

Building resilient Australian supply chains

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BUSINESS
ANALYTICS

Orchestrated resilience is pivotal to thriving
in an increasingly unknown future

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What is supply chain resilience?

The ability of an organisation's end-to-end supply chain to absorb, adapt and recover from a disruptive event.

As glaringly exposed by the 2020 pandemic, supply chains are increasingly complex and fragile. Supply chain executives must design resilient networks capable of rapidly and effectively responding to ever-changing business circumstances, including supply shortages, resource limitations, demand fluctuations and logistical delays.

This requires the ability to continuously monitor the supply chain for disruptions, track inventories over the entire supply network and assess upstream suppliers and downstream customers to evaluate and respond to risk.

This is no easy feat. Resilience can only be achieved by fully embracing digital technologies and data analytics, allowing the supply chain to be connected, visible, integrated, intelligent and agile.



Elements of a resilient supply chain

Resilient businesses fare better when interrupted and outlast their competition. A resilient supply chain is:



Connected

Supports all enterprises and products to provide complete information about market status, intra-enterprise operations and inter-enterprise communications.



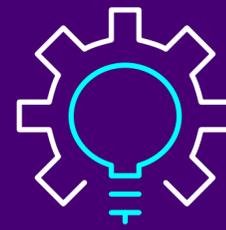
Visible

Keeps track of the flow of materials, finances and information throughout the supply chain in real time.



Integrated

Shares information and makes decisions jointly throughout the supply chain.



Intelligent

Makes large-scale, optimal decisions and uses predictive analytics to protect the supply chain from future risks.



Agile

Detects changes, collects relevant data, analyses opportunities and threats, makes optimal decisions, implements these decisions and modifies operations accordingly.

A supply chain with these features can only be unleashed using innovative and tailored digital solutions.

A woman with blonde hair in a ponytail, wearing a yellow high-visibility vest over a yellow t-shirt, is looking at a computer monitor in a warehouse or retail setting. The background is blurred, showing other workers in similar vests and shelves of products.

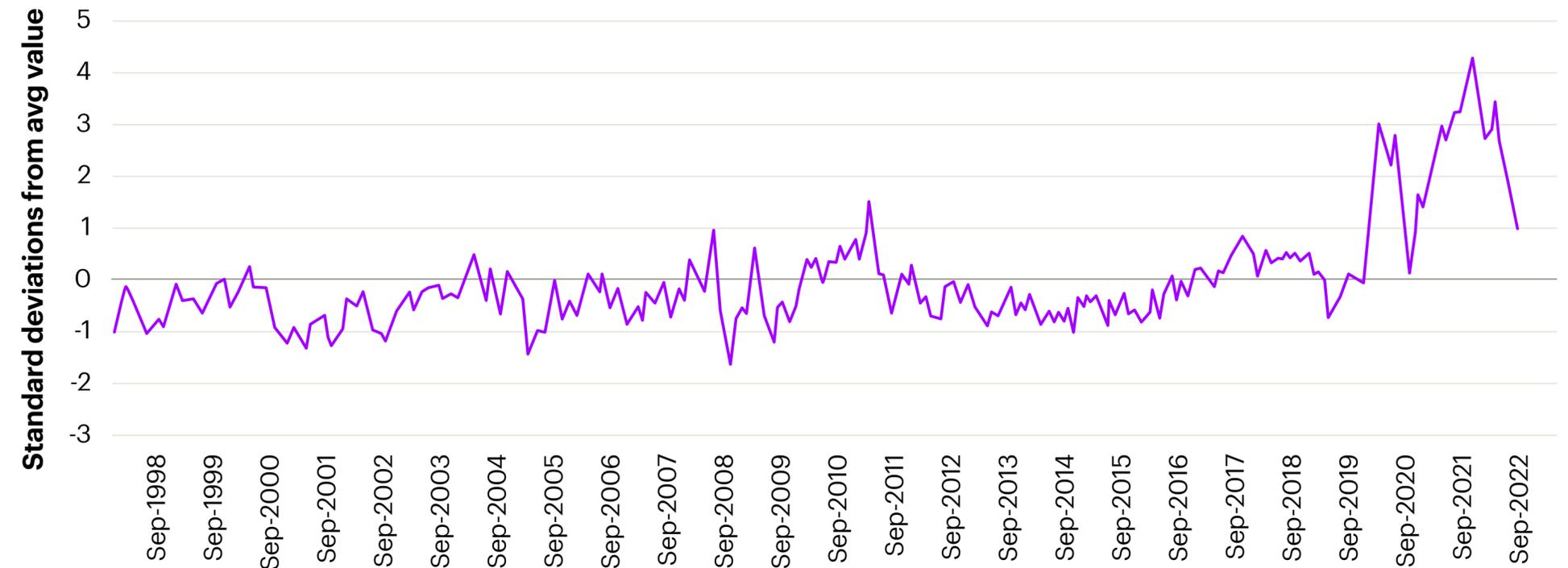
How supply chain priorities have changed

In the last 10-15 years, supply chain risk has increased significantly, as captured by the Global Supply Chain Pressure Index (GSCPI).

This index integrates several common metrics—Baltic Dry Index (BDI), HARPEX index, Purchasing Managers' Index (PMI) and airfreight cost indices from the U.S. Bureau of Labor Statistics—to assess everything from cross-border transportation costs to country-level manufacturing data in Europe, China, Japan, South Korea, Taiwan, the U.K. and the U.S.

Supply chain risk started increasing after the 1980s' globalisation movement and China's 1978 Open Door Policy popularised **outsourcing** and **offshoring**. Such strategies made supply chains more geographically diverse, exposing them to geopolitical and environmental risk. At the same time, heightened efficiency in freight logistics and digital advances, while helping to streamline supply chains, also made them more vulnerable.

Global Supply Chain Pressure Index (GSCPI)

