



# DIRDC FREIGHT DATA REQUIREMENTS STUDY INTERNATIONAL APPROACHES

A Research Report for the Department of Infrastructure, Regional Development and Cities  
Rose Elphick-Darling, Dr Don Gunasekera, Juan E. Muriel-Villegas, Juan Esteban Calle Salazar,  
Karla C. Álvarez-Uribe

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## Abbreviations

ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission
AGIMO	Australian Government Information Management Office
AGLDWG	Australian Government Linked Data Working Group
AIBE	Australian Institute for Business and Economics (UQ)
ALC	Australian Logistics Council
ANAO	Australian National Audit Office
ANDS	Australian National Data Service
API	Application Programming Interface
APP	Australian Privacy Principle
ARC	Australian Research Council
ARRB	Australian Road Research Board
ASAC	Australian Statistics Advisory Council
ATDAN	Australian Transport Data Action Network
AURIN	Australian Urban Research Infrastructure Network
BITRE	Bureau of Infrastructure, Transport and Regional Economics
CAV	Connected and Automated Vehicles
CBA	Cost Benefit Analysis
CITS	Co-operative ITS
COAG	Council of Australian Governments
CRC	Cooperative Research Centre
CSCL	Centre for Supply Chain and Logistics
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DIRDC	Department of Infrastructure, Regional Development and Cities
DFAT	Department of Foreign Affairs and Trade
DPMC	Department of Prime Minister and Cabinet



DTA	Digital Transformation Agency
DTO	Digital Transformation Office
FMS	Freight Movements Survey
FOI	Freedom of Information
GIF	Graphics Interchange Format
GIS	Geographic Information System
G-NAF	Geocoded National Address File
GPS	Global Positioning System
GVA	Gross value added
HILDA	Household, Income and Labour Dynamics Australia
IAP	Intelligent Access Program
ICT	Information and Communications Technology
IDI	Integrated Data Infrastructure
iMOVE	iMOVE Australia (incorporating the iMOVE Co-operative Research Centre)
LBE	Large business enterprise
IoT	Internet of Things
IP	Internet Protocol
IPA	Infrastructure Partnerships Australia
IT	Information Technology
ITS	Intelligent Transportation Systems
JSON	JavaScript Object Notation
MaaS	Mobility as a Service
MADIP	Multi-Agency Data Integration Project
MBE	Medium business enterprises
MOG	Machinery of Government
MOU	Memorandum of Understanding
NCRIS	National Collaborative Research Infrastructure Strategy
NDC	National Data Custodian



NFSC	National Freight and Supply Chain (Strategy)
NID	National Interest Dataset
NHVR	National Heavy Vehicle Regulator
NSS	National Statistical Service
NTC	National Transport Commission
NSW DAC	New South Wales Data Analytics Centre
OAIC	Office of the Australian Information Commissioner
OECD	Organisation for Economic Co-operation and Development
PC	Productivity Commission
rCITI	Research Centre for Integrated Transport Innovation (UNSW)
SBE	Small business enterprises (LBEs)
SMART	SMART Infrastructure Facility, University of Wollongong
SMVU	Survey of Motor Vehicle Use
TCA	Transport Certification Australia
TIC	Transport and Infrastructure Council
TfNSW	Transport for New South Wales
TMR	Department of Transport and Main Roads Queensland



## 1. Introduction

### 1.1. Background

The purpose of this report is to set out relevant international approaches to freight data collection and consider the suitability of these approaches in the Australian context.

The overall purpose of the FDRS project is to conduct an in-depth study into the data requirements of the Australian freight industry and the freight data challenges identified by the recent Inquiry into National Freight and Supply Chain Priorities (NFSC 2018a). As outlined in the project request from DIRDC, the study is to:

- Identify what freight data is required (for governments and across industry) to improve freight related planning, operations and investment decision-making;
- Identify what part of those requirements can be satisfied from existing data collection processes, and what additional data would be required;
- Explore how needed data might be obtained; and
- Explore how freight data should be stored, analysed and disseminated.

### 1.2. Research objectives

The research objectives are to:

- Identify countries whose freight task has similar characteristics to Australia's;
- Locate datasets or collections that may contribute to our understanding of Australian freight data requirements;
- Examine the collection, analysis and dissemination systems of these datasets; and
- Highlight where best practice is applied.

The research has focused on datasets that have been identified as a “gap” in terms of what stakeholders require to make their operational, planning, investment and policy decisions more effectively.

### 1.3. How this report is set out

This Report is set out in 7 sections, as follows:

- Section 1 – Introduction;
- Section 2 – Key findings;
- Section 3 – Methodology for selection of comparator countries;





- Section 4 – International comparisons;
- Appendix A – Freight data by country;
- Appendix B – Detailed Research methodology; and
- Appendix C – International data repositories.



## 2. Key findings

We set out the main findings of the research below.

### 2.1. Agility and resourcefulness required

Australia is a large country with a relatively small, highly concentrated population. The relatively unique character of Australia's supply chains suggests that, *prima facie*, a freight and supply chain data system may be difficult to borrow directly from international models.

Successful international approaches are often delivered at the supranational level, such as in the European Union, which collectively funds many institutions related to data collection, spreading the costs and benefits across the 28-member union. The lesson for Australia is to work at the national level, involving the states and territories for maximum benefit.

### 2.2. Data sharing within government

Recognising the benefits of open data from both a public transparency and economic efficiency perspective, governments are seeking to improve publicly-owned metadata records and create more accessible dashboards and API-based dataset accessibility for researchers in government, industry and academia.

A key example is the EU Open Data Portal established in 2012 following a European Commission decision on the reuse of Commission documents. As a result, all EU institutions are encouraged to make their data publicly available whenever possible.

In France and South Africa, annual reporting across a number of datasets held by numerous agencies is presented as the *State of Logistics*. The basis of the reporting is data-sharing arrangements established between the reporting agency and data custodian agencies within local, regional and national governments.

### 2.3. Mandating of data collections

The use of mandated data collections for informing policy agencies was notable in the international experience. Mandating data collection as an intrinsic part of economic regulation is more common overseas than in Australia (although Australian regulators generally have powers to compel the provision of data from regulated firms such as rail operators), as is the extent of regular survey instruments relating to freight movement and commodity flows. Rolling monthly surveys and annual collections that are legislated deliver longstanding, detailed data series that benefit government in planning infrastructure investment and industry in understanding infrastructure capacity.

### 2.4. Accessing non-government data

Generally, the freight datasets in comparable countries demonstrate greater convergence of industry real-time data with government's more static point-in-time (time series) data. All governments investigated are forming government-industry alliances, contracting to source these datasets and



exploring the implications of this transformation. Intelligent Transport Systems and the Smart Cities movements have been at the forefront of this trend and many of the protocols and architectures stem from this work.

The transition to the use of administrative sources of data and big data pools, often from commercial activities, are happening at a pace. The speed of technology change has made this possible.

## 2.5. Standardisation of data formats and interoperability

The sharing mechanisms in portals or cloud-based networks are dependent on data standards and protocols so they can be shared effectively. Establishing an architecture for the data collection and dissemination is a vital role which has been generally adopted by governments across the selected countries.

This is an important lesson in the federal Australian context where states play a significant role in data collection but, heretofore, have not made efforts to standardise collection methods across states.

## 2.6. Role of industry in freight data collection

Concerns related to industry data sharing that have been suggested as barriers, such as protection of commercially sensitive data, use for identifying regulatory breaches etc, are increasingly being dealt with through quite sophisticated access arrangements and processes that negate many of the concerns of data producers/owners. These developments are in the context of increasing privacy requirements (eg. the “right to be forgotten” (EU, UK), and “my data my say” (NZ) policies and programs.

## 2.7. Thematic freight data collections and research focus

The research uncovered a number of freight data repositories dedicated to a specific theme or issue of high priority within a country or country grouping. For example, there is an international focus on city logistics and understanding the last mile of freight distribution, driven by concerns related to congestion and the rapid growth of ecommerce. With the majority of populations living in urban areas, there is a compelling need to understand network impacts and capacity optimisation, given the high cost of this activity.



## 3. Methodology for selection of comparator countries

### 3.1. Country selection

In selecting countries to compare to Australia, often the starting point is to refer to OECD countries, which have similar levels of economic development, trade conventions and governance structures. The 34-member countries were examined for similarities to Australia, based on a range of factors relevant to freight transport demand and supply, and supply chain composition in Australia.

Additionally, freight data arrangements and datasets in a number of non-OECD countries were examined, including South Africa, Russia, Thailand and China.

### 3.2. Common characteristics

A range of characteristics related to general economic conditions, transport networks and supply chains were compared across these countries with Australia. The comparison incorporated as one factor the World Economic Forum Global Competitiveness Index scores, which consider a range of productivity metrics, including use of technology and innovation.<sup>1</sup> The factors measured against Australia were as follows:

- Population: Australia's market size impacts the ability to achieve productivity through scale economies in freight operations;
- GDP per capita: An indicator of income and, hence, capacity to invest in (and maintain) freight network datasets;
- Domestic freight task: a relative indicator of network size;
- Population density: Sparse populations present distribution challenges, raising costs and risk;
- Size of largest cities: Potential for similar scale and complexity in urban logistics;
- Road network size: Asset management scale;
- Rail network size: Asset management scale;
- Proportion of road freight mode share: An indicator of dependency on road versus other transport modes;
- Wheat exports: An example of a critical export commodity;
- Port container throughput: An indicator of international trade effort;
- Key trading partners: Potential to match datasets; and

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<sup>1</sup> World Economic Forum Global Competitiveness Index, 2018.  
<http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport2018.pdf>



- Global Competitiveness Index scores: Key variables that impact freight are Infrastructure quality, ICT Adoption and Innovation Capability.

### 3.3. Similarity score

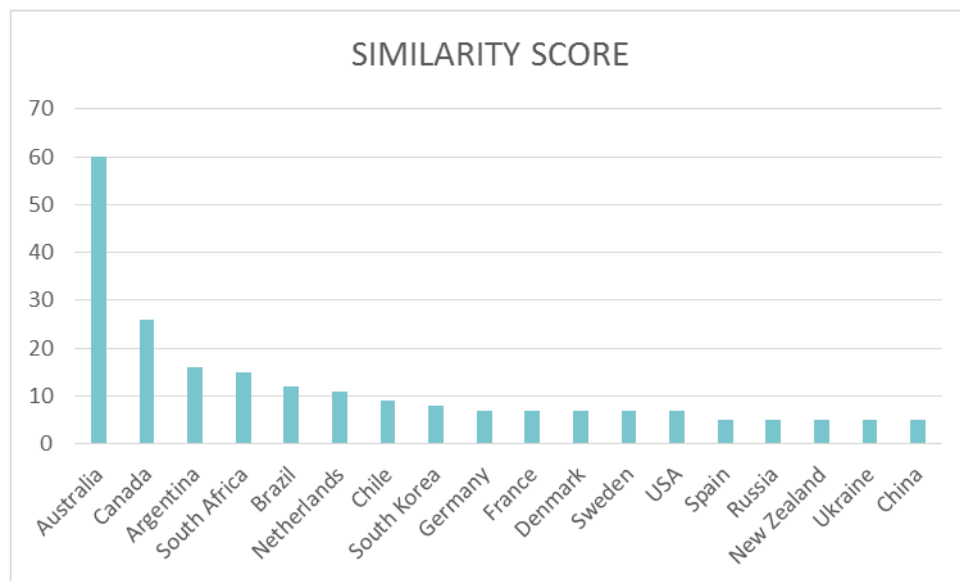
We then scored countries based on their similarity to Australia on each identified characteristic. Two results were evident:

- The country with the highest correlation to Australia across these factors (Canada) scored less than half (43%) of the Australian benchmark score. This is indicative of the uniqueness of the Australian freight transport and supply chain.
- Based on this methodology, only a small group of countries can be considered to have similar characteristics to Australia, namely: Canada, Argentina, South Africa, Brazil and the Netherlands.

We also scanned a wider group of countries (beyond the OECD), which revealed additional countries with similar characteristics to Australia, namely: Chile, South Korea, Germany, France, Denmark, Sweden, USA, Spain, Russia, New Zealand, Ukraine and China. This group of countries is more reflective of Australia’s key trading relationships, such as with China, USA, South Korea and New Zealand.

Figure 1-1 illustrates the uniqueness of Australia relative to comparator countries. Australia, as the ‘denominator’ country scores 60 points, being 5/5 across the 12 identified characteristics. Canada’s score of 26 points is the closest country to Australia. Australia’s major trading partners all score less than 10 points.

**Figure 1-1. Scoring characteristics by similarity to Australia**



Source: Deakin CSCL, 2019.



## 4. Comparison of country freight data with Australian freight data gaps

The research also explored the availability of freight data in relation to identified freight data gaps in Australia. We reviewed country settings in terms of national strategic agendas in relation to freight transport and supply chain imperatives, the impetus for formation of datasets and specific data, custodianship, accessibility, evidence of metadata describing the key data and datasets and methodologies that might relate to gaps in Australian collections.

Appendix A contains a summary of findings for each country analysed to date and a detailed listing of all data relevant to Australian freight data requirements. Within each category, data for each measure has been recorded, with information detailing the custodian, collection methodology, time series, frequency of release, and the URL link to the dataset.

Table 2-1 summarises key datasets and their availability in countries examined. Where two data metrics relate to a category, these are indicated.

One conclusion that can be drawn from the table is that the datasets are more likely to be available by parameter rather than by country. For example, safety, network usage and CO2 emissions datasets are almost universally produced across the select comparator countries. On the other hand, no country comes close to producing the range of freight supply-chain parameters identified. This finding most likely reflects a number of factors, including: (i) economic and governance development stage; (ii) political imperatives; and (iii) layout and risks associated with each supply chain network.



Table 2-1. Data availability in required categories

		Country													
Freight Supply Chain Issue	Category	Argentina	Brazil	Canada	Chile	France	Germany	Italy	Netherlands	New Zealand	Russia	South Africa	South Korea	Spain	Thailand
Economic impact	Average employment per business in road transport	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Vehicles used for "own transport" and for "hire and reward"	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Environment	CO2 emissions	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Particulates emissions	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Noise highway/rail corridor	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Noise individual vehicle, activity	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Noise urban impact	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Impact of freight on urban transport congestion	EV Fleet Size	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Last mile B2B, B2C	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Infrastructure	LCV location data	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Bridge, tunnel, road, rail capacity	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Network impediments	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Network interruptions/delays	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Rail freight path utilisation	■	■	■	■	■	■	■	■	■	■	■	■	■	■
International competitiveness	Telecommunications	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Cost comparison with trading ports	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Land use	Land acquired and gazetted for national freight corridors	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Network performance	Average speed	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Network Usage	Route utilisation	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Tonnage x mode x month/p. a.	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Traffic by route x mode	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Safety	Non-fatal accidents involving freight vehicles	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Supply chain productivity	Cost in selected supply chains	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Commodity flow	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Data availability: ■ Available ■ Discovery ■ Unavailable

It is evident that datasets have been developed in a number of jurisdictions that match the data “gaps” in Australia. For example, in France data from police investigations and hospital records are shared with transport agencies to identify non-fatal accidents that involve freight vehicles. Definitions of vehicles, the outcome after 30 days for injured parties, and descriptions of the incident are available for analysis, leading to more informed policy deliberations and comparisons with other countries and safety regimes.

