics' Macro (DAEM) modelling framework, a macroeconomic model of the Australian economy. For the purposes of this research, employment projections at the 4-digit ANZSCO level have been smoothed using a three-year moving average, in order to provide workforce forecasts that are more reflective of trend jobs growth.



Table 1 provides a breakdown of Deloitte Access Economics' employment forecasts for the supply chain and logistics workforce by the component occupations. Demand for production managers is expected to grow by over 7,000 people over the next five years, at an annual growth rate of 2.2%. The forecast growth rate is strongest

for supply distribution managers, where average annual growth is forecast to be a robust 3.1%. The overall positive outlook for labour market demand in these supply chain and logistics occupations is expected to be supported by the expanding nature of supply chain functions and growing role of e-commerce.

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Table 1: Supply chain and logistics employment forecasts by occupation, 2016-17 to 2021-22

Occupation	2016-17 (000s)	2021-22 (000s)	Change in employment (000s)	Average annual growth rate (%)
Importers Exporters and Wholesalers	19.8	21.1	1.3	1.3%
Manufacturers	21.3	22.2	0.9	0.9%
Production Managers	60.1	67.1	7.1	2.2%
Supply Distribution Managers	41.4	48.2	6.8	3.1%
General Manager (Transport, Postal and Warehousing industry)	2.1	2.2	0.1	0.8%
Total Supply Chain and Logistics	144.7	160.8	16.1	2.1%

Source: Deloitte Access Economics (2017)



The average annual income of supply chain and logistics workers with a postgraduate qualification in Management and Commerce is forecast to increase over the next five years, rising to \$164,360 in 2021-22.

How can further study benefit workers in supply chain and logistics occupations?

Increased earning potential

Conventional economic theory suggests that workers who undertake further study are able to realise higher wages in the labour market. From a human capital perspective, education is an important determinant of the overall productivity of labour, which is then reflected in the wages paid to individual workers. The knowledge and skills derived from education represents an increase in human or intellectual capital, leading to more productive workers who are financially rewarded for their increased efficiency. Furthermore, signalling theory suggests that further study can be a means for individuals to 'signal' their capability to employers, as more capable individuals may be more successful in completing their education.

Recent Deloitte Access Economics research has estimated the impact of a postgraduate qualification on wages, controlling for other factors which may also contribute to earnings differentials at the individual level (such as demographics and experience). While this study did not specifically examine the wages earned by supply chain and logistics workers, it found that a significant wage premium is attained by workers who have completed postgraduate study in the broader Management and Commerce field of education.³ Across all workers who studied Management and Commerce at the postgraduate level, an undiscounted lifetime wage premium of 48% relative to workers with no post-school qualifications was found to be directly attributable to having completed the postgraduate qualification (Deloitte Access Economics, 2016).

Looking specifically at the occupations previously identified in the supply chain and logistics workforce, data from the latest Census suggests that the average annual income earned by postgraduate-qualified workers who studied Management

and Commerce in these occupations was \$140,949 in 2016-17. In raw terms – without accounting for other factors such as demographics and experience – this was 66% higher than the average 2016-17 income of workers employed in supply chain and logistics occupations who have no post-school qualifications. The average annual income of supply chain and logistics workers with a postgraduate qualification in Management and Commerce is forecast to increase over the next five years, rising to \$164,360 in 2021-22.⁴

Broadening career pathways

Further to the increased earning potential, **additional study in the supply chain and logistics area can enable workers to build on their core skills while also upskilling in areas such as business analytics, project management and strategy development.** This can facilitate future career progression and lead to a diverse range of new employment opportunities.

Senior supply chain workers are required to have expertise in their technical area of responsibility, as well as having the skills to understand multi-functional processes spanning the business, such as strategy and operations, supplier evaluation, demand and forecasting alignment, and capital investment decisions (Global Supply Chain Institute, 2015). The complexities associated with senior roles in this area mean that further study can be beneficial for existing employees in supply chain and logistics management who are seeking to accelerate their career development. As discussed in Box B, further study can also provide an opportunity for workers in other fields to transition into the supply chain and logistics area.

3. Management and Commerce has been identified as the most relevant field of education for supply chain and logistics qualifications. The Management and Commerce field of education is represented at the 2-digit level in the Australian Standard Classification of Education (ASCED).

4. Future income has been estimated using annual Wage Price Index growth forecasts from the September 2017 *Business Outlook* (Deloitte Access Economics, 2017b).

Box B: Supply chain and logistics qualifications and career applications

Our consultation with Professor Booi Kam from RMIT University suggests that studying a postgraduate qualification in supply chain and logistics can assist in preparing workers for senior roles in the area. The broad nature of the supply chain and logistics discipline means that **further study can be valuable for developing advanced skills in business strategy, project management and analytical modelling, and providing individuals with a better understanding of how their skills and knowledge can be applied in a workplace context.** Qualifications that emphasise a flexible application of these capabilities across different industries and business functions can provide students with a broad perspective on the potential opportunities of a career in supply chain and logistics management.

A diverse range of workers can benefit from further study in supply chain and logistics management. Booi notes that while some supply chain management professionals will look to undertake a postgraduate qualification in the area in order to accelerate their career progression, other individuals who study supply chain and logistics currently work in alternate areas and are seeking a qualification that enables them to pivot towards a supply chain management role. Further study in the supply chain and logistics area provides a formal qualification for these workers who have accumulated industry experience in other areas, providing them with a platform for combining their existing skills with supply and logistics knowledge in order to transition towards new career opportunities.

What are the key takeaways for current and future supply chain and logistics workers?

- The expanding roles associated with supply chain functions, driven by increasingly complex and dynamic supply chain structures and the growing importance of technology, will be associated with greater demand for supply chain and logistics skills.
- This is expected to drive future growth in the supply chain and logistics workforce, increasing from 145,000 persons in 2016-17 to 161,000 persons in 2021-22. The average annual growth rate of 2.1% is stronger than the 1.5% per annum growth forecast for the entire Australian labour force.
- Across workers who have completed a postgraduate qualification in Management and Commerce, a lifetime wage premium of 48% (relative to workers with no post-school qualifications) is directly attributable to their qualification.
- The average annual income of supply chain and logistics workers with a postgraduate qualification in Management and Commerce was \$140,949 in 2016-17, and this is forecast to rise to \$164,360 in 2021-22.
- Further study in the supply chain and logistics area can also enable workers to develop advanced skills that accelerate career progression, and allow professionals in other areas to move into supply chain management roles within their industry.

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