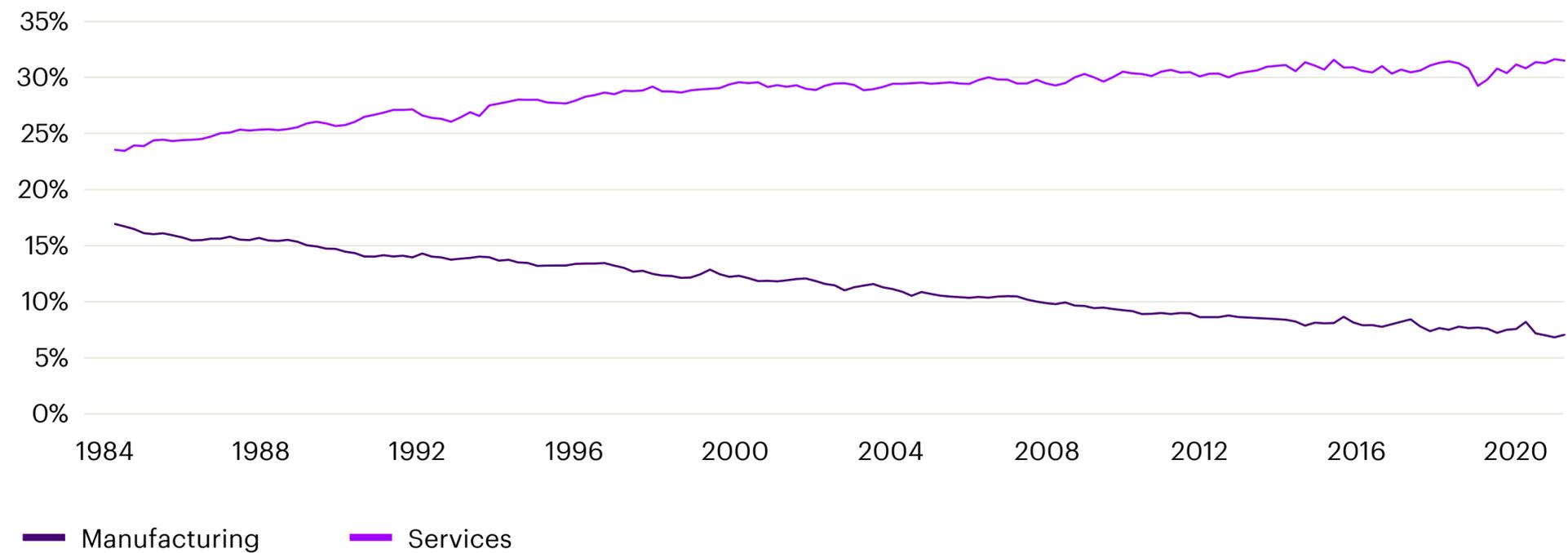


Source: Federal Reserve Bank of New York, September 2022¹

Globalisation benefited organisations by reducing their assets and costs, improving profits and giving consumers access to cheaper products, while also reducing poverty in many societies. However, globalisation also led to a **loss of blue-collar jobs and manufacturing capability** in many developed countries.

Effective supply chain management requires striking the right balance between reliability and costs. In the 10-15 years before the pandemic, capacity problems were rare and consumer demand was generally predictable. This led to firms shifting their focus to **streamlined, cost-efficient operations** through just-in-time or lean strategies, where goods were only produced as needed. To optimise costs, some organisations disregarded the importance of having strategically positioned “safety stock” over the entire supply network.

Australian employment by industry (Share of total)



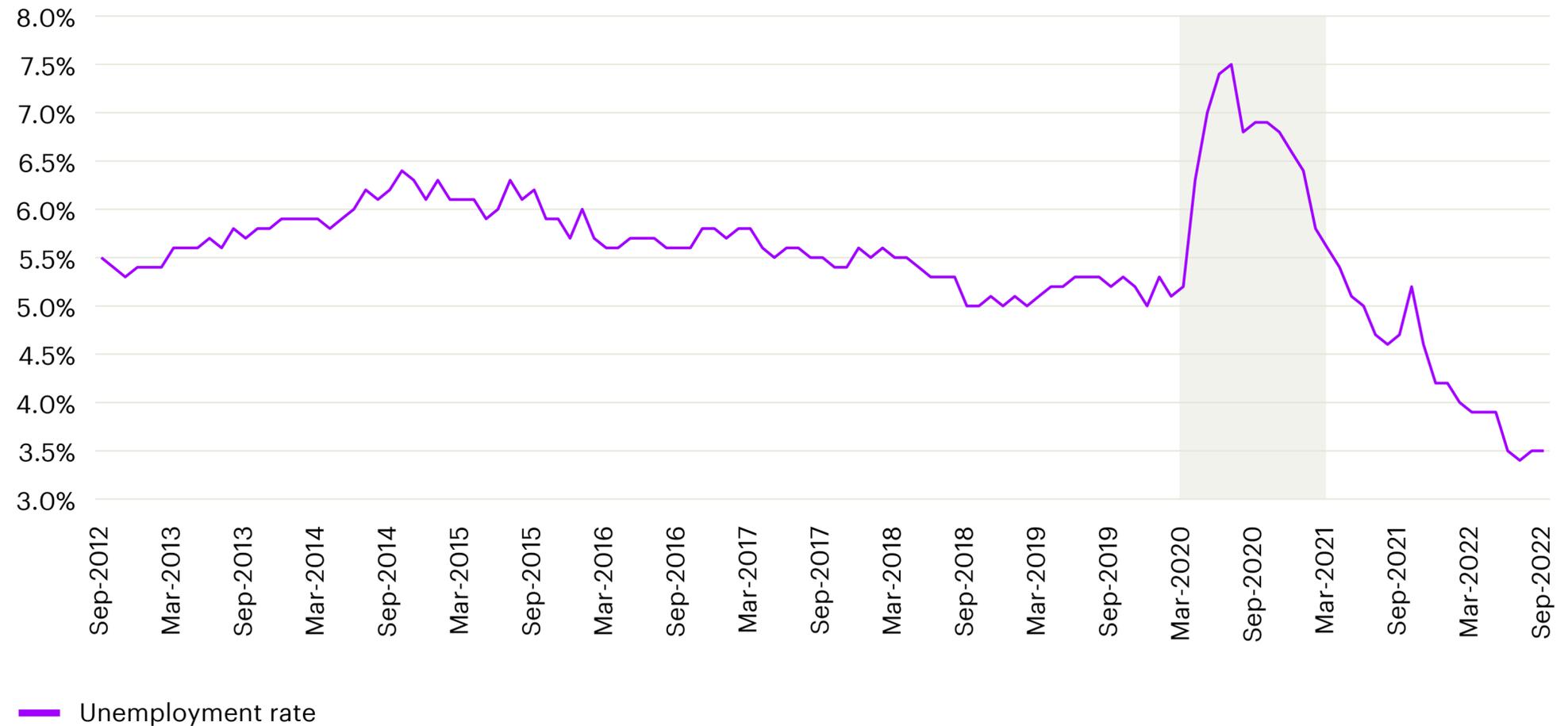
Note: Services include Electricity, Gas, Water and Waste Services; Accommodation and Food Services; Financial and Insurance Services; Rental, Hiring and Real Estate Services; Professional, Scientific and Technical Services; Administrative and Support Services; Arts and Recreation Services and Other Services

Source: [Australian Bureau of Statistics, Employed persons by industry, August 2022](#)

Many **lean supply chains** were able to withstand isolated incidents, such as Iceland’s volcanic eruption in March 2010, Japan’s earthquake/ tsunami in March 2011 and Thailand’s floods in August 2011. However, these disruptions were restricted to relatively smaller regions, largely only affected production facilities and had no significant impact on consumer demand. On the other hand, the **scale of disruption** due to the COVID-19 pandemic has been entirely different. Even Toyota, the flagship of the just-in-time supply chain, was not immune to the global chaos, asking suppliers to increase their semiconductor inventory levels from the conventional three months to five months.²

In early 2020, as the COVID-19 virus spread across the world, governments started shutting borders. By mid-2020, unemployment rates began climbing rapidly (7.5% in Australia) and the global economy started to falter.

Australian unemployment rate, seasonally adjusted



Source: [Australian Bureau of Statistics, Labour Force, Australia September 2022](#)



Prediction is difficult, especially if it is about the future.”