Another instance of dataset development is the supply chain data collated from a range of commodity and freight types indicating monthly movements, mode of transport, net tonne kilometres travelled and vehicle types. In some jurisdictions cost in segments by activity in the supply chain is measured. Some countries measure selected supply chains eg. fuel, manufactures, commodities, while others have a monthly reporting regime, indicating internal, transiting, import and export flows (Appendix A).



## 4.1. Highlighting best practice

Best practice generally indicates a method or process which consistently produces superior outcomes and that is established or proposed as a standard suitable for widespread adoption.<sup>2</sup>

The following are some examples from the comparator countries and leading jurisdictions related to freight and supply chain data collection that appear to be delivering consistently high-quality data in relation to freight transport and therefore qualify as worthy of consideration. As the research focus was on datasets aligned to Australian requirements, these examples relate to practices that may be pertinent in terms of methodology, theme or application of the data in planning, operations and investment.

### 4.1.1. France

#### ***Mandated data collection by regulators***

In France, collection of data from private infrastructure operators is undertaken as part of the economic regulator's task in reviewing the performance of network and asset lessees and in monitoring competition and access arrangements. The data provision is mandated and is forming an important source of data to inform infrastructure capacity and usage levels for transport agency planning. France is a highly regulated market and there are undoubtedly costs associated with data supply and benchmarking performance. However, there is a consistent methodology which is adopted as a part of doing business.

#### ***Holistic freight and supply chain approach***

France is also notable for combining data from a number of Ministries (Environment, Transport, Industry, Health, and Customs) to produce regular state-of-the-nation reports that combine a range of data relating to freight transport and logistics. This holistic viewpoint creates a readily usable industry and government reference set which assesses a range of metrics beyond freight transport, including the value of freight moved and the contribution of the sector.

#### ***Observatories***

France formed its first freight data observatory in 2000 and now produces two reports each year on topics of relevance to freight transport, with the research support of the Transport Ministry. There are also regional freight observatories and the French-Italian observatory dedicated to Alpine freight transport issues. France is also at the forefront of the EU Horizon 2020 initiatives in establishing CityLabs (Paris, Lyon) aimed at conducting applied research on urban freight impacts and solutions.

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<sup>2</sup> Miriam-Webster Dictionary.





#### 4.1.2. Canada

##### ***Canadian Commodity Flow Survey***

Canada launched its new Canadian Commodity Flows Survey (CCFS) dataset in 2018, based on data collected in 2014.<sup>3</sup>

Canada's Transportation and Statistics agencies have worked closely with the US Bureau of Transportation Statistics (BTS) and the US Census Bureau to develop the methodology.

#### 4.1.3. Chile

##### ***Cost in select export supply chains***

The Chilean National Logistic Observatory reported in 2018 a methodology for evaluating the foreign trade logistics costs for three different types of products.<sup>4</sup> For exports they used blueberries, for imports they used cloth and television imported from China. For defining the costs of the export supply-chain they conceptualized eight modules, which relate to each stage of the export process:

- Module for the local transport tariff (Chile)
- Module for the custom tariff (Chile)
- Module for the port terminal transfer tariff (Chile)
- Module for the international transport and freight insurance tariff (Chile)
- Module for the port terminal transfer tariff (rest of the world)
- Module for the custom tariff (rest of the world)
- Module for the local transport tariff (rest of the world)
- Module for the general management tariff

For the computation of the cost for the local transport in Chile, previous studies that reported costs and margins of transportation companies were used.

##### ***Inter-regional volumes by commodity***

In 2009, the Ministry of Transportation and Telecommunication assigned to CIPRES Ingeniería LTDA, a consulting company, to undertake analysis of the national freight transportation task. CIPRES developed a methodology for the estimation of the interregional flows by commodity. As they know the national production by region, the imports and exports of each commodity, then it is possible to compute the amount of the commodity consumed in the national market. For some commodities, which are produced and consumed in few regions was possible to estimate the flow between regions, but for some other with multiple origins and destinations it was necessary to employ a minimum

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<sup>3</sup> <https://www150.statcan.gc.ca/n1/en/daily-quotidien/180328/dq180328h-eng.pdf?st=bGu0xGgy>

<sup>4</sup> [https://www.observatoriologistico.cl/fileadmin/doc\\_documentos/Informe\\_Costos\\_Logisticos\\_comex\\_2018.pdf](https://www.observatoriologistico.cl/fileadmin/doc_documentos/Informe_Costos_Logisticos_comex_2018.pdf)



distance model between regions. Depending on the type of commodity, an attraction array is generated, for example, for fruits consumption the attraction estimation is done through the population of the region.<sup>5</sup>

#### 4.1.4. Spain

##### ***Unified database of existing data resources***

The Spanish transport and logistics observatory (OTLE) is an entity that collects information from the different observatories and makes it available to the public. The main categories are:

- Mobility
- Socioeconomic information
- Capital and infrastructures
- Security
- Environmental information
- Metropolitan transport
- Logistics

The cost to establish the Transport and Logistics Observatory was AUD\$882,000 and it employs 6 staff. The Observatory began in 2014 by undertaking a forensic examination of all available datasets that contribute to understanding the transport and logistics system. The unification of existing relevant datasets that otherwise would not have been shared is an important feature of the value returned to stakeholders. Many of the data collections are mandated by the Transport Ministry and other national agencies.

The Observatory, which is fully government-funded, coordinates the supply of data from government agencies, regional and local administrations, and from the private sector. In May 2017, the Transport Ministry commissioned Ineco, a major engineering company, to work with the Observatory to develop the upgrade the data system architecture to support the establishment, maintenance and upgrading of OTLE's information sources and analysis. The Observatory is now moving to provide more accessible formats for users.

In terms of user engagement, there is a permanently open mailbox for users and stakeholders. Additionally, there is an "Observatory Day" held with some regularity where transport operators and associations representing large companies and SMEs participate.

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<sup>5</sup> <http://www.subtrans.cl/upload/estudios/CargaNacional-IF.pdf>



#### 4.1.5. Brazil

##### ***Non-fatal accident data***

The Brazil Road Federal Police agency keeps a database of all the accidents since 2007. They store the data at the level of event. For each event data includes the number of fatalities, serious injuries, minor injuries, and unharmed. The database reports as well the exact point and date of the accident.<sup>6</sup>

##### ***CO2 emissions***

The Ministry of Science, Technology, Innovation and Communication of Brazil created SIRENE, as the National Register System of Emissions. SIRENE has collected data on the emissions by economic sector since 1990. SIRENE supports its estimation on the document “2006 IPCC Guidelines for National Greenhouse Gas Inventories”, which is the methodological framework for calculating emissions of the Intergovernmental Panel on Climate Change (IPCC).

#### 4.1.6. Netherlands

##### ***Historic and current traffic database***

Through the National Traffic Database, an overview of the current situation on the road is available. Every minute, data from more than 37,000 measurement locations in the Netherlands are collected and distributed to customers. Data includes -

- Traffic intensity (the number of vehicles passing a measuring point)
- Point speed (average speed of vehicles passing a measuring point)
- Realised or estimated travel time
- Vehicle category (derived from the length of the passing vehicles)

These data are not consistently collected and held in Australia, bearing in mind that a large proportion of the road network is under the management of local government, with further data held by state road managers. Culway counts and periodic traffic surveys are not collated nationally and are either not dynamic or fed back to users.

#### 4.1.7. South Africa

##### ***State of Logistics™ Survey***

The Council for Scientific and Industrial Research (CSIR), in collaboration with Stellenbosch University, publishes data on the cost of logistics. This data series extends over a period of 14 years and is detailed in the State of Logistics Report.<sup>7</sup>

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<sup>6</sup> <https://www.prf.gov.br/portal/dados-abertos/acidentes>

<sup>7</sup> [www.imperiallogistics.co.za](http://www.imperiallogistics.co.za).



### ***National corridor freight data focus***

National Freight Data Bank: The lack of road freight data was an ongoing concern – outdated provincial databank information made future estimates less reliable. In a bid to address this concern, the South African Department of Transport has embarked on developing a national transport databank as well as a national freight databank<sup>8</sup>.

The National Freight Data Bank has been established and it offers a comprehensive and consolidated view on all modes of freight transport in South Africa. Several agencies and organisations have shared data for inclusion in the National Freight Databank in order to compare and determine trends and bottlenecks within the freight transport system. The statistical information contained under this platform includes historical data on freight volumes for the following:

- Three commodity sectors: agriculture, manufacturing and mining
- Five modes of transport: road, rail, pipeline, air and maritime
- Sixteen national freight corridors.

The National Freight Data Bank project facilitates the availability of cross border data, information on freight movement and other freight corridor information. It is proposed that the availability of freight and corridor information will ultimately result in the reduction in cost of doing business, as the data will enable the identification of operational and infrastructure gaps and/or bottlenecks and will subsequently result in the ability to formulate policies and strategies that are geared towards the achievement of proper infrastructure investments and planning across all spheres of government to overcome these problems.<sup>9</sup>

#### **4.1.8. Germany**

##### ***Leadership in development of Intermodal Indicators***

Europe is moving towards a more integrated system of transport modality, with a keen interest in methodologies that will trace the efficiency of modal transfers. Germany has been tasked with developing multimodal indicators, in the context not only of economic efficiency, but to measure sustainable development targets. A detailed analysis of data that would contribute to this indicator is contained in the Conference of European Directors of Roads Report (2017)<sup>10</sup> “Freight-and-Logistics-in-a-Multimodal-Context\_Understanding-what-influences-modal-choice”. It is notable that the German methodology to measure multimodal performance has now been adopted by the European Union.

In addition, the guidelines on compiling intermodal statistics at national level using the ‘German approach’ will be used for a pilot exercise in collecting intermodal indicators. As regards modal split

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<sup>8</sup> <http://freightdatabank.info/#/>

<sup>9</sup> (see <https://www.agriorbit.com/national-freight-data-bank-south-africa/>).

<sup>10</sup> [http://www.cedr.eu/download/Publications/2017/CR-2017-7\\_Call-2015-Freight-and-Logistics-in-a-Multimodal-Context\\_Understanding-what-influences-modal-choice.pdf](http://www.cedr.eu/download/Publications/2017/CR-2017-7_Call-2015-Freight-and-Logistics-in-a-Multimodal-Context_Understanding-what-influences-modal-choice.pdf)



indicators, work will continue to develop distance matrices and methodology for territorialising freight volumes transported by all means of transport by distance class, and will be extended to cover passenger data. Cooperation with other international and European organisations will be stepped up for three reasons: (i) to harmonise and exchange collected statistics; (ii) to reduce the reporting burden; and (iii) meet the new requirements of the amended transport statistics regulations on rail and inland waterways.<sup>11</sup>

#### 4.1.9. European Union

##### ***Formation of the European Open Data Portal***

The EU has formed an Open Data Portal to make datasets more available to the public. This has entailed considerable effort to identify and acquire access to the datasets, which are of variable quality and format. The portal has become a “go to” site for publicly generated data across EU countries. Transport is one domain on the portal. The portal incorporates -

- a standardised catalogue, giving easier access to EU open data;
- a list of apps and web tools reusing these data;
- a SPARQL endpoint query editor;
- REST API access;
- tips on how to make best use of the site (see the Search and SPARQL manuals).

The benefits of open data are articulated as: “enabling the general public to reuse data boosts economic development within the EU and transparency within the EU institutions.”

The data concerned include:

- geographic, geopolitical and financial data
- statistics
- election results
- legal acts
- data on crime, health, the environment, transport and scientific research.

All these data are freely available. They can be reused in databases, reports or projects. A variety of digital formats are available from the EU institutions and other EU bodies.

“Generally speaking you can reuse data free of charge, provided that you acknowledge the source ([see legal notice](#)). A small number of datasets are subject to specific conditions on reuse, most of which

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<sup>11</sup> [https://ec.europa.eu/eurostat/documents/747709/753176/AWP2018\\_Strategic\\_priorities.pdf](https://ec.europa.eu/eurostat/documents/747709/753176/AWP2018_Strategic_priorities.pdf)



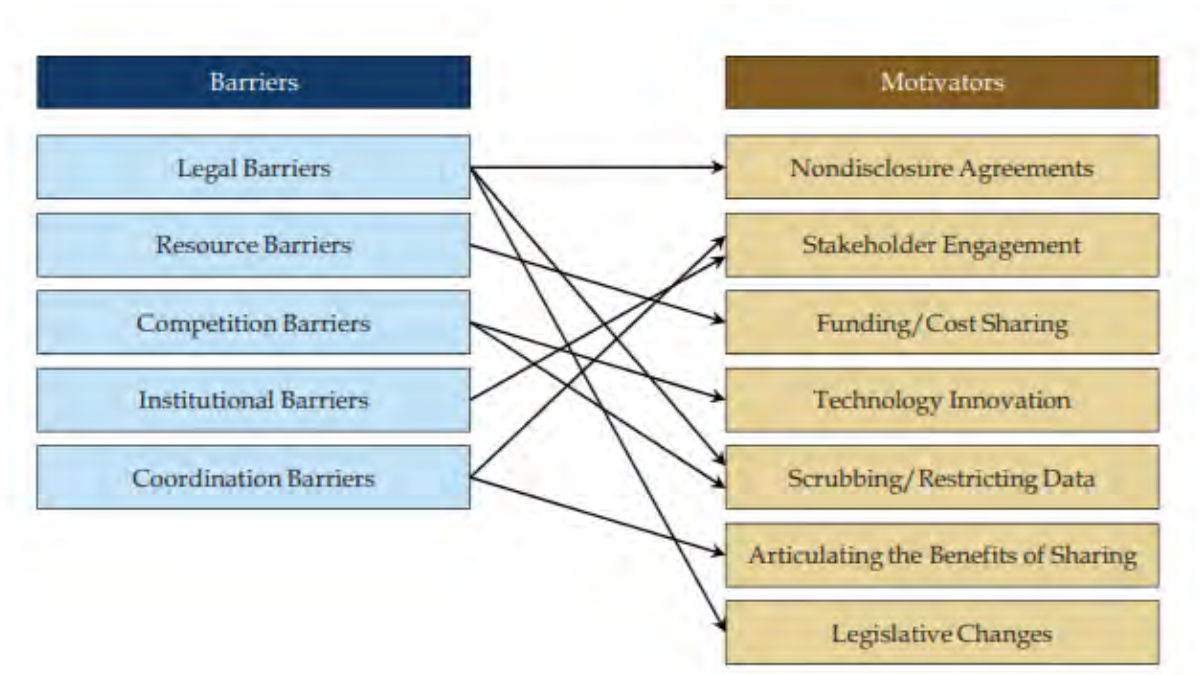
have to do with protecting third-party intellectual property rights. You will find a link to these conditions on the relevant data pages”. <https://data.europa.eu/euodp/en/about>

### **Horizon 2020 initiatives to improve data availability and sharing**

CityLab Observatory is developing new datasets for measuring the impacts and costs of freight and service trips on urban areas. AEOLIX data sharing platform is another example of the outputs from the Horizon 2020 funding.