Niels Bohr, Physicist and Nobel Laureate

Expecting consumer demand to nosedive, manufacturers and distributors lowered capacities and laid off workforces. In fact, the opposite happened. Consumers in lockdown started spending their government stimulus cash on consumer electronics, clothing, furniture, sporting equipment and home improvement hardware. **Spending patterns shifted from services to durable goods,** and online sales skyrocketed.

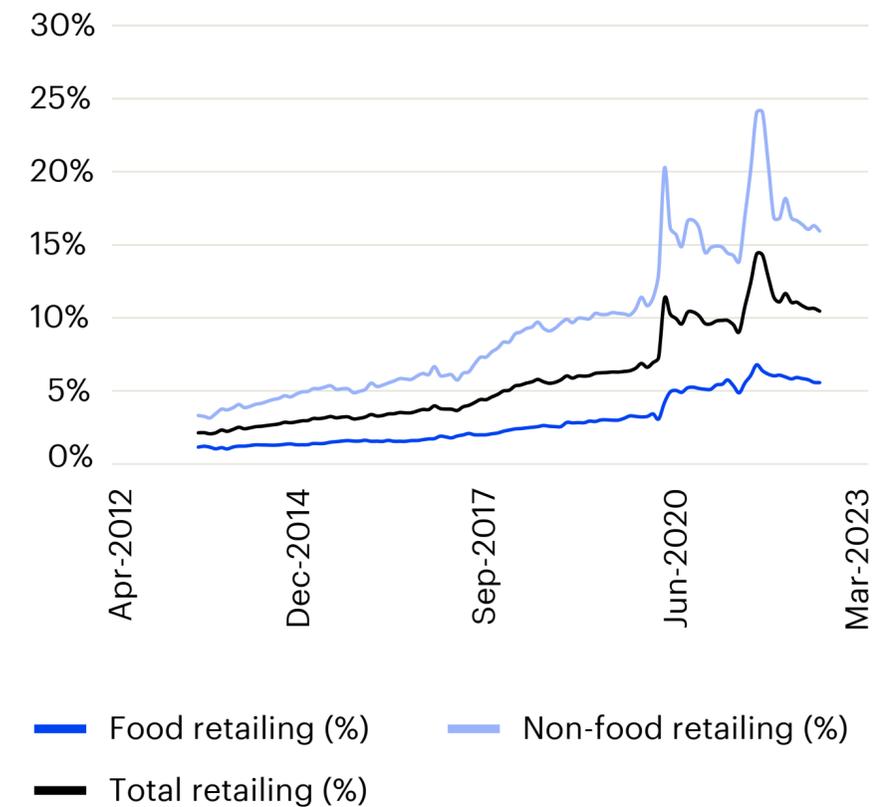
Australian household spending on goods and services

(Current price & calendar adjusted – indexed to 2019)



Source: Australian Bureau of Statistics, Monthly household spending indicator, July 2022

Online share of retail sales (Australia)



Source: Australian Bureau of Statistics, Online retailing, July 2022

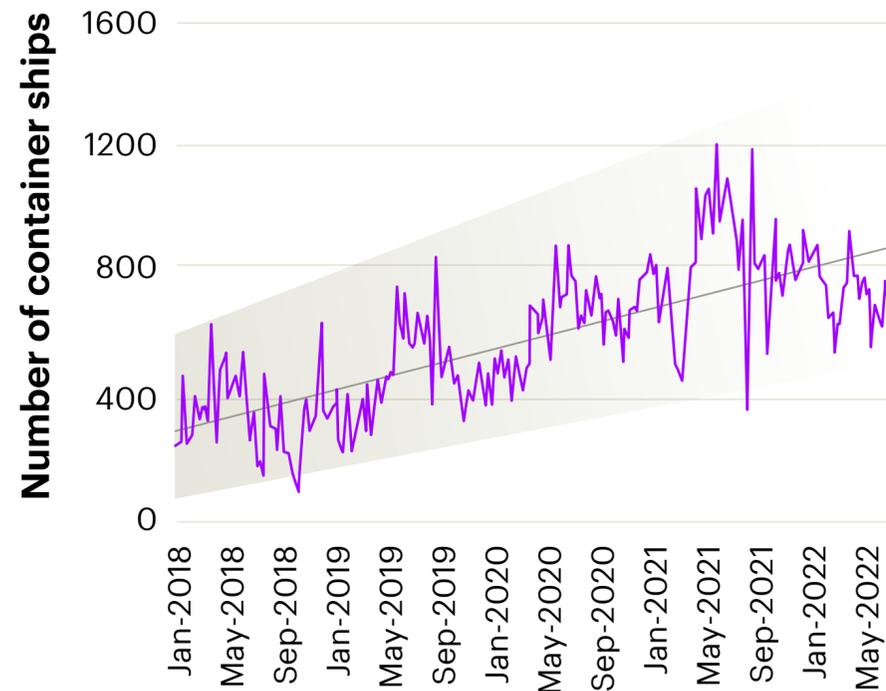
The pandemic supply chain disruptions were also unique in that they **related to transport capacity**, which previously had rarely been a problem. But COVID-19 brought with it unprecedented trade conditions.

Around 90% of global trade volume is transported by sea, with about 70% shipped in containers.³ In early 2020, Chinese factories increased production of personal protective equipment (PPE), test kits and other weapons for battling COVID-19, and began to distribute them globally, even to countries that didn't traditionally trade with China.⁴ This **non-typical trade activity** eventually led to a critical shortage of containers in China and an oversupply of empty containers everywhere else.

In early 2022, Shanghai's two-month lockdown made matters worse by **stopping operations in the world's largest and busiest seaport**. This put enormous pressure on global supply chains, with queues of container ships waiting off the coast for port availability.

Building resilient Australian supply chains

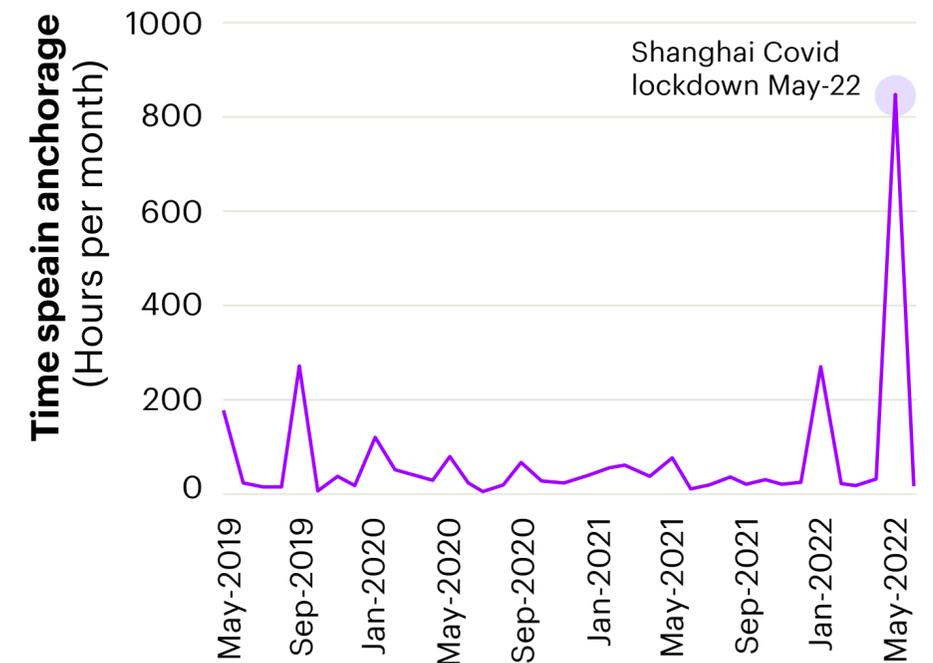
Number of container ships entering Shanghai anchorage weekly



The unpredictable nature of container ships entering Shanghai anchorage

Source: [Marine Traffic, Ports Database, June 2022](#)

Monthly average hours spent by container ships in Shanghai anchorage

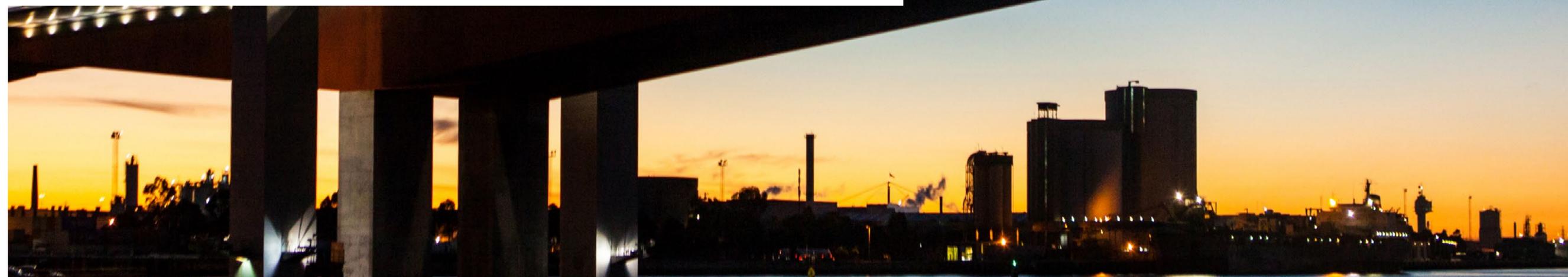


Source: [Marine Traffic, Ports Database, June 2022](#)

Labour scarcity can further exacerbate issues. Even when shipping containers got to port, they still experienced significant delays in unloading and distribution because of labour shortages. Drivers are an integral component of intermodal transportation networks, and the **shortage of truck drivers** had been a growing global problem even before the pandemic exacerbated the issue. In an already aging workforce, many drivers left the industry because of concerns about COVID-19 and the complications of cross-border issues.

By the end of 2021, the American Trucking Association estimated that the current driver shortage of 80,000 drivers could extend to more than 160,000 drivers by 2030.⁵ According to world road transport organisation, the IRU, the global driver shortage is expected to surge by 40% in 2022. The situation in Australia is no different. In April 2022, the local online jobs platform, Seek, reported more than 20,900 vacant positions for truck drivers.⁶

It is clear the supply chain landscape within Australia has changed and, with it the priorities of supply chain professionals. Never has a resilient supply chain been so central to ensuring business continuity.





What are the challenges in establishing a resilient supply chain?

Visibility

To achieve supply chain resilience, organisations need to be able to **map their entire supply networks**, including not only tier-1 suppliers, but tier-2 (suppliers of their suppliers) and tier-3 (raw material suppliers) too. In the Business Continuity Institute's (BCI) 2019 Supply Chain Resilience Report, of companies asked about supply chain visibility, 57% said they had none and a further 20% were unsure of what could be seen. Since then, COVID-19 has led to an increase in the use of technology for Supply Chain mapping. BCI's 2021 report found that 41% of organisations surveyed are now using technology for supply chain mapping and most of them acknowledged that this increase is due to COVID-19. However, part of the issue is that some suppliers—especially smaller ones—might not want to share details of their own network, fearing they might be squeezed out of the supply chain. Organisations need to find ways of incentivising all suppliers to share this vital information.

Risk management

To fully understand what supply chain resilience entails, organisations need to correctly **identify suppliers that impose the greatest risks**. Typically, supply chain executives associate the degree of risk with total spend. They assume that, if a major supplier goes down, it will have the greatest impact on the organisation's profitability. In the aftermath of Japan's earthquake and tsunami in March 2011, a global automotive manufacturer discovered this is not necessarily true. The company had implemented a supplier diversification strategy to build redundancy into its lean supply chain: a 60/20/20 supply model that split spending between several suppliers to spread risk. However, the model did not take into account that many tier-1 suppliers were relying on a common set of tier-2 suppliers whose manufacturing capabilities were impacted by the disaster.

Without visibility of its upstream suppliers, the manufacturer's diversifying strategy for resilience was not fully effective.⁷ Organisations need to gain a better understanding of all supply tiers to correctly calculate their supply network's risk profile.

“If you can't describe what you are doing as a process, you don't know what you're doing.”

W. Edwards Deming, Statistician

Culture

Resilience requires a **mindset shift away from the cost reductions** supply chain managers prioritised before the pandemic. In the current trading environment, an optimised, resilient supply chain is not necessarily the most cost efficient, but the one configured to achieve the right level of reliability at the minimum possible cost. Clearly, adding safety stock, building warehouses, working with alternative suppliers and adopting new digital technologies will increase operating costs. What really matters is finding the right balance between the burden of additional costs and the enhanced risk management capabilities they enable in the face of disruption. For example, with a small additional investment in manufacturing flexibility, organisations can better match supply with demand—a critical capability in a constantly disrupted world.