#### **4.1.10. USA**

In 2013, the NCFRR produced a Freight Data Sharing Guidebook to assist in arrangements for accessing and sharing government and industry data. Arrangements for de-identifying data, managing privacy and Freight Data Guide (2018).



The US Department of Transportation and the American Association of State Highway and Transportation Officials have published a *Freight Data Guide* as part of the CO2: Freight Demand Modelling and Data Improvement Strategic Plan.

#### **FAF4**

FAF version 4 (FAF4) provides estimates for tonnage, value, and ton-miles by regions of origin and destination, commodity type, and mode. Data are available for the base year of 2012, the recent years



of 2013-2016, and forecasts from 2020 through 2045 in 5-year intervals. Data may be accessed through the Data Extraction Tool, downloaded as a complete database, or in summary files.<sup>12</sup>

### ***American Transport Research Institute (ATRI) Surveys***

This not-for-profit industry body collects and disseminates data from industry for use by governments and industry. In particular, the use of electronic work diary data and network usage data from GPS fleet data. A recent publication “The Cost of Congestion to the Trucking Industry 2018 Update” demonstrates the relevance of this data.

#### 4.1.11. China

##### ***China’s Smart Logistics Strategy***

The China Federation of Logistics and Purchasing, which services China’s logistics industry peak bodies, collates regular data from industry surveys. The 13th 5-year plan aims to create “smart logistics” and the key areas include logistics data, logistics cloud and logistics equipment, as industry takes up big data, AI and IoT data to drive efficiency in the ecommerce market. The smart logistics strategy has sparked efforts in research, such as JD.com Smart Logistics Institute and Alibaba’s smart logistics parks and adoption of GS1 data standards. The aim is to create digitally connected logistics capability between logistics hub incumbents to manage distribution tasks. CFLP is expected to collate data monitoring the smart logistics market.

##### ***Manufacturing and Non-Manufacturing Procurement Manager’s Index data***

The CFLP, in conjunction with the National Bureau of Statistics, surveys 800 purchasing manager per month to collate data relating to manufacturing, services and retail. The data indicates activities around logistics.

#### 4.1.12. United Kingdom

##### ***IoT and big data sharing***

The UK Department for Transport and Transport for London have been developing policy and implementation for the incorporation of IoT data in transport operation, planning and investment. The initiative is driven by convergent agendas under:

- Implementation of Open Data in the Transport agencies;
- Potential for big data from IoT devices to support Smart Cities initiatives;
- Potential to leverage innovation by developers for new applications not yet conceived;
- Value to be derived from IoT applied to freight; and

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<sup>12</sup> <https://www.bts.gov/faf>.



- Consensus that government has a role in standard setting and governance frameworks.<sup>13</sup>

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<sup>13</sup> Scoping Study into Deriving Transport Benefits from Big Data and the Internet of Things in Smart Cities  
<https://www.gov.uk/government/publications/transport-benefits-from-big-data-and-the-internet-of-things-in-smart-cities>  
The Case For Government Involvement To Incentivise Data Sharing In The UK Intelligent Mobility Sector  
<https://s3-eu-west-1.amazonaws.com/media.ts.catapult/wp-content/uploads/2017/04/12092544/15460-TSC-Q1-Report-Documentsuite-single-pages.pdf>





## 5. Freight data repository models – an international perspective

### 5.1. Common themes

This research on international approaches examined data hubs, portals, dashboards and data clouds as mechanisms to accumulate, analyse and present data, broadly defined as repositories. A number have been identified globally that are providing value to government, industry and the research community.

Repeatedly, the value proposition put forward for the formation of these repositories is described in terms of mutual interest in:

- Understanding the capacity and quality of transport network assets;
- Understanding the usage levels of these networks, including different vehicle combinations;
- Understanding constraints on the capacity of the network assets;
- Understanding the economic value of the freight vis-à-vis the national economy, to support economic choices and investment assessments;
- Understanding how supply chain development impacts on land use and transport network usage and capacity, including congestion;
- Understanding where costs occur in supply chains and how they are impacting unit cost of products shipped;
- Understanding how well air and sea ports are performing against international counterparts, particularly in relation to the competitiveness of exports;
- Understanding how to balance sustainable development goals with freight transport efficiency; and
- Creating indicators to measure the above so that planning, regulations, operational efficiency and infrastructure investment can be executed effectively.

These repositories of vital information enable the parties to improve decision-making. Evidence of this includes targeted network investment (eg. South Africa, South Korea); congestion management initiatives such as after-hours goods delivery, enabling greater access for higher productivity vehicles and targeted maintenance programs for land transport (New Zealand, UK, France, Netherlands).

Freight data hubs or repositories discovered in the research fall into 4 broad custodial categories (Figure 3-1):

1. Government-owned and located;
2. Industry-government joint ventures;



3. Industry; and
4. Academia.

The geographic coverage of the data repositories tiers into 5 layers, covering:

1. Global;
2. Multi-country/trading block;
3. Country;
4. Regional/provincial; and
5. City.

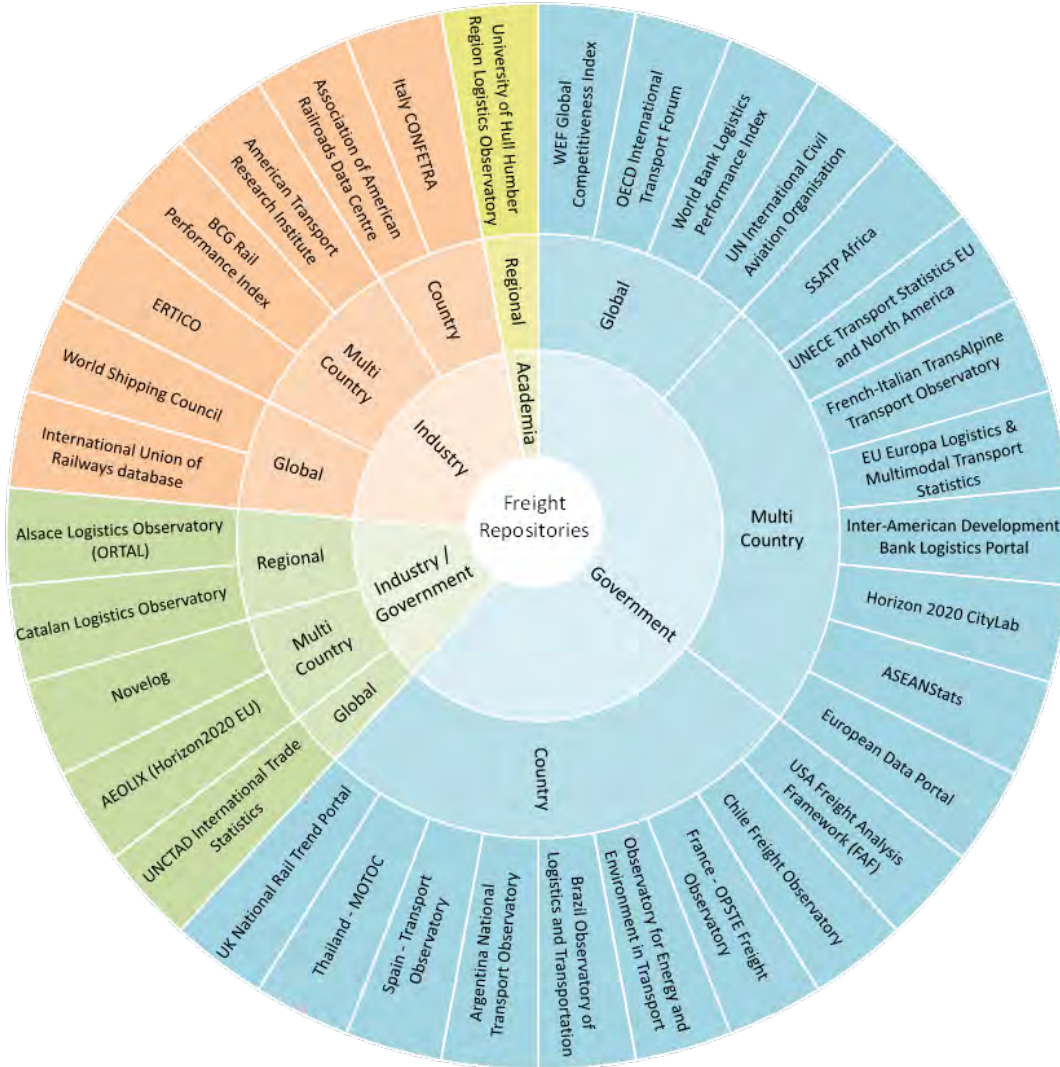
Freight data repositories were also found with a specific thematic focus, such as:

1. Intelligent Transport Systems;
2. Impacts of urban freight; and
3. Decarbonisation of freight transport.

The following figure details freight data “hubbing” across these custodial and geographic vectors. Further detail and URL links are at Appendix C.



Figure 3-1. Freight Data Repositories



Source: Deakin CSCL, 2018.



## 5.1.1. General remarks on the data repositories

### 5.1.1.1 *Observatories*

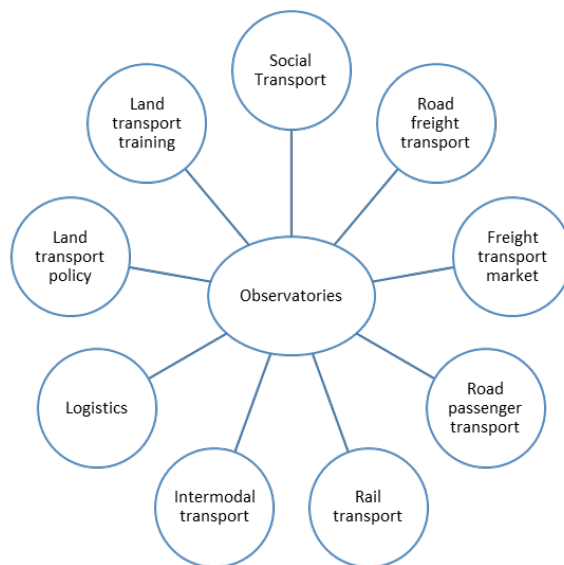
The term “observatory” has been defined as a tool to gather data and measure and monitor key indicators on logistics and trade in an accessible location. The data repository is purposeful in that it has an active performance monitoring and reporting role and the data is collected, collated and analysed in relation to key performance indicators built specifically to advance planning, operations or investment.

Observatories are not only an aggregator and access point for data: they undertake analysis and report on the indicators they observe.

A number of observatories for transport more generally, or specifically to collate freight and trade data, have been established in the last two decades, notably in European countries. These have become mainstays for government and industry data sharing.

A number of jurisdictions have also formed theme-specific observatories and in Spain, for example, there are nine dedicated observatories to study different aspects of transport.

**Figure 3-2. Transport Observatories, Spain**



Source: Ministry of Development, Spain.

The success of the European observatories in creating a focus for exchange of data between government, industry and academia has been translated into development bank-funded initiatives in Latin America with the formation of freight transport or logistics observatories. The purpose is to assess the performance of the sector and the transport infrastructure used for freight movement with a view to gaining a clearer understanding of capacity needs and demand for infrastructure investment.



#### 5.1.1.2 *Thematic freight data hubs*

A number of hubs have been formed, often through industry-government joint venture companies or industry-led initiatives, to focus on answering pressing questions related to freight planning, operations and investment. These tend to be associated with themes such as use of emerging technologies in freight productivity, understanding the impact of freight in cities, or testing solutions to lessening the environmental and amenity impacts of freight movement. For example, the CityLabs EU Horizon 2020 hub currently engages 17 cities in applied research and data gathering.

#### 5.1.1.3 *Accessibility and open data*

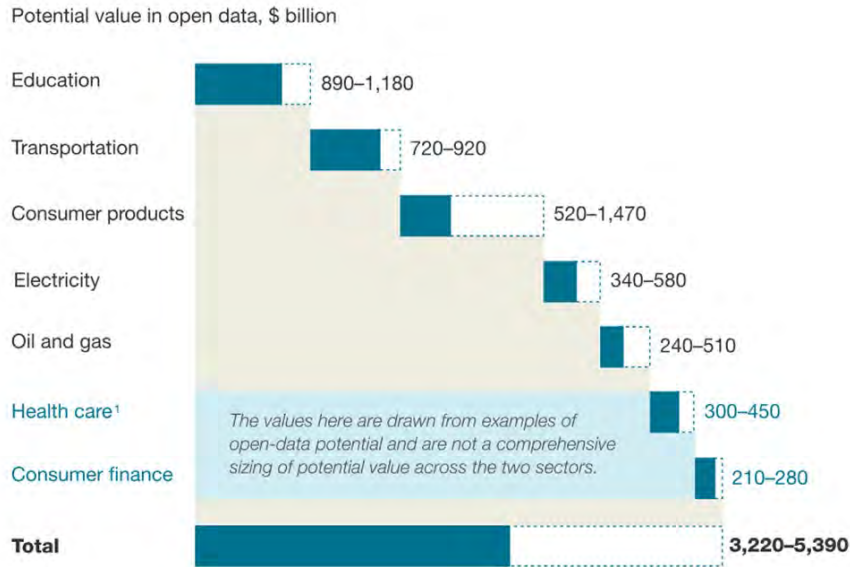
The trend to make data more transparent and accessible is contributing to the drive for the establishment of government metadata and data repositories. For example, the UK government has established an open data site <https://data.gov.uk/>; the EU has established the European Data Portal <https://www.europeandataportal.eu/en/homepage> ; the US Federal Government issued a Directive in 2009 requiring metadata records to be deposited on the Open Data site <https://www.data.gov/>. The US Government Open Data Policy has now been in place for several years <https://opengovdata.io/2014/us-federal-open-data-policy/>.

Open Data programs are also resulting in governments investing in the “front-end” presentation of data for users, with new presentation and analytical tools enabling combinations of network geography and usage data, high quality geospatial visualisations, data dashboards and application programming interface (API) “plug and play” capability for users accessing the data.

According to a 2013 analysis by McKinsey Global Institute, open data has significant potential to generate economic benefits in the transport sector.



**Figure 3-3. Potential value in open data, McKinsey**



<sup>1</sup>Includes US values only.

Source: McKinsey Global Institute analysis

#### 5.1.1.4 Partnership of government, industry and academia

Hubs utilising data from internet of things (IoT), big data pools, or requiring enhancement using artificial intelligence (AI) or machine learning techniques tend to rely more heavily on external sources of expertise to provide the analytical tools to prepare data for subject matter expert interrogation. This indicates new alliances forming to create this capacity and new governance models required to manage these relationships and the hybrid data created.

Private hubs, some hosted by industry peak bodies, tend to aggregate company-level data to be made available, retaining a distance from government while creating de-identified, aggregated datasets as an input to government strategic planning and investment evaluation (eg. American Transport Research Institute in the USA collating industry survey data and electronic logging data from vehicles; China Federation of Logistics & Purchasing Procurement Manager’s Index (PMI)).

## 5.2. Developments and challenges in freight data collection

Governments are increasingly “tempted” by the potential value of large real-time data pools being created by industry through digitisation of business processes and the Internet of Things. This data is highly granular, accurate, commonly based on geo-coordinates and time stamped. It is frequently utilised in Smart City initiatives as part of complex systems analytics.

When applied in the mobility scenario, say to heavy vehicle movements or courier van movements, the data promises to enhance and potentially replace more static collection methods.



While governments are putting in place frameworks to achieve access to this data, they are also challenged to meet their own data issues, with standardisation, open data and privacy legislation impacting their own datasets.

### 5.2.1. Big data analytics

Private companies generating large data pools (eg. INRIX, HERE Technologies, Teradata, Streetlight Data) are working with metropolitan, state and national transport agencies and freight transport suppliers to generate new insights, often in the context of smart city planning.

Common user hubs designed for the exchange of freight and logistics information and data at a company level are emerging, with ERTICO in Europe developing AEOLIX, and in the Netherlands iSHARE network. These connecting agents enable data sharing between companies, analysis and aggregation of data, and avert the need for and cost of a proliferation of company-based “portals” and platforms.

### 5.2.2. Data standards and privacy protection for sharing

New models for data sharing and open data sourcing emphasise the need for standardisation of definitions of logistics activities, processes, events and assets. This is further stressed in the use of distributed ledgers as in blockchain applications. For example, the US Bureau of Transportation Statistics Freight Data Dictionary <https://www.bts.gov/content/freight-data-dictionary> and the US Blockchain in Transport Alliance, aiming to promulgate standardisation and industry adoption <https://www.bitastudio/>.

On the issue of interoperable and open data sharing, a UK review of government and industry data holdings concluded in 2015 that:

“The issue of transport-related data interoperability – at a global level – represents a significant challenge to the development of data-driven intelligent mobility services over the next 10 years. Due to their scale and product-reach the major global technology firms (eg. Google, with their Transit and Directions products) appear able to drive interoperable transport data standards such as GTFS more effectively, rapidly, and globally than existing industry bodies have to date. This can challenge transport data providers’ desire to remain platform and supplier-agnostic by using common open data standards.”<sup>14</sup>

The EU is struggling with the same dilemma in relation to datasets and the UNECE has been reviewing definitions and data protocols to enable sharing. In the USA, a Freight Transportation Data Architecture was developed in 2015.<sup>15</sup> GS1, the global data standards body, has established the Global Data Synchronisation Network to support logistics data standardisation and Alibaba has now adopted the GS1 standard for its e-commerce logistics.<sup>16</sup>

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<sup>14</sup> <https://ts.catapult.org.uk/wp-content/uploads/2016/04/The-Transport-Data-Revolution.pdf>

<sup>15</sup> <https://www.nap.edu/download/21910>

<sup>16</sup> <https://www.gs1.org/transport-and-logistics>



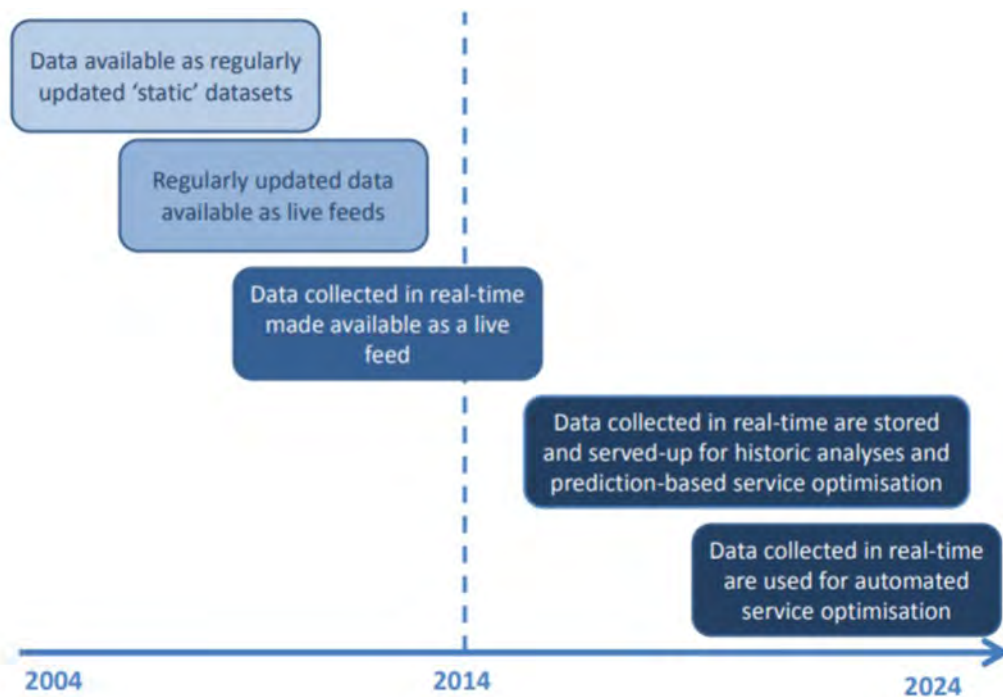


Added to the issue of standardisation, logistics suppliers within or supplying the EU are implementing the General Data Protection Regulation introduced in May 2018, impacting the sharing and storage of customer data and privacy systems to enable “the right to be forgotten”.<sup>17</sup>

### 5.2.3. Real time data sharing

Figure 3-3 highlights the shift in the accessibility of more real-time data as technologies enable the collection from a diverse range of data sources. The timeliness of data relates to the operational needs of supply chains and is likely to relate to transport network management eg. traffic congestion, network interruptions or regulatory activity (cross-border inspections, vehicle enforcement).

**Figure 3-4. Indicative path for real-time data sharing**



Source: The Transport Data Revolution, UK Catapult Transport Systems, 2015.

#### 5.2.3.1 Consideration of a freight data cloud

The European Commission, as part of the European Open Science Cloud, has investigated the formation of a Transport Research Cloud.

“To enhance the use of transport research data, there is a need to establish an EU Transport Research Cloud (TRC) in line with the EU’s open science efforts and the EOSC. A primary aim for the TRC will be to provide researchers in the transport and logistics domain with access to open datasets covering topics of importance to their research. Current approaches to data access, which are ad hoc, based on

<sup>17</sup> EUGDPR <https://eugdpr.org/>.





personal relationships and individual knowledge of where data resides, are insufficient to provide the broad access to properly curated data needed by researchers in this domain.

The TRC presents numerous opportunities for the domain. If data can be made open and easily accessible, there will be much greater availability of relevant datasets and wider opportunities for reuse and remixing. This will facilitate research across communities and countries, advancing the state-of-the-art in the field more quickly. If the TRC becomes the go-to place for datasets in the field, it could also facilitate more public-private partnerships as commercial companies are encouraged to make their data available and research teams do not have to approach data “Owners” individually and make separate agreement for reuse.”<sup>18</sup>

The report recommends that the TRC now proceed to feasibility assessment. The premise of the initiative is that data paid for by public agencies should be available for public access and be treated as a public good. It also points out that while technically achievable, the data culture of the transport research community is likely to be the greatest challenge. The report recognises the need for the data in policy development, transport network development and infrastructure construction. It reviews the costs, funding and long-term sustainability requirements for the TRC. It makes a series of recommendations related to reusable research data, data as a public good, standards, data infrastructure, and incentives, education and training of the research community.

In China, the development of smart logistics data sharing clouds for smart logistics parks aligns with the massive ecommerce boom. While this data is focused on creating operational efficiencies, academic work has commenced on extraction of aggregated data for urban planning purposes from the ecommerce platforms.

## 5.3. Key findings

### 5.3.1. Agility and resourcefulness required for a unique country

Australia is a large country with a relatively small, highly concentrated population. However, our export resources are spread widely, from the wheat belts in the south-west corner of Western Australia to the beef producing regions in central Queensland, iron ore in the Pilbara, and the coal deposits in the Gippsland, Hunter and Bowen basins. These resources travel great distances to export ports around the country.

The relatively unique character of Australia’s supply chains and convoluted freight transport settings when compared with other countries suggests that a freight and supply chain data system may be difficult to borrow directly from international models and will require adaptation to the Australian federal (and public/private mix) context.

Successful freight and, more broadly, transport data systems overseas are often supported by a larger economy or country grouping (such as in the European Union), enabling scarce resources to be

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<sup>18</sup> Analysis of the State-of-the-Art, Barriers, Needs and Opportunities for setting up a Transport Research Cloud, 2018. <https://publications.europa.eu/en/publication-detail/-/publication/93f647a7-ee08-11e8-b690-01aa75ed71a1/language-en>



dedicated to building data capture, analysis and dissemination systems. For example, the European Union collectively funds many institutions, including related to data collection, spreading the costs and benefits across the 28-member union.

Effective datasets, methodologies and repositories have also been identified in other jurisdictions such as in Canada, the United States and United Kingdom. Australia is advancing its efforts in similar directions and can learn from the approaches of international counterparts. That said, an Australian system will need to be as agile and resourceful as possible to deliver comparable datasets to the large-scale survey methodologies used in larger economies.

### 5.3.2. Data sharing within government

Recognising the benefits of open data from both a public transparency and economic efficiency perspective, governments are seeking to improve publicly-owned metadata records and create more accessible dashboards and API-based dataset accessibility for researchers in government, industry and academia.

A key example is the EU Open Data Portal established in 2012 following the European Commission Decision 2011/833/EU on the reuse of Commission documents. All EU institutions are invited to make their data publicly available whenever possible. This means data can be reused free of charge and without any copyright restrictions. The portal holds metadata records, links to the datasets, published reports on data, data procurement activities, visualisation programs, analyst training and developer APIs. The open data portal is described here (Open Data Portal):

*“A small international team at the Publications Office of the European Union in Luxembourg maintains the site. We work together with data providers to standardise data and make them more easily available. Our aim is to give these data as high a profile as possible. We are constantly working to improve the portal. Our current projects are the Data Catalogue Vocabulary (DCAT) implementation and a visualisation project.”*

In France and South Africa, annual reporting across a number of datasets held by numerous agencies is presented as the *State of Logistics*. The basis of the reporting is data-sharing arrangements established between the reporting agency and data custodian agencies within local, regional and national governments.

### 5.3.3. Mandating of data collections

The use of mandated data collections for informing policy agencies was notable in the international experience. Mandating data collection as an intrinsic part of economic regulation is more common overseas than in Australia (although Australian regulators generally have powers to compel the provision of data from regulated firms such as rail operators), as is the extent of regular survey instruments relating to freight movement and commodity flows. Rolling monthly surveys and annual collections that are legislated deliver longstanding, detailed data series that benefit government in planning infrastructure investment and industry in understanding infrastructure capacity.

These datasets are generally derived via two paths. The first is through national or supranational legislation enabling statistical agencies and transport portfolios to mandate collection; the second is



through national regulators with responsibility to collect data on the performance of concession-holders and lessees of transport networks and nodes such as air/sea ports and intermodals.

An example is France, where the economic regulator ARAFER<sup>19</sup> publishes a range of data on commodities, usage levels, rolling stock consists (in the case of rail), volume and value of freight on the network or transiting the node, supplied to the regulator on a regular basis. In the USA and Canada, participation in annual trucking surveys is mandated Section 13 of the Federal-Aid Highway Act of 1938<sup>20</sup> and the truck parking Jason's Law data collection was legislated in 2015 under the MAP-21 legislation. In the Netherlands, regular road, rail and air transport surveys are mandated.

#### 5.3.4. Accessing non-government data

Generally, the freight datasets in comparable countries demonstrate greater convergence of industry real-time data with government's more static point-in-time (time series) data. All governments investigated are forming government-industry alliances, contracting to source these datasets and exploring the implications of this transformation. Intelligent Transport Systems and the Smart Cities movements have been at the forefront of this trend and many of the protocols and architectures stem from this work.

The transition to the use of administrative sources of data<sup>21</sup> and big data pools, often from commercial activities, are happening at a pace. The speed of technology change has made this possible. This transition has raised many issues, including those related to access, cost and risk management. Governments are, rightly, concerned about these issues but have, nonetheless, entered into agreements and participated in joint venture arrangements with industry and 3<sup>rd</sup> party suppliers and custodians.

A key example is the creation of a Big Data Ecosystem for Europe over the past 5 years, as a result of concern that the USA was ahead of Europe in innovating products, applications and services from big data pools. In 2014 the EU formed the Big Data Value Association through a Public-Private Partnership contractual model to provide industry leadership and participate in the Horizon 2020 research agenda.<sup>22</sup>

A successful data system has many characteristics, for example it would "bring together data owners, data analytics companies, skilled data professionals, cloud service providers, companies from the user industries, venture capitalists, entrepreneurs, research institutes and universities" (DG Connect 2013). A successful data ecosystem, which is a prominent feature of the data-driven economy, would see these stakeholders interact seamlessly within a Digital Single Market, leading to business opportunities, easier access to knowledge, and capital (European Commission 2014).

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<sup>19</sup> ARAFER <https://www.arafer.fr/observatoire-des-transports/>

<sup>20</sup> USA Trucking Surveys legislated <https://www.fhwa.dot.gov/infrastructure/fairbank.cfm>

<sup>21</sup> According to Berg and Li (2015), administrative sources are data holdings containing "information collected primarily for administrative (not statistical) purposes by government departments and other organisations usually during the delivery of a service or for the purpose of registration, record-keeping, or documentation of a transaction".