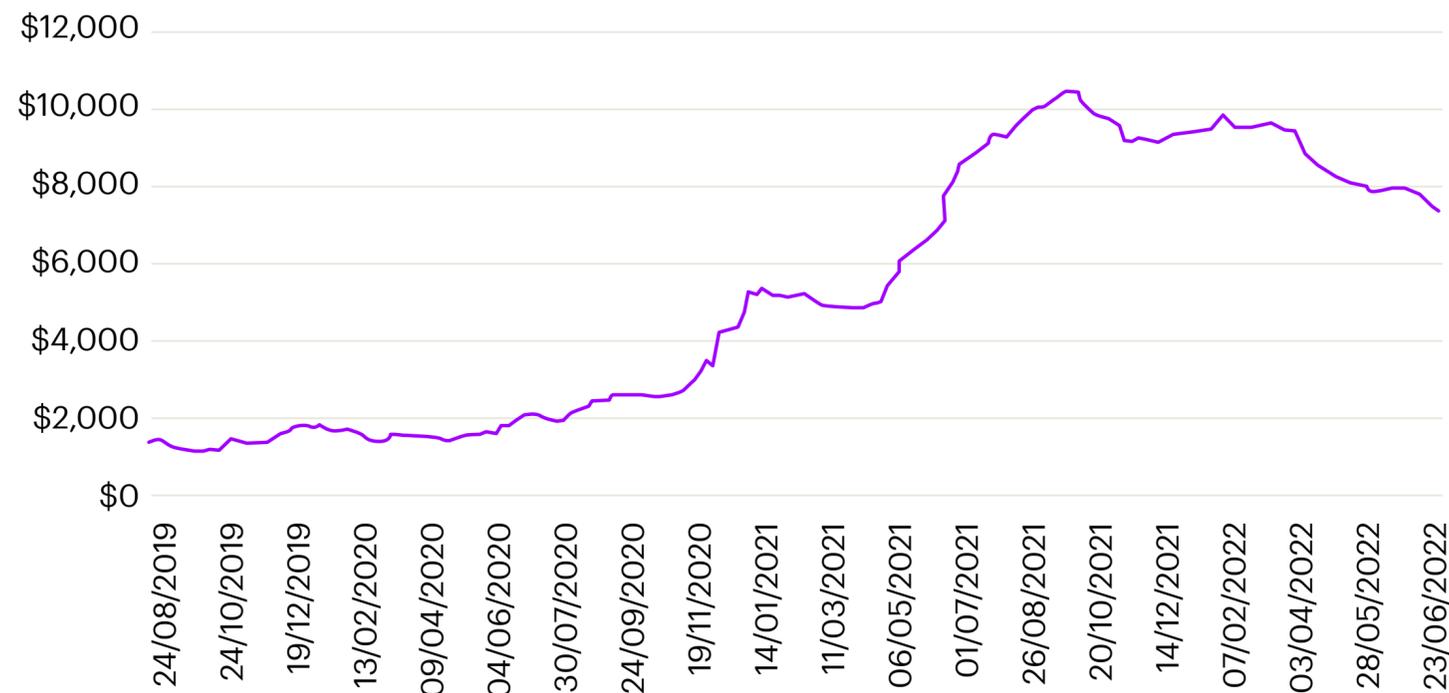
An aerial photograph of a coastal city and port. In the foreground, a large blue and white cargo ship is moving through the water, leaving a white wake. A smaller tugboat is positioned behind it. The city is built on a peninsula, with various buildings, including residential and commercial structures. In the background, there are mountains under a clear blue sky. A purple semi-transparent box is overlaid on the left side of the image, containing white text.

What additional challenges do businesses face in Australia?

High reliance on imports

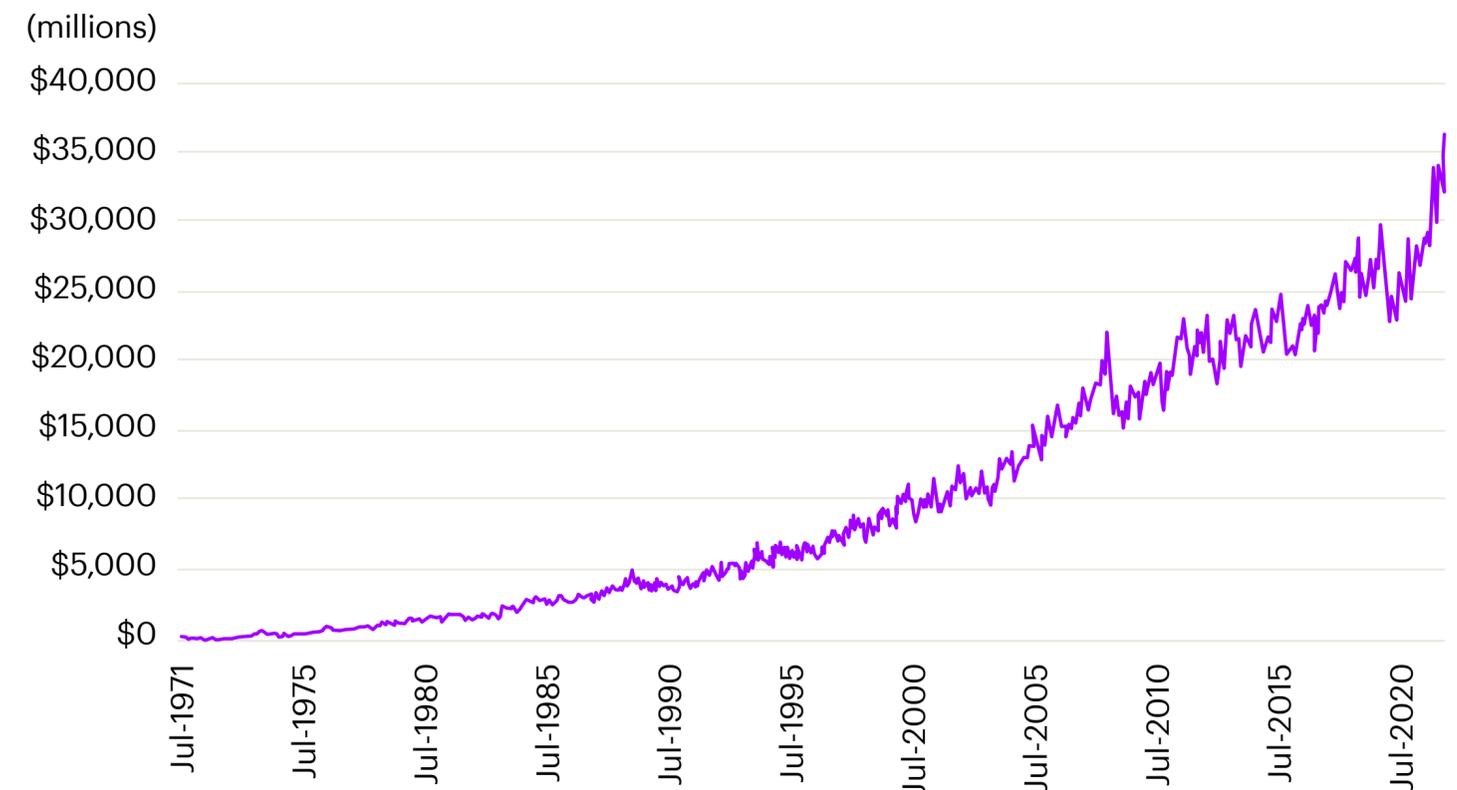
Australia's imports of goods and services are the equivalent of 21.60% of its GDP.⁸ National reliance on imports has never been higher than it is now, continuing to increase the pressure on Australia's ports. As an island nation, Australia already conducts 98% of its trade through its ports, compared to the 90% global average.⁹ This means that global disruptions in sea freight and increasing container shipping costs pose heightened challenges for Australian businesses.