<sup>22</sup> <http://www.bdva.eu/PPP>



DG Connect has argued that:

*“The Commission can contribute to this by bringing the relevant players together and by steering the available financial resources that facilitate collaboration among the various stakeholders in the European data economy” (DG Connect 2013).*

Big data offers tremendous untapped potential value for many sectors. That said, even in Europe there remains challenges and opportunities to improve the data collection ecosystem. As Commissioner Kroes (of the European Commission) has explained: “The fragmentation concerns sectors, languages, as well as differences in laws and policy practices between EU countries” (European Commission 2013; Kroes 2013). During the ICT 2013 Conference, Commissioner Kroes called for a European public–private partnership on big data to create a coherent European data ecosystem that stimulates research and innovation around data, as well as the uptake of cross-sector, cross-lingual, and cross-border data services and products.”<sup>23</sup>

### 5.3.5. Standardisation of data formats and interoperability

The sharing mechanisms in portals or cloud-based networks are dependent on data standards and protocols so they can be shared effectively. Effort in standardising collection formats, definitions and data are in motion across national and supranational groupings. Work on creating data dictionaries to format transport data is being undertaken in USA, UK as well as in Australia (TforNSW Freight Data Portal).

Establishing an architecture for the data collection and dissemination is a vital role which tends to be adopted by governments across the selected countries. For example, the Spanish transport and logistics observatory (OTLE) is a good case study of the substantial effort taken to access and reconcile datasets from government agencies and the highly autonomous regions of Spain.

Interoperability is stressed in the formation of collaborative data portals within industry. Examples include:

- Architecture for European Logistics information Exchange (AEOLIX) formed in 2016 from a consortium of shippers, ports, technology companies, funded under the EU Horizon 2020 program, to provide a means to support data exchange between supply chain partners, without the need to develop multiple portals; and
- iSHARE in the Netherlands provides a neutral transactional platform for logistics; and in China the Smart Logistics clouds fulfil a similar requirement.

### 5.3.6. Role of industry in freight data collection

Concerns related to industry data sharing that have been suggested as barriers, such as protection of commercially sensitive data, use for identifying regulatory breaches etc, are increasingly being dealt

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<sup>23</sup> Cavanillas J, Curry F, Wahlster W (2016) *New Horizons for a Data-driven Economy*, Springer.  
<https://link.springer.com/content/pdf/10.1007/978-3-319-21569-3.pdf>



with through quite sophisticated access arrangements and processes that negate many of the concerns of data producers/owners. These developments are in the context of increasing privacy requirements (eg. the “right to be forgotten” (EU, UK), and “my data my say” (NZ) policies and programs.

In some jurisdictions, the role of industry is prominent in the collection and aggregation of industry operational data, often held by industry bodies (eg. CONFETRA in Italy, ATRI in the USA/Canada and CFLP in China) where data is aggregated and prepared for use by external customers, keeping the raw data at arm’s length from government. The industry entities charged with this task appear to have high levels of cooperation and trust from the businesses they collect data from.

### 5.3.7. Thematic freight data collections and research focus

The research uncovered a number of freight data repositories dedicated to a specific theme or issue of high priority within a country or country grouping. For example, there is an international focus on city logistics and understanding the last mile of freight distribution, driven by concerns related to congestion and the rapid growth of ecommerce. With the majority of populations living in urban areas, there is a compelling need to understand network impacts and capacity optimisation, given the high cost of this activity. The EU, generally, recognises the need for data related to new challenges such as urban logistics. Themed observatories have been established, such as CityLab Observatory, which is developing new datasets for measuring the impacts and costs of freight and service trips (like passenger transport) in urban areas. It examines and collects data on land use issues and logistics sprawl, e-commerce and e-grocery supply chains, including instant deliveries, service trips, and circular economy issues. For each topic, CityLab Observatory has collected data, compared and analysed these data, and provided a list of ‘conceptual relationships’ that contribute to the identification of simple relationships between trends and the urban mobility of goods.

## 5.4. Conclusion

Australia is behind world’s best-practice in relation to maximising the economic benefits for freight dataset collection. Although Australia is relatively unique in its geographic, demographic and federal structure, there are several international approaches that can and should be adopted to Australian conditions.

Generally, overseas governments make a particular effort to allow free and unimpeded access to datasets held by government departments and other public agencies.

Generally, governments achieve these aims by: (i) public stating this goal, and (ii) creating portals and hubs to hold metadata, standardise data formatting and provide tools to assist in easily transferring the data for analysis by other parties. The aspiration for governments is that industry will use the data to improve business performance and that innovation will be spurred along through greater and more widespread application of the data.

Making data more accessible has come with challenges associated with standardising government datasets and addressing data quality issues as open data dissemination and industry data sharing is advancing.



Internationally, governments usually fund data repositories and are increasingly engaged as a stakeholder or shareholder in developing frameworks and entities to manage the convergence of industry and government big data, especially data that describes the interaction with government-owned infrastructure or networks. Increasingly, overseas governments are benefitting from an alliance with technical specialists from data pooling companies, capable of working with governments to explore the value and application of IoT data pools in freight and logistics data supply.

There are also significant advances in freight data collection and dissemination processes and systems internationally. A number of jurisdictions can provide Australia with the benefit of their experience, having established data models and repositories. Engagement with those countries to progress the journey of economic reform in relation to assembling datasets on complex supply chain ecosystems will benefit the *National Freight and Supply Chain Strategy* implementation.



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## Appendix A Country freight data

### A.1. Canada

Canada exhibits similar characteristics to Australia across many dimensions and is often used as a comparator country in terms of economic and public policy analysis. For example, Canada compares with Australia in terms of:

- Population size;
- GDP per capita;
- Size of domestic freight task;
- Population density;
- Major city size;
- Road and rail network length;
- Wheat export task; and
- Global Competitiveness Index score.

Canada's Transport 2030, establishes the vision and priorities under which datasets will be aligned. Announced as part of this vision in 2017, one initiative is \$50 million over 11 years to launch a Trade and Transportation Information System, to be implemented by a new Canadian Centre on Transportation Data, to have access to high-quality, timely and accessible information on the transportation system.<sup>24</sup>

"Through a new data hub, the CCTD now provides easy access to a comprehensive, timely and accessible source of multimodal transportation data and transportation system performance measures. This includes maps, analysis and data from different transportation stakeholders, as well as a first national transportation performance dashboard and access to the data in the annual statistical addendum in electronic form. This hub will be continuously developed to add new and relevant content that is useful to the transportation community. The longer-term goal is to share information that will contribute to effective decision-making in Canada so as to take full advantage of the transportation system to support a strong economy."

Key providers of freight data are Statistics Canada and Transport Canada. These are two key government agencies. Section 50 of the Canadian Transportation Act (CTA) authorises Transport Canada to undertake freight data collection. Section 50 further authorizes Transport Canada to obligate carriers to provide information on transported freight. However, under Section 50 of the CTA,

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<sup>24</sup> About the Canadian Centre on Transportation Data and the Transportation Data and Information Hub; <https://www144.statcan.gc.ca/tdih-cdit/about-apercu-eng.htm>; <https://www144.statcan.gc.ca/tdih-cdit/index-eng.htm?HPA=1>





any information provided to Transport Canada remains confidential and can only be released with the authorization of the carriers from whom the data are collected. The most important constraints in datasets is the general accessibility of information due to commercial confidentiality.

Statistics Canada carry out several surveys related to the trucking industry and freight transportation. These include:

- The Quarterly For-Hire Motor Carriers of Freight Survey,
- The Quarterly For-Hire Trucking Survey,
- The Annual Motor Carriers of Freight Survey, and
- An Annual Canadian Vehicle Survey and the Railway Car Loading Survey.

Transport Canada also publishes an annual report, *Transportation in Canada*, which includes information on the transportation industry and an analysis of the freight transport.<sup>25</sup>

Provincial governments also collect data on trucking operations and truck fleet characteristics at the provincial level. But, not all provincial efforts in traffic data collection include freight data.

Several local governments have also taken the initiative to collect freight data. These initiatives have all been one-time only surveys, developed to respond to specific local needs.

There are private sources of national level freight data in Canada.

- R.L. Polk & Co., a private company, collects information on current truck stocks and newly registered vehicles.
- The Association of American Railroads (AAR) also collects freight data for commercial use. The AAR offers extensive sets of annual railway information on both US and Canadian freight movements. Examples of such datasets include railway traffic by commodity, freight loss and damage, railroad equipment reports, railway revenues and expenses, etc.<sup>26</sup>

The concentration of economic activity in Canada is in large cities. The large metropolitan areas in Canada account for 50% of the total provincial economic activity. Similarly, other statistics from Quebec suggest that more than 50% of the trucks that carry freight in Quebec use roads in the Montreal region. These numbers reinforce the central position enjoyed by the large cities within the Canadian economic frameworks. Hence, there is a recognition that the focus on urban freight or the urban part of the regional, national, or international freight within Canada deserves more attention.

Data on transportation in Canada via Transport Canada (TA) and the Canadian Centre on Transportation Data (CCTD) is broadly grouped under:<sup>27</sup>

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<sup>25</sup> Transportation in Canada Overview Report 2017.

[https://www.tc.gc.ca/media/documents/policy/Transportation\\_in\\_Canada\\_2017nwe.pdf](https://www.tc.gc.ca/media/documents/policy/Transportation_in_Canada_2017nwe.pdf)

<sup>26</sup> <https://www.aar.org/data-center/>

<sup>27</sup> <https://www144.statcan.gc.ca/tdih-cdit/index-eng.htm>



- Canadian Freight Analysis Framework
- Canadian transportation economic account
- Open Data
- Statistics by subject - Transportation Data
  - Air transportation
  - Rail transportation
  - Road transportation
  - Water transportation

#### Data sets:

- National department of statistics;<sup>28</sup>
- Canadian Motor Vehicle Traffic Collision Statistics;<sup>29</sup>
- Road transportation;<sup>30</sup>
- Railway car-loadings statistics;<sup>31</sup>
- Greenhouse gas emissions;<sup>32</sup>
- Infrastructure statistics hub.<sup>33</sup>

### Key datasets/collections related to Australian requirements

Canada launched its new Canadian Commodity Flows Survey (CCFS) dataset last year, based on data collected in 2014.<sup>34</sup>

Canada's Transportation and Statistics agencies have work closely with the US Bureau of Transportation Statistics (BTS) and the US Census Bureau to develop the methodology.

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<sup>28</sup> <https://www150.statcan.gc.ca/n1/en/type/data?text=road%20safety&p=1-All>

<sup>29</sup> <https://www.tc.gc.ca/eng/motorvehiclesafety/canadian-motor-vehicle-traffic-collision-statistics-2016.html>

<sup>30</sup> <https://www.tc.gc.ca/eng/policy/anre-menu-3021.htm>

<sup>31</sup> <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2310021601>

<sup>32</sup> <https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions.html>

<sup>33</sup> <https://www150.statcan.gc.ca/n1/pub/71-607-x/71-607-x2018013-eng.htm>

<sup>34</sup> <https://www150.statcan.gc.ca/n1/en/daily-quotidien/180328/dq180328h-eng.pdf?st=bGu0xGgy>



## A.2. Argentina

Argentina compares to Australia in terms of the size of the domestic freight task, low population density, size of the rail network and wheat export task.

Argentina collects the freight data in a decentralised way through several government organisations and transport associations. The Modernisation Secretary<sup>35</sup> and the national transport observatory are the key organisations that gather and report the data. Surprisingly, the National Institute of Statistics<sup>36</sup> does not present significant data on freight activities in the country, focusing solely on the value added to the national GDP. Information before the year 2000 is difficult to obtain or unreliable. Besides, many datasets are made available to the public on a previous year only basis.

Data regarding to urban logistics is easier to obtain through local agencies (eg. the survey and statistical agency of Buenos Aires city), that makes publicly available data on basic metrics for urban mobility. However, no projects involving envisions of the cities in coming years were found.

### Datasets

- Ministry of transport statistics;<sup>37</sup>
- National Security Agency;<sup>38</sup>
- National transport observatory.<sup>39</sup>

## A.3. South Africa

South Africa compares with Australia in the size of the domestic freight task, largest city size, and extent of the road network asset.

Statistics South Africa (Stats SA), the national statistical agency provides a range of road freight statistics on a regular basis. Stats SA publishes a range of transport-related information in various reports and publications. The freight related publications include:

- The Land Transport Survey, published on a monthly basis, and provides data on passenger and freight transportation by land. This publication contains results of the monthly survey of land transport which covers both rail and road transportation of both passengers and freight. This survey is designed to obtain information regarding total payload transported (tonnage), income of commodities transported and the gross income from freight transportation.
- Transport and Storage Industry Report: The Statistical Report No. 71-02-01 (2016) Transport and storage industry 2016, updates the statistical Report No. 71-02-01 (2013) transport and storage industry 2013. This statistical report contains financial information, employment,

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<sup>35</sup> (<https://datos.gob.ar/dataset?groups=tran&organization=transporte>)

<sup>36</sup> ([https://www.indec.gob.ar/nivel3\\_default.asp?id\\_tema\\_1=3&id\\_tema\\_2=11](https://www.indec.gob.ar/nivel3_default.asp?id_tema_1=3&id_tema_2=11))

<sup>37</sup> <https://datos.gob.ar/dataset?groups=tran>

<sup>38</sup> <https://www.argentina.gob.ar/seguridadvial/observatoriovial/estadisticas>

<sup>39</sup> <http://www.ondat.fra.utn.edu.ar/>



details of income from service rendered and ICT usage. The 2016 Transport and storage industry report covers enterprises registered for value-added tax (VAT) that are mainly engaged in the following activities (classified according to the January 1993 edition of the Standard Industrial Classification of All Economic Activities (SIC), Fifth edition, Report No. 09-90-02):

- Railway transport (SIC 7111)
- Other scheduled passenger land transport (SIC 7121)
- Other non-scheduled passenger land transport (SIC 7122)
- Freight transport by road (SIC 7123)
- Transport via pipelines (SIC 7130)
- Sea and coastal water transport (SIC 7211)
- Inland water transport (SIC 7220)
- Air transport (SIC 7300)
- Cargo handling (SIC 7411)
- Storage and warehousing (SIC 7412)
- Other supporting transport activities (SIC 7413)

#### ***Travel agencies and related activities (SIC 7414)***

Furthermore, the split between different freight modes in South Africa are regularly published in the form of a State of Logistics Survey.

South African National Roads Agency SOC Limited (SANRAL): Road vehicle movements on main national and provincial roads are monitored respectively by the South African National Roads Agency SOC Limited (SANRAL) and the provinces. The information is used for the management of the roads maintenance programs in the related agencies. Axle loads are measured or estimated to gauge the road loading at each point.

National Freight Data Bank: The lack of road freight data was an ongoing concern – outdated provincial databank information made future estimates less reliable. In a bid to address this concern, the South African Department of Transport has embarked on developing a national transport databank as well as a national freight databank.

The National Freight Data Bank has been established and it offers a comprehensive and consolidated view on all modes of freight transport in South Africa. Several agencies and organisations have shared data for inclusion in the National Freight Databank in order to compare and determine trends and bottlenecks within the freight transport system. The statistical information contained under this platform includes historical data on freight volumes for the following:

- Three commodity sectors: agriculture, manufacturing and mining.



- Five modes of transport: road, rail, pipeline, air and maritime.
- Sixteen national freight corridors.

The National Freight Data Bank project facilitates the availability of cross border data, information on freight movement and other freight corridor information. The availability of freight and corridor information will ultimately result in the reduction in cost of doing business, as the availability of freight and corridor information will enable the identification of operational and infrastructure gaps and/or bottlenecks and will subsequently result in the ability to formulate policies and strategies that are geared towards the achievement of proper infrastructure investments and planning across all spheres of government to overcome these problems.

### ***Challenges and opportunities***

Road freight origin and destination (O:D) information is unavailable in South Africa, as there is no legislation in place to compel the disclosure of this data. The lack of information on road freight volumes, operators, commodities, and movements is a continuous concern for planning authorities. The introduction of an effective registration and licensing system for road freight operators will resolve this problem.

Freight operations need to be flexible and demand- responsive. Data that is older than 6 to 12 months is likely to lead to inaccuracies in planning. The data sourced for the National Transport Master Plan 2050 (NATMAP 2050) on road, rail, and ports has contributed to a higher level of accuracy than would have been possible with a more mechanistic process.

The keys to effective freight planning information are:

- Information systems based on real observed data that provide essential information and feedback from modal operators, for policy formulation and research.
- Econometric modelling related to physical reality for checks and balances and audits.

## **A.4. Brazil**

Brazil compares to Australia in relation to its domestic freight task, population density, rail network size and international sea freight container trade throughput.

In 2012, the Brazilian Government created the Planning and Logistics Company, reporting to the Presidency Secretary. Its mission is to structure and qualify, through studies and research, the process of integrated logistics planning in the Country, interconnecting highways, railways, ports, airports and waterways. As part of the Planning and Logistics Company, the National Observatory of

Logistics and Transportation was formed to support the need for information in the Logistic Sector.<sup>40</sup> The objectives are to:

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<sup>40</sup> <https://www.ontl.epl.gov.br/diagnostico-logistico1>



- Act in the management of transport and logistics information
- Support transportation planning and decision-making processes
- Monitor the evolution of the sector through indicators
- Develop and disseminate an integrated logistics vision

As part of this mission, the National Observatory of Logistics and Transportation has created products such as Information System, Analytical Dashboards,<sup>41</sup> Technical Publication,<sup>42</sup> and Workshops.<sup>43</sup>

In the Information Systems area, applications have been built that allow revising the national infrastructure of roads and railways; the Analytic Dashboard presents the main indicators of the logistics sector, the economical context and environmental metrics; technical publications include the Logistic Transportation Newsletter (yearly),<sup>44</sup> and reports of diagnoses of the transportation sector.<sup>45</sup>

Nowadays, they do not have any portal for downloading data, but they are working on building a web application for making available its information. Brazil is trying to unify all the information that public entities are gathering through an Open Data Portal.<sup>46</sup> However, research indicates that some information is still gathered in different public agencies and, hence, not all public data is provided to the Open Data Portal.

In its reports, the Observatory describes the difficult task of gathering the data of many different agents in Brazil. This is informative for Australia, given we face similar obstacles in relation to accessing information from disparate sources.

### ***Key datasets/collections related to Australian requirements***

- Non-fatal accident data: The Brazil Road Federal Police keeps a database of all the accidents since 2007. They store the data at the level of event. For each event they present the amount of deaths, serious injured, slightly injured, and unharmed. The database reports as well the exact point and date of the accident<sup>47</sup>.
- CO2 emissions: The Ministry of Science, Technology, Innovation and Communication of Brazil created SIRENE, as the National Register System of Emissions. On the SIRENE webpage is available the data of the emissions by economic sector since 1990. SIRENE supports its estimation on the document “2006 IPCC Guidelines for National Greenhouse Gas

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<sup>41</sup> <https://www.ontl.epl.gov.br/paineis-analiticos>

<sup>42</sup> <https://www.ontl.epl.gov.br/boletins-de-logistica>

<sup>43</sup> <https://www.ontl.epl.gov.br/a-contribuicao-do-observatorio-nacional-de-transporte-e-logistica-para-o-planejamento-do-setor-de-transporte>

<sup>44</sup> <https://www.ontl.epl.gov.br/anuario-estatistico>

<sup>45</sup> <https://www.ontl.epl.gov.br/aplicacoes>

<sup>46</sup> [http://dados.gov.br/dataset?sort=score+desc%2C+metadata\\_modified+desc&q=minist%C3%A9rio+dos+transportes&organization=ministerio-dos-transportes-portos-e-aviacao-civil-mtpa](http://dados.gov.br/dataset?sort=score+desc%2C+metadata_modified+desc&q=minist%C3%A9rio+dos+transportes&organization=ministerio-dos-transportes-portos-e-aviacao-civil-mtpa)

<sup>47</sup> <https://www.prf.gov.br/portal/dados-abertos/acidentes>



Inventories”,<sup>48</sup> which is the methodological framework for calculating emissions of the Intergovernmental Panel on Climate Change (IPCC).<sup>49</sup>

## A.5. Netherlands

The main source of freight data in Netherlands is the national statistical office, Statistics Netherlands,<sup>50</sup> which provides reliable statistical information and data to produce insight into social issues, thus supporting the public debate, policy development and decision-making while contributing to prosperity, well-being and democracy. The Statistics Netherlands Act constitutes the legal basis for the Centraal Bureau voor de Statistiek (CBS).<sup>51</sup>

All data collected for government organisations is gathered and shared through the open data portal. Some datasets are available to directly download in csv format or available for consultation through web services.<sup>52</sup>

The Institute for Transport Policy Analysis provides knowledge inputs for the preparation of mobility policy at the Ministry of Infrastructure and the Environment. The Institute carries out its own research and collects the results of studies conducted elsewhere. It ensures that the ministry is able to develop policy with a sound knowledge base.

Freight related data is collected mainly through three surveys ran by Statistics Netherlands. They are:

- Road Transport Survey: the purpose of the road transport survey is to compile overviews with information on domestic and international road freight transport. This information is specified by number of journeys, distance covered, transported weight and transport performance. The goods flows are broken down by type of goods and by countries and regions of loading and unloading. In addition, a distinction is made between “hire and reward” and “own transport” vehicles.<sup>53</sup>
  - Freight transport by rail: this survey displays the transported tons and tonne-kilometres by rail on Dutch territory. The information is gathered from all companies transporting freight on the Dutch Railways.<sup>54</sup>
  - Aviation sector: this survey compiles overviews with information about traffic and transport in aviation, especially the number of flight movements the transport of

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<sup>48</sup> [https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2\\_Volume2/V2\\_3\\_Ch3\\_Mobile\\_Combustion.pdf](https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_3_Ch3_Mobile_Combustion.pdf)

<sup>49</sup> [http://sirene.mcti.gov.br/documents/1686653/1706227/4ed\\_ESTIMATIVAS\\_ANUAIS\\_WEB.pdf/a4376a93-c80e-4d9f-9ad2-1033649f9f93](http://sirene.mcti.gov.br/documents/1686653/1706227/4ed_ESTIMATIVAS_ANUAIS_WEB.pdf/a4376a93-c80e-4d9f-9ad2-1033649f9f93)

<sup>50</sup> <https://www.cbs.nl/>

<sup>51</sup> <https://www.cbs.nl/en-gb/society/traffic-and-transport>.

<sup>52</sup> <https://data.overheid.nl/about-dataoverheidnl-english>

<sup>53</sup> [https://www.cbs.nl/nl-nl/onze-diensten/methoden/onderzoeksomschrijvingen/korte-  
onderzoeksbeschrijvingen/wegvervoer](https://www.cbs.nl/nl-nl/onze-diensten/methoden/onderzoeksomschrijvingen/korte-onderzoeksbeschrijvingen/wegvervoer)

<sup>54</sup> [https://www.cbs.nl/nl-nl/onze-diensten/methoden/onderzoeksomschrijvingen/korte-  
onderzoeksbeschrijvingen/goederenvervoer-over-het-spoor](https://www.cbs.nl/nl-nl/onze-diensten/methoden/onderzoeksomschrijvingen/korte-<br/>onderzoeksbeschrijvingen/goederenvervoer-over-het-spoor)



passengers, freight and mail. The data are broken down by type of flight, by origin and destination of the flight.<sup>55</sup>

### ***Key datasets/collections related to Australian requirements***

Through the National Traffic Database,<sup>56</sup> an overview of the current situation messages on the road is available. Every minute, data from more than 37,000 measurement locations in the Netherlands are collected and distributed to customers. It contains the following data:

- Traffic intensity (the number of vehicles passing a measuring point)
- Point speed (average speed of vehicles passing a measuring point)
- Realized or estimated travel time
- Vehicle category (derived from the length of the passing vehicles).

## A.6. Chile

Chile compares to Australia in terms of its population size, major city size and Global Competitiveness Index score.

In 2017, The Ministry of Transportation and Telecommunication of Chile created the National Logistic Observatory.<sup>57</sup> Its creation came after the workshop organised with the International Transport Forum in December 2014. The final report that justify and guide the creation of the observatory is Logistic Observatory for Chile.<sup>58</sup> The implementation of the observatory was planned over a 5-year period. It was staffed at first with one person from the Ministry and after six months appointed the Director, with a staff of 9 to be progressively appointed. The observatory governance structure is described in the figure below.

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<sup>55</sup><https://www.cbs.nl/nl-nl/onze-diensten/methoden/onderzoeksomschrijvingen/korte-onderzoeksbeschrijvingen/luchtvaart>

<sup>56</sup> [http://www.ndw.nu/pagina/nl/4/databank/31/actuele\\_verkeersgegevens/](http://www.ndw.nu/pagina/nl/4/databank/31/actuele_verkeersgegevens/)

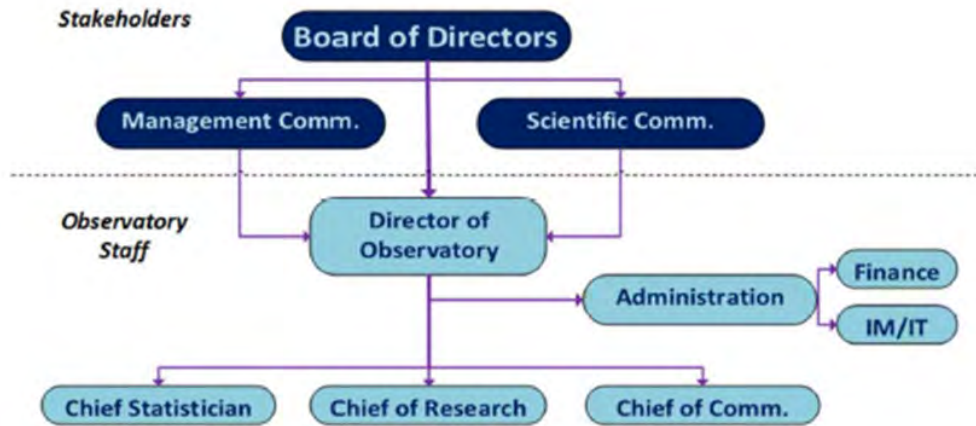
<sup>57</sup> <https://www.observatoriologistico.cl/sobre-nosotros>

<sup>58</sup><https://www.oecd-ilibrary.org/docserver/5jlvwz919fzx-en.pdf?expires=1542841377&id=id&accname=guest&checksum=20773E2359F9CA8BF82E097E70770062>





Figure 3-5. Chile Observatory organisational structure



Source: Logistic Observatory for Chile, 2015.

While the observatory was founded by the Ministry of Transportation and Telecommunication, over time the model is moving towards the private sector accounting for more than 50% of operating costs. The current objectives of the national logistic observatory are:

- Capture, organize and publish objective information of high quality on the national logistics sector.
- Prepare relevant and value-added analysis and research related to the national logistics sector.
- Properly disseminate (publish and promote) the results obtained.
- Help position the logistics sector and improve its public image.

The observatory classifies its products in three groups: analysis, profiles, and datasets. The focus of the analysis has been in the foreign trade sector including analysis reports on the cost of foreign trade logistics and characterization of port operations.

The profiles are updated dashboards, presenting indicators related to logistic performance, socioeconomic data and the characterization of different modes of transportation. In terms of logistic performance, the observatory reports the position of Chile in rankings, such as the Global Competitiveness, Doing Business and Logistic Performance Indicator. The datasets are downloadable spreadsheets with different levels of aggregation that support the statistics presented in the dashboards.<sup>59</sup>

### **Key datasets/collections related to Australian requirements**

The Chilean National Logistic Observatory reported in 2018 a methodology for evaluating the foreign trade cost of three different types of products. For exports they used blueberries, for imports they

<sup>59</sup> Datasets metadata <http://apps.mtt.cl/doc/informes/20180227%20Fichas%20Conjuntos%20de%20Datos.pdf>



used cloth and television imported from China. For defining the costs of the export supply chain they conceptualized 8 modules, which relate to each stage of the export process:

- Module for the local transport tariff (Chile)
- Module for the custom tariff (Chile)
- Module for the port terminal transfer tariff (Chile)
- Module for the international transport and freight insurance tariff (Chile)
- Module for the port terminal transfer tariff (rest of the world)
- Module for the custom tariff (rest of the world)
- Module for the local transport tariff (rest of the world)
- Module for the general management tariff.

For the computation of the tariff for the local transport in Chile, they used previous studies that reported costs and margins of transportation companies.<sup>60</sup>

### ***Inter-regional volumes by commodity***

In 2009, the Ministry of Transportation and Telecommunication assigned to CIPRES Ingeniería LTDA, a consulting company, the economic analysis of the national freight transportation. CIPRES developed a methodology for the estimation of the interregional flow by commodity. As they know the national production by region, the imports and exports of each commodity, then it is possible to compute which amount of the commodity was consumed in the national market. For some commodities, which are produced and consumed in few regions is possible to estimate the flow between regions, but for some other with multiple origins and destinations it was necessary to employ a minimum distance model between regions. Depending on the type of commodity, an attraction array is generated, for example, for fruits consumption the attraction estimation is done through the population of the region.<sup>61</sup>

## A.7. Germany

Germany compares with Australia in terms of its GDP per capita, largest city size, extent of the road and rail networks and ranking on the Global Competitiveness Index. A range of entities in Germany collect and disseminate freight transport data and statistics. These include:

- The Federal Bureau of Motor Vehicles and Drivers (KBA Kraftfahrt-Bundesamt);
- The Federal Statistical Office in Germany, Statistisches Bundesamt (Destatis); and
- Authorities in cities and regions.