World container index – assessed by Drewry
USD per 40 ft container



Source: [Drewry, World Container Index, September 2022](#)

Total monthly imports AUD

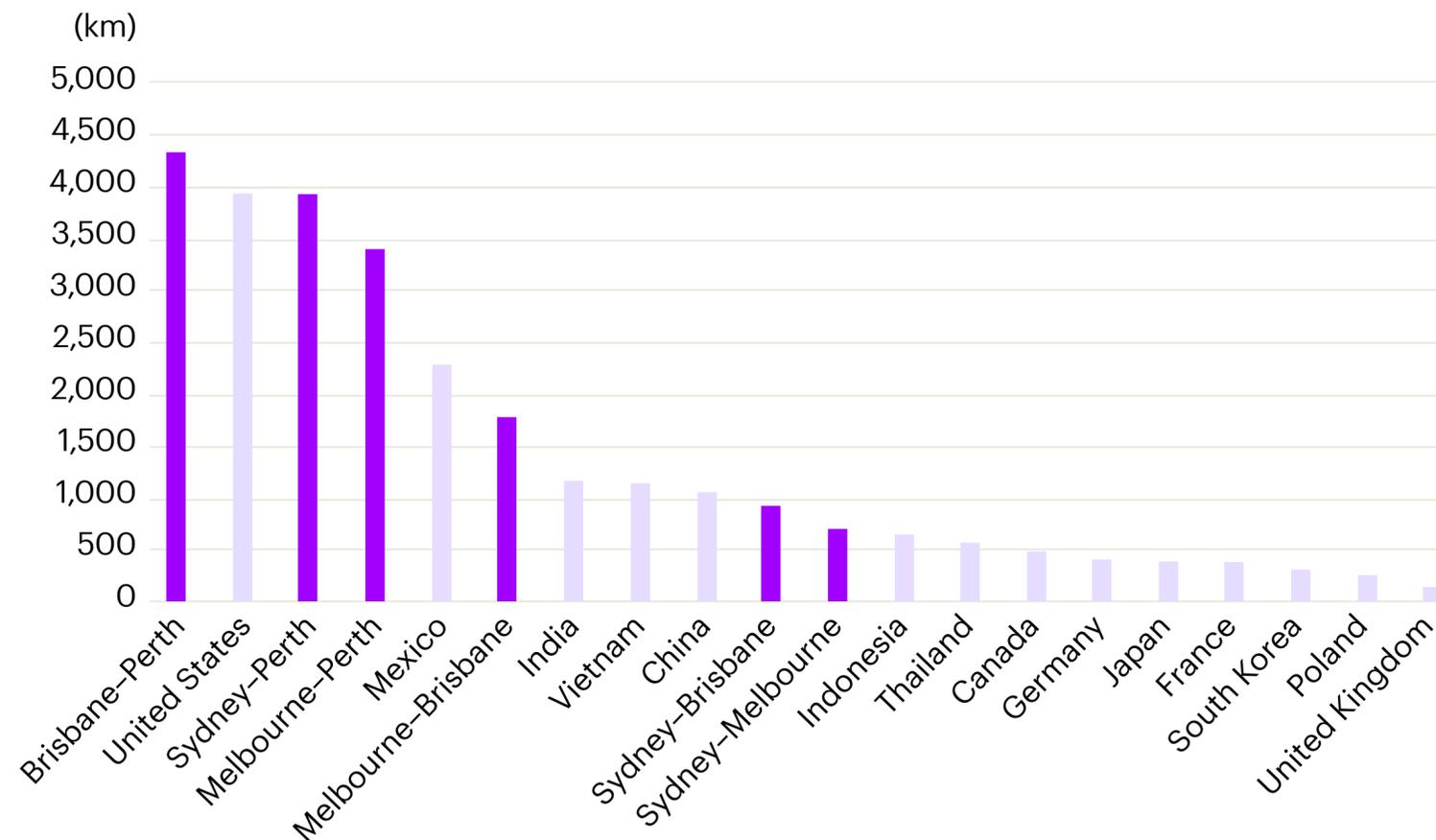


Source: [Australian Bureau of Statistics, International Trade in Goods and Services, Australia, July 2022](#)

Challenging internal logistics

With a vast land mass and capital cities on its coastal fringes, internal freight is expensive in Australia, especially given the nation’s disproportionately high dependency on road freight. Increasing shortages of truck drivers, coupled with surging fuel prices due geopolitical uncertainty in Ukraine, are further exacerbating this issue.

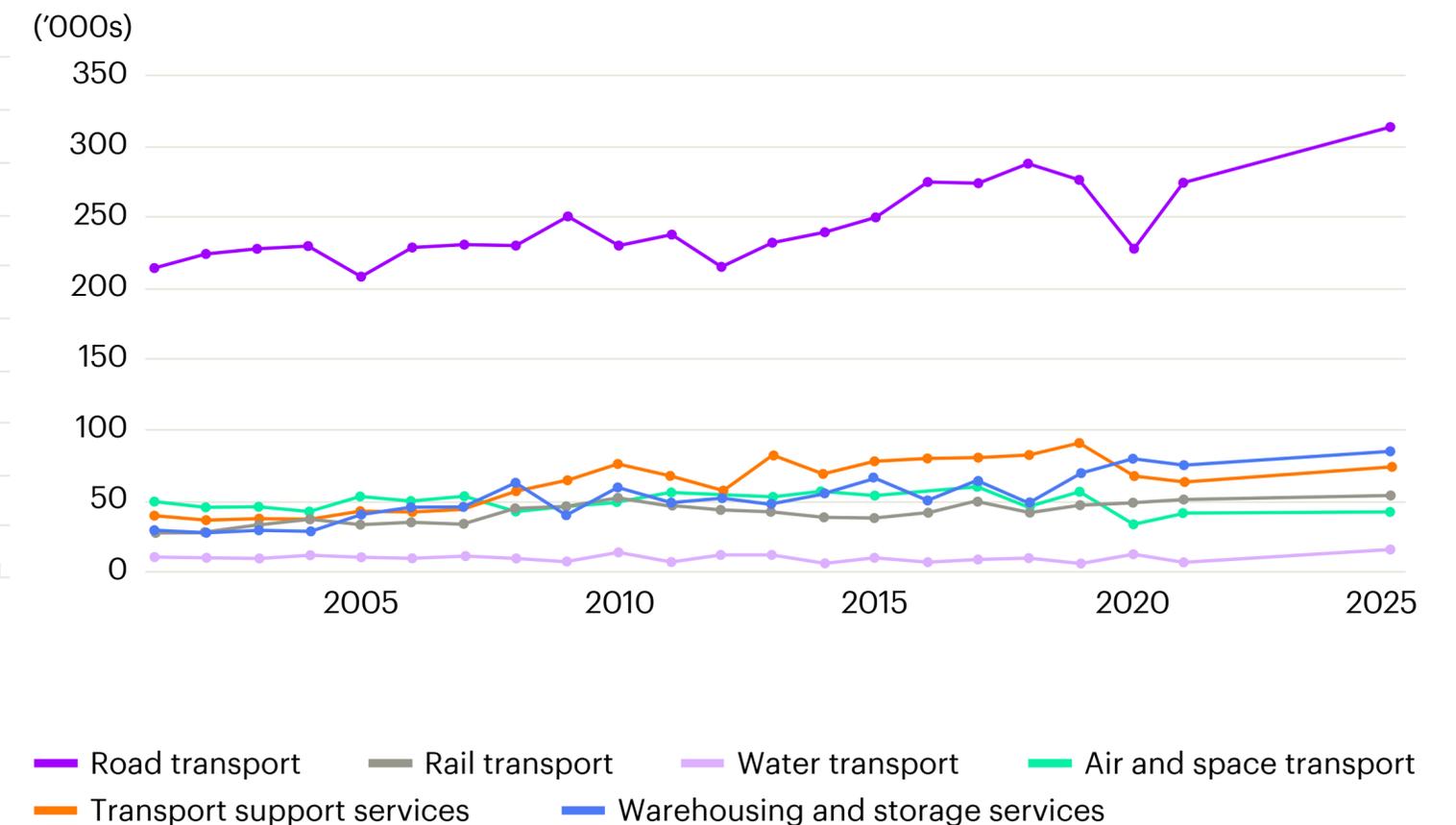
Distance between major capital cities



Note: Distances for countries outside of Australia measured between the two most populated cities (e.g., United States: Los Angeles-New York)

Source: Vivid Maps, Countries ranked by the distance between the two most populated cities

Employment level and projection

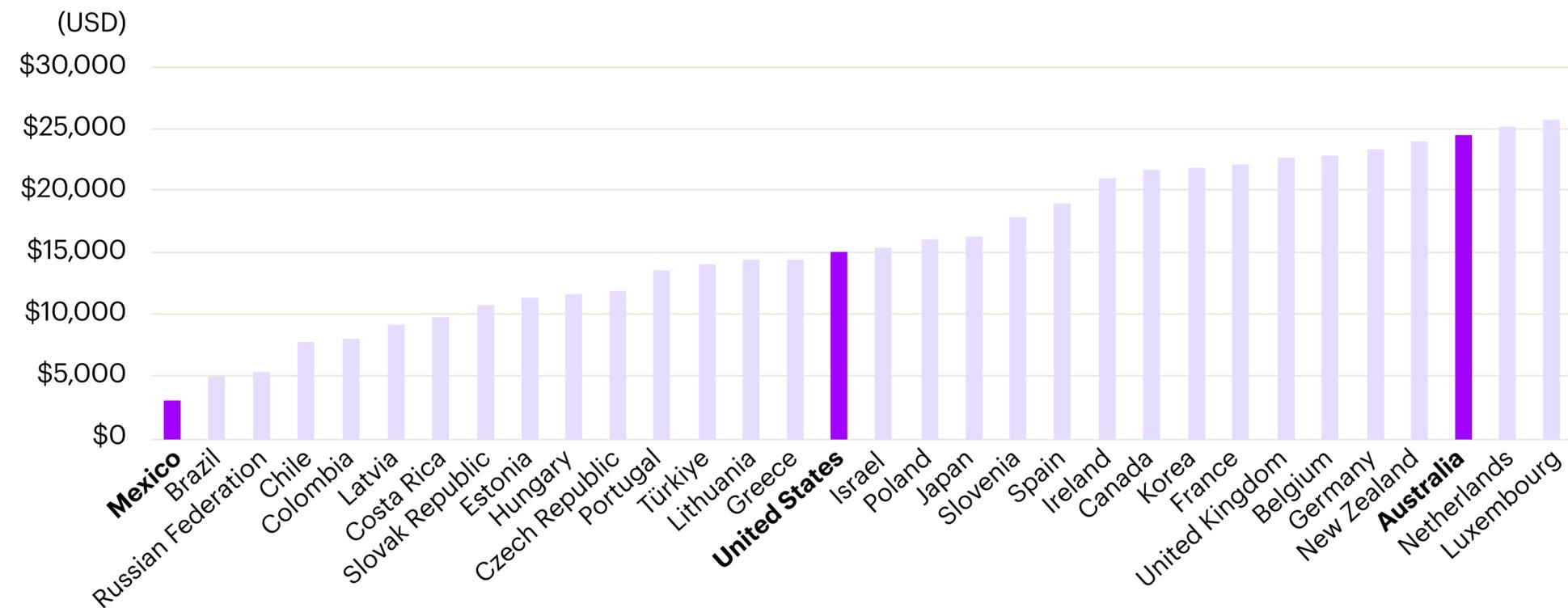


Sources: National Industry Insights Report, Transport, 2021

High labour costs

To reduce uncertainty and unpredictability in long supply chains, many countries have started onshoring and near-shoring to bring manufacturing closer to home. For example, the U.S. is looking to regain some of its manufacturing output, bringing back some of the jobs previously lost to globalisation.¹⁰ Even where this is not feasible due to high U.S. labour costs, Mexico offers a nearby competitive alternative. Australia's cost of labour is significantly higher than that in the U.S., and our island nation has no "neighbouring" countries offering cheaper alternatives.

Annual minimum wage earnings (2020)



Source: [OECD, Real minimum wages, August 2022](#)





Increasing climate risk

Extreme weather events put local transport infrastructure at risk, exposing new vulnerabilities in local supply chains. Australia is already experiencing higher temperatures and more extreme droughts, fire seasons and floods due to climate change. The number of days breaking heat records has doubled in the past 50 years.¹¹

Direct and indirect disaster costs are also projected to increase from an average of \$18.2B per year to \$39B per year by 2050,¹² highlighting the scale of disruption that Australian supply chains will need to endure.



What has industry learnt from the pandemic experience?

In a July 2022 workshop, supply chain executives discussed how the last two years of disruption affected their organisations, how they responded and what lessons were learned.

Reports from the pandemic

Businesses reported increasing “unknowns” in their supply chains, including long and unreliable lead times from suppliers, uncommon material and labour shortages, infrastructure failures, unprecedented demand and forecasts that didn’t reflect reality. Supply chain costs increased, with up to 50% rises in material and transportation costs and reliance on “Plan B” options. The result was delays in delivering major projects and lost sales or poor customer outcomes from outbound delays.

Supply chain responses

Companies typically addressed uncertainties with a mix of largely reactionary strategies, including:

- Increasing stakeholder engagement
- Identifying local alternatives for sourcing, transport, labour and materials
- Partnering with analytics and customer experience teams
- Carrying additional inventory, leading to a lack of space and increased storage costs
- Adapting existing infrastructure (e.g., turning retail stores into pick/pack, dispatch locations)
- Modelling worst case scenarios to add contingency

Numerous companies increased their focus on data collection and reporting. However, data sets were typically captured as an afterthought and underutilised in terms of predictive analytics or creating real-time situational awareness. Most were focused on day-to-day decision making and efficiency, rather than future-proofing and resilience.

There is a clear gap in the application of digital technologies to drive timely and informed decision making within Australian businesses.



How digital technologies can enable supply chain resilience

Resilience requires organisations to develop fit-for-purpose capabilities across their network, building Intelligent Visibility, which comprises:

Structural Visibility



The ability to see across the entire network, including multi-tier suppliers, manufacturing locations and distribution centres, at a point in time or over a certain period. This provides a view of the material and physical flows between different nodes in supply chain, information that organisations can use to create a **Digital Twin**.

Dynamic Visibility



Access to real-time information across the network, using Supply Chain Control Towers that support a portfolio of maturing capabilities:

Monitoring (most basic) – organisations collect and observe supply chain health and performance in real time, answering questions such as, “Do we have the right inventory to meet customer deliveries?”