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<sup>60</sup>[https://www.observatoriologistico.cl/fileadmin/doc\\_documentos/Informe\\_Costos\\_Logisticos\\_comex\\_2018.pdf](https://www.observatoriologistico.cl/fileadmin/doc_documentos/Informe_Costos_Logisticos_comex_2018.pdf)

<sup>61</sup> <http://www.subtrans.cl/upload/estudios/CargaNacional-IF.pdf>



The Federal Bureau of Motor Vehicles and Drivers (KBA Kraftfahrt-Bundesamt) publishes statistics on:

- Vehicles and trailers, driving permits, traffic offences, and goods transported. The objective of these reports is to provide information to the state, public, and scientific community, as well as to the private sector.<sup>62</sup>

The Federal Statistical Office in Germany, *Statistisches Bundesamt (Destatis)* collects and publishes statistics on Transport which cover:

- Goods transport;
- Passenger transport;
- Enterprises, infrastructure, vehicle stocks; and
- Traffic accidents.

The series of transport and freight related data provided by *Destatis* include:

- Goods transport;
- Quantities carried, by main traffic relations and mode of transport;
- Transport performance, by main traffic relations and mode of transport;
- Quantities carried, by mode of transport and product division;
- Transport performance, by mode of transport and product division;
- Rail transport by Länder (the equivalent of Australian states);
- Inland water transport by Länder;
- Air transport by Länder; and
- Maritime transport by Länder.

The more recent freight related statistics released by *Destatis* include:

- Rail transport in 2017;
- Volume of goods transported on inland waterways in 2017; and
- Freight transshipment in maritime transport in 2017.<sup>63</sup>

Data collection on urban freight distribution is the responsibility of cities and regions. The government does not coordinate data collection centrally, but offers financial incentives. In general, little data are available. Where data are available, they are frequently in the hands of private companies, such as

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<sup>63</sup> <https://www.destatis.de/EN/FactsFigures/EconomicSectors/TransportTraffic/GoodsTransport/GoodsTransport.html>



logistics service providers and couriers, thus often not publicly accessible (see Binnenbruck, 2006 quoted by van den Bossche et al 2017). In Germany, a lack of data is particularly notable concerning the following:

- The use of small utility vehicles of a maximum weight below 3.5 tonnes;
- Freight transport by foreign vehicles;
- Transport flows within and between agglomerations;
- The use of roads by commercial transport;
- Reasons for accidents involving utility vehicles in a city;
- Data on parking fees;
- Parking spaces for freight vehicles;
- Road taxes, city taxes; and
- Use of energy, and CO2 emissions by utility vehicles.

The Federal Bureau of Motor Vehicles and Drivers (KBA Kraftfahrt-Bundesamt) has been collecting data using a random sample of approximately 1.8 billion trips performed by the German freight transportation sector.

- A mail-in/mail-out questionnaire is sent to a randomly selected common vehicle owner, either carrier or forwarder company, by the German Central Vehicle Register of the KBA.
- The owner is obliged to report a travel diary for a period of 3.5 days. The truck sample is defined as a heavy cargo vehicle, which is any truck, trailer and semi-trailer weighing greater than 3,500 kilograms.

The database includes information on the vehicle type and trip properties such as whether the trip is a line haul or a multi-stop trip. Line haul trips are trips where there is only one pick-up and one drop-off for the trip. The 3.5 days period for the trip diary is also randomly selected over the year. As a result, the survey captures truck traffic characteristics through diurnal, weekly, monthly, and seasonal variations. The statistics collected by the Federal Bureau of Motor Vehicles and Drivers (KBA Kraftfahrt-Bundesamt) are published on a monthly, biannual and annual basis in the publication *Statistical Reports*.

### **Datasets**

- Regional Atlas;<sup>64</sup>

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<sup>64</sup><https://www-genesis.destatis.de/gis/genView?GenMLURL=https://www-genesis.destatis.de/regatlas/AI013-2.xml&CONTEXT=REGATLAS01>



- National Institute of Statistics;<sup>65</sup>
- Transport and traffic;<sup>66</sup>
- Federal statistics.<sup>67</sup>

## A.8. France

France compares with Australia in terms of the size of its road and rail networks, international sea freight container throughput and Global Competitiveness Index score.

France is an integral part of the EU TEN-T transportation network.<sup>68</sup>

“Horizon 2020” is the European Commission’s proposal to generate ideas, growth and jobs through the world’s largest collaborative program for research and innovation (2014-2020). In the transport sector, the Commission will strive for a balanced approach in implementing the program that takes into account the specifics of each mode (rail, road, waterborne and air transport) while remaining holistic; an approach which reconciles competitiveness with sustainability and which invests both in technology and in relevant socio-economic research. The four main priorities for transport research under Horizon 2020 are:

- Making transport more sustainable: resource-efficient transport that respects the environment.
- Making transport and transport systems seamless: better mobility, less congestion, greater safety and security.
- Keeping transport competitive: the European transport industry as a global leader.
- Making transport research responsive: socio-economic research and forward-looking activities for policy-making.

The work carried out in the framework of the Strategic Transport Technology Plan (STTP) will contribute to focusing the transport European research and innovation activities through Horizon 2020.

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<sup>65</sup>[https://www.genesis.destatis.de/genesis/online/data;sid=194E1EB283435CE5ABD076A98F04D09F.GO\\_1\\_4?operation=abrufabelleAbrufen&selectionname=81000-0013&levelindex=0&levelid=1544161422113&index=13](https://www.genesis.destatis.de/genesis/online/data;sid=194E1EB283435CE5ABD076A98F04D09F.GO_1_4?operation=abrufabelleAbrufen&selectionname=81000-0013&levelindex=0&levelid=1544161422113&index=13)

<sup>66</sup><https://www.statistikportal.de/de/transport-und-verkehr>

<sup>67</sup>[https://www.genesis.destatis.de/genesis/online/data;sid=194E1EB283435CE5ABD076A98F04D09F.GO\\_1\\_4?operation=abrufabelleAbrufen&selectionname=81000-0013&levelindex=0&levelid=1544161422113&index=13](https://www.genesis.destatis.de/genesis/online/data;sid=194E1EB283435CE5ABD076A98F04D09F.GO_1_4?operation=abrufabelleAbrufen&selectionname=81000-0013&levelindex=0&levelid=1544161422113&index=13)

<sup>68</sup>[https://ec.europa.eu/transport/themes/infrastructure\\_en](https://ec.europa.eu/transport/themes/infrastructure_en) .



In France, the road and rail network are described as being over 98 percent complete. The Ministère de la Transition Ecologique et Solidaire has a Freight Data Hub and presents Key Indicator and Counts of Transport Reports annually on the performance of freight transportation<sup>69</sup>.

### **Datasets**

- The national interdepartmental road safety observatory;70
- Ministry of ecological and solidarity transition;71
- Hybrid and Electric Vehicle Technologies and Programmes;72
- Transportation Ministry;73
- Beyond 20/20 report database.74

### **Data and Statistical Studies Département**

The Data and Statistical Studies Département (SDES)<sup>75</sup> - Ministry for the Ecological and Inclusive Transition, created a complete database of free available information with time series going back to 1997. The information is limited to road freight but includes regional and urban data of transported goods, traffic, service park inventory and activity by origin and destination.

### **Hybrid and Electric Vehicle Technologies and Programmes (IA-HEV)**

The IA-HEV enables member parties to discuss their respective needs, share key information, and learn from an ever-growing pool of experience from the development and deployment of hybrid and electric vehicles. Current participants Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, Republic of Korea, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States of America. The mission of this project is (1) to supply objective information to governmental policy makers and decision makers at the national level, as well as to industry decision makers from utilities, automotive, and component suppliers. (2) to facilitate international collaboration in pre-competitive research and demonstration projects, and to function as a promoter for Research, Development, Demonstration, and Deployment (RDD&D) involving shared

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<sup>69</sup>[http://www.statistiques.developpement-durable.gouv.fr/fileadmin/documents/Produits\\_editoriaux/Publications/Datalab/2018/datalab-31-chiffres-cles-transport-mars2018-c.pdf](http://www.statistiques.developpement-durable.gouv.fr/fileadmin/documents/Produits_editoriaux/Publications/Datalab/2018/datalab-31-chiffres-cles-transport-mars2018-c.pdf)

[http://www.statistiques.developpement-durable.gouv.fr/fileadmin/documents/Produits\\_editoriaux/Publications/Datalab/2018/datalab-42-rapport-comptes-transports-2017-aout2018.pdf](http://www.statistiques.developpement-durable.gouv.fr/fileadmin/documents/Produits_editoriaux/Publications/Datalab/2018/datalab-42-rapport-comptes-transports-2017-aout2018.pdf).

<sup>70</sup><http://www.securite-routiere.gouv.fr/la-securite-routiere/l-observatoire-national-interministeriel-de-la-securite-routiere/series-statistiques>

<sup>71</sup> <http://www.statistiques.developpement-durable.gouv.fr/transports/873.html>

<sup>72</sup> <http://www.ieahev.org/by-country/france-on-the-road-and-deployments/>

<sup>73</sup> <http://www.stats.environnement.developpement-durable.gouv.fr/Eider/series.do>

<sup>74</sup> <http://developpement-durable.bsocom.fr/statistiques/ReportFolders/reportFolders.aspx>

<sup>75</sup> Transition MftEal. Data and Statistical Studies Département (SDES)



resources from multiple countries and (3) to reduce energy consumption, harmful emissions, and improve local and global air quality.

## A.9. Denmark

Denmark compares with Australia in relation to its CDP per capita and Global Competitiveness Index score.

The Danish statistical agency, Danmarks Statistik (DST), produces a range of statistics related to freight transportation across all modes.

DST offers a consulting service which generates tailored data at a specified hourly rate <https://www.dst.dk/en/TilSalg/skraeddersyede-loesninger>. It also explains the limitations of datasets, any quality issues and describes collection methodologies clearly <https://www.dst.dk/en/Statistik/dokumentation/documentationofstatistics>.

The transport collection includes detailed fleet compositions registered each year, monthly freight transport data including origins and destinations, regional freight volumes by tonnage, distance travelled and freight type carried. Many of the freight volumes by ship, air and rail are quarterly.

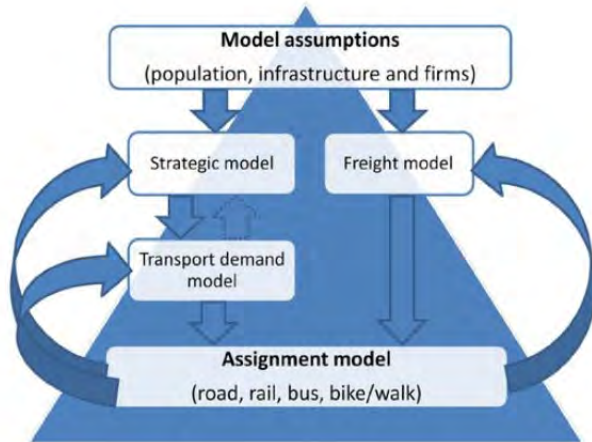
Ministry of Transport (Department of Transport, Building and Housing) <https://www.trm.dk/en> coordinates transport policy. The Ministry oversees a number of agencies responsible for various transport modes and networks, as well as state-owned companies and industry joint venture entities responsible for safety, port-city operations etc.

In 2017 the Danish Minister for Transport, Building, and Housing assigned a group of independent experts to look into the policy impact of the new forms of mobility coming from the latest trends in digitalization and automation of transportation. The Expert Group report indicates trends for freight transport in platooned and electric vehicles in its *Mobility for the Future* report 2018. Another policy influence is the Danish Climate Policy Plan 2050, with new vehicles to be fossil-free by 2035.

Denmark is partnering with four countries under the EU Horizon 2020 Program to support industry uptake of electronic vehicles, forming an alliance with Denmark Technical University to achieve this. The Electric Urban Freight and Logistics (EUFAL) project creates a knowledge platform for industry <https://www.eufal-project.eu/home>.

Denmark has developed a national transport model which can be accessed under a weekly rental agreement for trained users. A large accumulation of data is curated by the Denmark Technical University on behalf of the Danish Government. At this stage local traffic volumes are not included, however inter-regional, international and transit movements through Denmark are modelled. Figure 3-5 shows the schema for the model which has a specific freight module.

**Figure 3-6. Denmark National Freight Model Design**



Source: Rich et al, Overall design of the Danish National Transport Model, 2010<sup>76</sup>

**Data relevant to Australian requirements:**

Non-Fatal Accidents for road, rail, sea, air are all reported in detail, including vehicle/object involved, sex, age and severity of injuries – reported monthly and published annually <http://www.statbank.dk/10056>.

### A.10. Spain

Spain has similar characteristics to Australia in terms of its level of urbanisation (particularly the size of the largest cities), length of road network and Global Competitiveness Index score.

The Spanish government through the Ministry of Development is responsible for the preparation and implementation of government policy on land transport infrastructure, air and maritime. The agency is engaged in:

- Preparing and carrying out the Government policy in terrestrial, air and maritime state infrastructure;
- Controlling, arranging and regulating administrative affairs of transport services;
- Arranging and managing state services of astronomy, geodesy, geophysics and cartography; and
- Planning and programming the investments related to the named services.

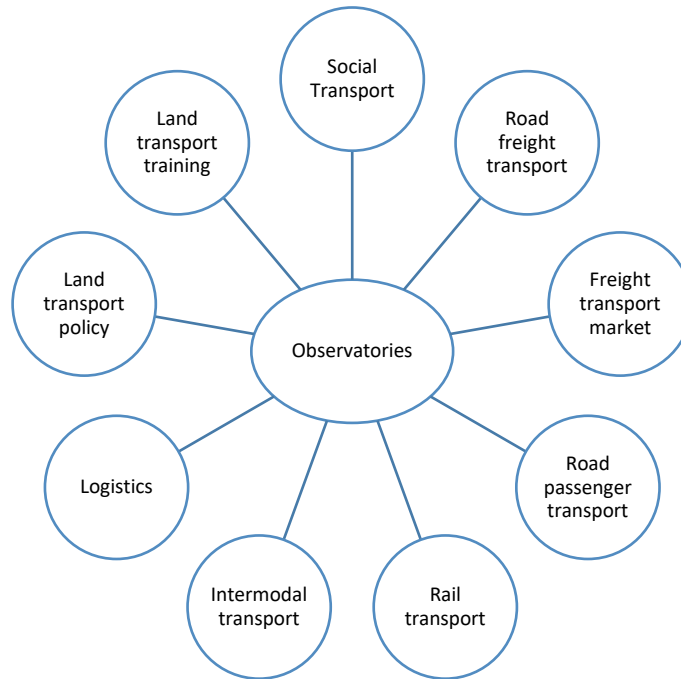
The Ministry of Development has nine observatories in charge of gathering, monitoring and reporting different metrics related to freight transportation in the country.