Predicting – using AI or machine learning, organisations can answer questions such as, “Which orders are most likely to face delivery issues?”

Prescribing – organisations use supply chain signals to optimise operations, such as dynamically re-routing supply to different locations.

Autonomous Execution (most advanced) – the control tower leverages AI or machine learning and robotic process automation to take independent actions based on supply chain signals.

In this way, by harnessing real-time data, as well as advanced predictive and prescriptive analytics, organisations can adapt and respond to volatility with minimal disruption.

How to get started on the resilience journey

Supply chain digital twins can help companies create visibility of their end-to-end supply chain, test for weaknesses and understand related revenue at risk.

A digital twin is a virtual rendition of an organisation's physical supply chain, created by integrating information from multiple sources into a data lake. With availability of global databases and supply chain platform technologies, such as Interos, it is now feasible to build digital twins that can simulate complex, N-tier supplier networks and understand the weakest nodes by assessing various disruption scenarios. These might include a sudden spike or drop in demand for a specific product, a tier-1 supplier plant shutdown, the disruption of a port or hub, a transportation capacity shortage, a distribution shutdown or a drop in manufacturing production.

All these disruptions can be translated to a node capacity impact that the supply chain has to recover from or adapt to, enabling organisations to identify:

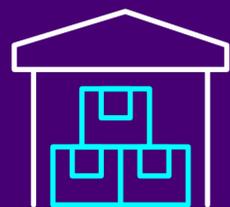
- **Immediate areas for improvement** – prioritised by balancing operational versus financial impacts.
- **Future mitigation strategies** – ranging from policy or process changes (e.g., redefining inventory levels by parts or products, dual sourcing or diversifying the supplier base or identifying backup distributors) to embedding Dynamic Visibility capabilities to create a visible, intelligent, connected and agile supply chain.

Intelligent Visibility will be a strategic future differentiator. But it doesn't have to be an expensive "all or nothing" commitment. Organisations can maximise their return on investment by embedding Intelligent Visibility into the most mission critical parts of their supply chain.



Supply Chain Resilience Stress Test

In partnership with the Massachusetts Institute of Technology (MIT), Accenture has industrialised a Supply Chain Resilience Stress Test tool, incorporating pre-defined disruption scenarios, their variations and impact of mitigating alternatives to calculate an organisation's Resilience Score looking at:



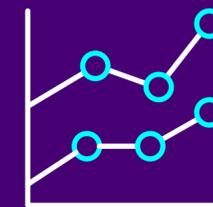
Time to Survive (TTS)

The maximum duration that the supply chain can match supply with demand after disruption with and without mitigating alternatives



Time to Recover (TTR)

The time it takes to recover to full functionality after a disruption



Performance Impact (PI)

The impact of a disruption for the duration of TTR on a performance measure

By comparing TTS with TTR, organisations can assess the criticality of the potential disruption.



Why organisations should continue to focus on resilience

Organisations should learn from their experiences in the past few years and move beyond a crisis management mentality. Once supply chains begin to recover, it's tempting to return to business as usual and begin over-emphasising cost efficiency. Instead, organisations should build resilience into their supply chains so they can anticipate and get ahead of future disruptions, rather than remaining unaware until they are forced to react to the next crisis.



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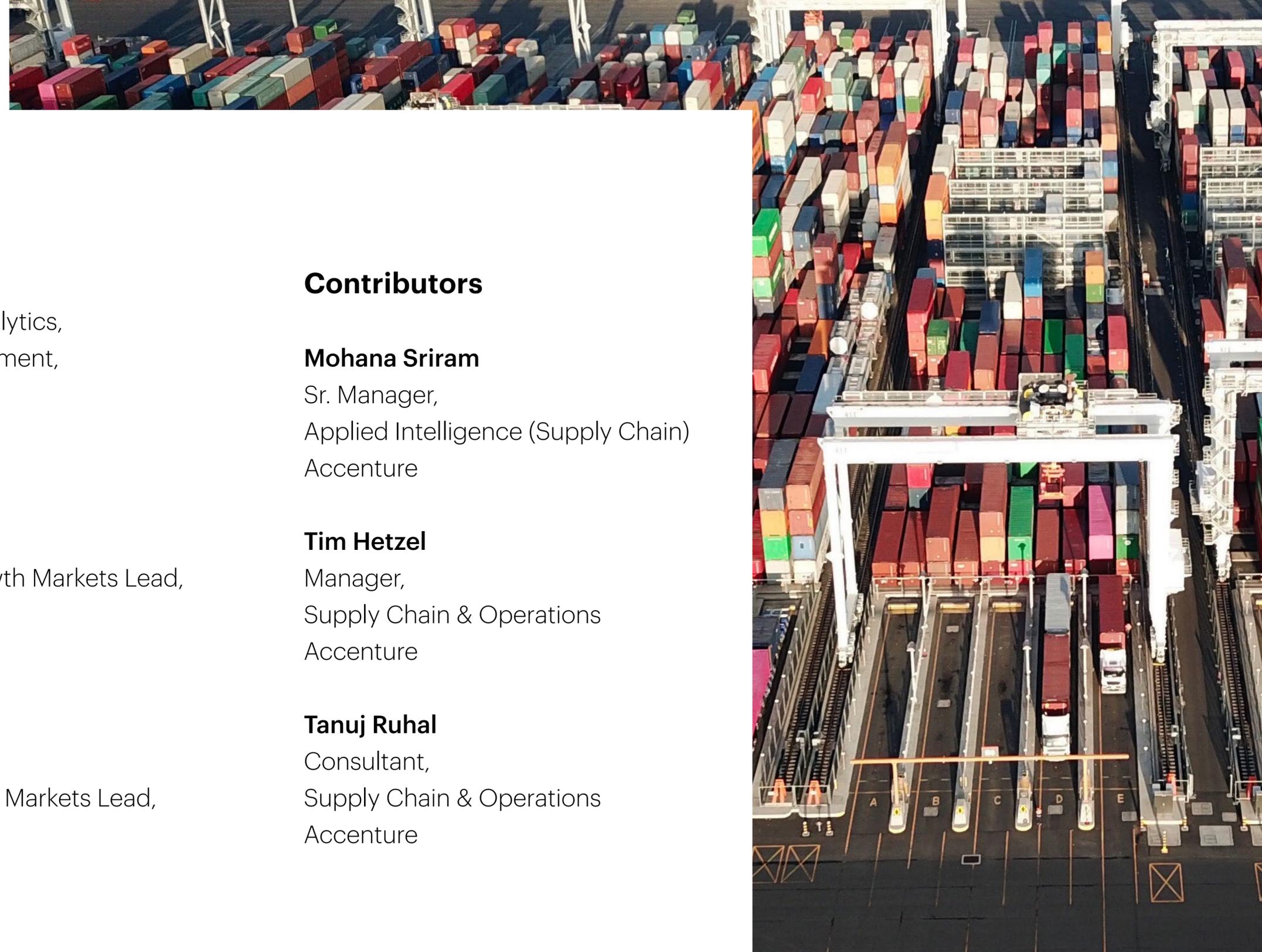
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