<sup>76</sup> Annual Transport Conference at Aalborg University 2010.





Figure 3-7. Spain transport observatories



“Horizon 2020”<sup>77</sup> is the European Commission’s proposal to generate ideas, growth and jobs through the world’s largest collaborative program for research and innovation (2014-2020). In Spain, this project has the following objectives within the transport sector as follows:<sup>4</sup>

#### Efficient transportation

- Making aircraft, vehicles and ships cleaner and quieter will improve environmental impact and reduce perceived vibration and noise
- Develop intelligent equipment, infrastructure and services
- Improvement of transport and mobility in urban areas

#### Better mobility:

- A substantial decrease in traffic congestion
- Substantial improvements in the mobility of people and goods
- Development of new concepts of freight transport and logistics
- Reduction of accident rates, number of injuries and fatalities and improvement of safety

“Challenge 2050” is the European rail sector’s shared perception of where the rail system could be by 2050. The document first gives a brief overview of the rail sector and then sets out the sector’s shared

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<sup>77</sup> <http://eshorizonte2020.cdti.es/index.asp?MP=87&MS=719&MN=2>.



vision. It also identifies the many goals that are complementary to the vision and support a rail system that is responsive to the needs of Europe's citizens.<sup>5</sup>

### **Datasets**

- Complete database with information gathered from different sources;<sup>78</sup>
- Spanish freight transport observatories (annual reports);<sup>79</sup>
- General traffic direction (traffic, accidents);<sup>80</sup>
- National ports information;<sup>81</sup>
- National Institute of Statistics;<sup>82</sup>
- Unified database of existing data resources.

The Spanish transport and logistics observatory (OTLE) is an entity that collects information from the different observatories and makes it available to the public. Although the regions in Spain are independent in collecting and sharing the data, OTLE's database provides information at a regional and national level in a centralised platform and across the different observatories. This provides an immense time advantage for the end user acting as a reference for the rest of the countries.

In Spain the regions are highly autonomous in their activities, therefore the Observatory enables a national perspective. Collections are categorised into:

- Mobility
- Socioeconomic information
- Capital and infrastructures
- Security
- Environmental information
- Metropolitan transport
- Logistics

The cost to establish the Transport and Logistics Observatory was AUD 882,000 and it employs 6 staff. The Observatory began in 2014 by undertaking a forensic examination of all available datasets that contribute to understanding the transport and logistics system. The unification of existing relevant datasets that otherwise would not have been shared is an important feature of the value returned to

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<sup>78</sup> <http://observatoriotransporte.fomento.es/BDOTLE/inicioBD.aspx?s=1>

<sup>79</sup> <https://www.fomento.gob.es/transporte-terrestre/observatorios/observatorios-y-estudios>

<sup>80</sup> [https://sedeapl.dgt.gob.es/WEB\\_IEST\\_CONSULTA/](https://sedeapl.dgt.gob.es/WEB_IEST_CONSULTA/)

<sup>81</sup> [http://www.puertos.es/es-es/estadisticas/Paginas/estadistica\\_mensual.aspx](http://www.puertos.es/es-es/estadisticas/Paginas/estadistica_mensual.aspx)

<sup>82</sup> <https://www.ine.es/dyngs/IOE/es/listadoIoeActual.htm?def=sector&id=1254735379314>



stakeholders. Many of the data collections are mandated by the Transport Ministry and other national agencies.

The Observatory, which is fully government-funded, coordinates the supply of data from government agencies, regional and local administrations, and from the private sector. In May 2017, the Transport Ministry commissioned Ineco, a major engineering company, to work with the Observatory to develop the upgrade the data system architecture to support the establishment, maintenance and upgrading of OTLE's information sources and analysis. The Observatory is now moving to provide more accessible formats for users.

In terms of user engagement, there is a permanently open mailbox for users and stakeholders. Additionally, there is an "Observatory Day" held with some regularity where transport operators and associations representing large companies and SMEs participate.

- EICT - European Centre for Information and Communication Technologies

The Centre combines technological expertise in Intelligent Transport Systems with methodological know-how for ITS project support. The centre currently manages the following projects:

- "eCall" project contemplates future cars with an electronic safety system.
- "Adaptative" Automated Driving Applications and Technologies for Intelligent Vehicles.
- "DENSE" aDverse wEather eNvironmental Sensing system seeks to develop a fully reliable environment perception technology.
- "euroFOT" Bringing Intelligent Vehicles to the Road is the first large-scale operational test in Europe.
- "L3Pilot" Piloting Automated Driving on European Roads.
- "RobustSENSE" Robust and Reliable Environment Sensing and Situation Prediction for Advanced Driver Assistance Systems and Automated Driving.
- "Tech Center a-drive" Competence Autonomous Driving
- "IMAGinE" Intelligent Maneuver Automation – Cooperative Hazard Avoidance.

Spain is an active member of AEOLIX, a project with the aim of contributing to the priorities of the EU transportation and logistics policy, but also the optimisation of cargo flows, the facilitation of supply chain management, the reduction of administrative burdens. The main objectives are:

- Gain a thorough insight in the lessons learned, needs and requirements in the domain of ICT applications for logistics
- Design an architecture for a collaborative IT infrastructure for operational connection of logistics information systems
- Implement an appropriate data access management model
- Build a common but user-tailored interface and tools to enable the IT infrastructure



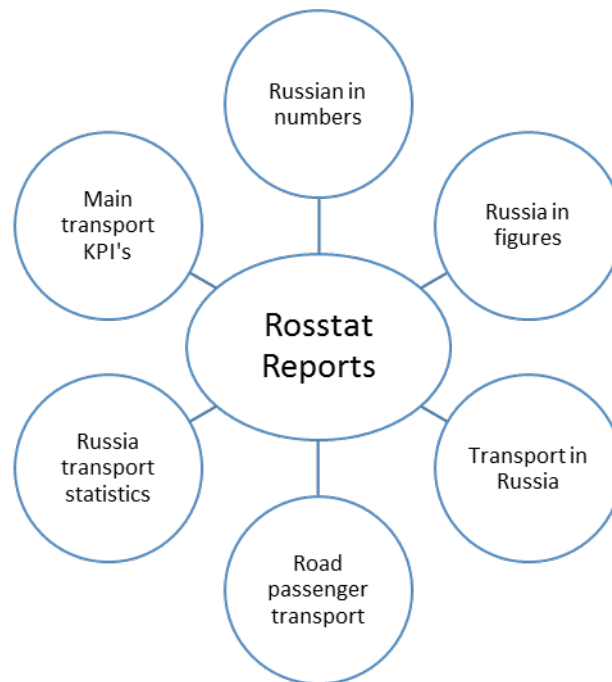
- Monitor the impacts of AEOLIX based on environmental, economic and social impacts
- Develop an exploitation business model to enable roll-out and deployment of the concept across Europe.

## A.11. Russia

Russia compares to Australia in terms of low population density, road network length and a significant wheat and coal export task.

In Russia, the Federal State Statistical Service – Rosstat - manages the statistical data. Specifically, Rosstat is in charge of “Regulatory legal and other acts governing the creation, management of state information systems, as well as the procedure for access of interested persons to information contained in state information systems under the authority of the federal executive body, its territorial bodies and its subordinate organizations”. This agency handles the regional and national data, dividing the country in 8 regions: Central federal district, North-west federal district, Southern federal district, North Caucasus federal district, Volga federal district, Ural federal district and far eastern federal district. Rosstat publishes the following reports about freight transportation.

**Figure 3-8. Main reports published by Rosstat**



Source: Deakin CSCL 2019.

### **Data Sets**

Two different data sets can be easily accessible from Rosstat that contains mostly social and macroeconomic information about 8 Russian’s regions.



- Database of municipal indicators
- The Unified interdepartmental informational - statistical system (EMISS)
- Unified database

The Russian government through Rosstat has publicly available complete repositories for all the government departments, with the availability to select among more than 100 indicators and several databases. Although each indicator has its own time frame in which they were measured, it is possible to customise the reports and to select among different types of charts to represent the information.

## A.12. New Zealand

New Zealand compares to Australia in terms of its low population density and similar Global Competitiveness Index score. It also has close ties with Australian transport agencies (especially through COAG) and shares similar structures in government administration of transport.

In New Zealand, Stats NZ coordinates a program of Domain Plans across government. The Transport Domain Plan, based on the Transport Research Strategy established priority areas for transport data and information collection. The Transport Domain Plan was developed in 2016 and has undertaken its first stocktake in 2017. <http://www.transport.govt.nz/mot-resources/transport-domain-plan/>

It is notable that Stats NZ, the national statistical agency, is developing an Integrated Data Infrastructure, given the relatively small population of the country. It collates and integrates data about individuals and businesses at a granular level from a range of surveys and censuses, and on application, can make this data available in a de-identified state. This reduces respondent burden while enabling researchers to access quality unit level data. A significant consultation program has been undertaken on the issue of “my data” and open data. <https://www.stats.govt.nz/integrated-data/integrated-data-infrastructure/>

Stats NZ holds metadata records in a repository DataInfo+, publishes methodological advice and publishes data standards and classification.

Freight data is relatively detailed and includes commodity flow data, electric vehicle monthly registration data as well as detailed modal data across sea, air, rail and road.

The repository for freight and trade data, the **Freight Information Gathering System (FIGS)** is a comprehensive compendium of data drawn from a number of government portfolios.

FIGS draws from monthly **Livestock Movement Data** (cattle and deer) based on the NZ version of National Livestock ID and covering origin and destinations.

In relation to datasets the align with Australian requirements, the following were identified –

The **National Freight Demand Study** was conducted in 2008 and in 2014. This study forms a “snapshot” of the freight task and a 30 year outlook. In 2014, it expanded to cover 29 commodities, showing total market size and regional distribution, linkages between import point and consumption, linkages between production and export; by mode. The survey is based on interviews with freight



operators and owners and performed in conjunction with the Economic Development agency. The methodology is detailed in Chapter 4 of the report <http://www.transport.govt.nz/mot-resources/freight-resources/nationalfreightdemandsstudy/>.

Safety – **Truck Crash Facts** details accidents involving heavy vehicles that result in minor, major and fatal injuries. The 2017 report details the results <http://www.transport.govt.nz/mot-resources/road-safety-resources/crashfacts/truckcrashfacts/>.

The Ministry of Transport posts via its **dashboard** a range of transport indicators covering a detail range of topics <http://www.transport.govt.nz/mot-resources/transport-dashboard/>. The dashboard was released in 2017 and is a comprehensive portal drawing data from numerous collections across government, including monthly electronic vehicle registrations and quarterly vehicle fleet statistics. The speed of release is impressive, with Q4 2018 data evident.

New Zealand developed an Intelligent Transport Systems Plan in 2014 and has proceeded to implement the following key actions (see Figure 3-8).

**Figure 3-9. New Zealand Intelligent Transport Systems Plan in 2014**



Source: <https://www.nzta.govt.nz/assets/resources/intelligent-transport-systems/docs/nz-transport-agency-intelligent-transport-systems.pdf>



## Appendix B Detailed Research Methodology

This research is undertaken as part of an [iMOVE CRC](#) Project commissioned by the Australian Department of Infrastructure, Regional Development and Cities (DIRDC), the agency responsible for designing and implementing the Australian Government's infrastructure, transport and regional development policies and programs.

Data is recognised by industry and government as a key underpinning for the effectiveness and competitiveness of Australia's supply chains. The data needed to plan, operate and invest in infrastructure, systems and processes to store and move freight increasingly rests on quality data that is available in a timely manner and in sufficient detail to make decisions.

During the course of preparing the National Freight and Supply Chain Strategy, this requirement was highlighted.

This research takes the freight data requirements identified by government and industry and examines international examples of data collections that may offer a useful comparison with Australian need.

The research objectives are to –

- Identify countries whose freight task has some similar characteristics to Australia's
- Locate data sets or collections that may contribute to our understanding of Australian freight data requirements;
- Examine the collection, analysis and dissemination arrangements of these data; and
- Highlight where best practice is applied in the above.

The methodology is set out below.

### B.1. Confirm data needs

Based on identified freight data needs from literature review and surveys of industry and government, the research sought to identify international data collections that met the identified gaps in Australian freight transport and supply chain data.

### B.2. Agree comparison jurisdictions

A series of key characteristics relating to demand and supply for freight were compared with Australia in a process to shortlist countries with similarities to Australia. The rationale for making these comparisons is that countries with similar freight imperatives and industry structures may have data collection methods, repositories and architecture at a scale and addressing issues in a manner that is more adaptable to Australian conditions. Recognising Australia's key characteristics relating to supply chain, such as large transport networks and distances to cover, a large bulk commodity export task, concentration of population in urban centres, countries facing similar challenges may have addressed similar data gaps effectively.



Consideration was also given to trading and administrative block groupings of countries, where data is harvested and published from multiple jurisdictions.

### B.3. Search for priority data

This task was completed through international record-keeping agencies that have metadata records of collections in each jurisdiction, and through desktop research of statistical agencies and peak industry bodies in each jurisdiction with accessible datasets and publications containing comparable data.

### B.4. Identify collection methods

Data collection methods for government and industry such as direct surveys and administrative data sources have been collated where available. As the trend is moving away from direct collections, data collected from alternative sources (including IoT and compliance data) that populates freight reporting has been included.

The arrangements under which data providers supply the information and the custodianship and access provisions are recorded as available. Information on the cost of data supply and the parameters of supply and demand have been recorded. For example, some agencies have self-directed open access protocols similar to ABS *Table Builder*, while others may have data consultancy services as a PAYG arrangement for users. Information on how the datasets contribute to productivity metrics in each jurisdiction have been recorded.

### B.5. Data Analysis

A template was formed to collate datasets, collections and publications based on the data in each country. The search included any documentation of methodologies, analytical processes to verify, cleanse, and assess the data from data custodians and providers in each jurisdiction. The researchers have also sought any information on the extent of automation of these processes, data quality assessment frameworks being used (analogous to Australia's *Data Quality Assessment Framework*) relating to the Institutional Environment, Relevance, Timeliness, Accuracy, Coherence, Interpretability, and Accessibility of the data.

Increasingly, methods such as machine learning are being used to estimate data and blend surveyed data with modelled attributes to complete a dataset. Where published, these methods are also recorded.

### B.6. Data reporting

The research indicates the format of released data, periods for collection, the length of data series, the publications or dataset release formats and who the key audiences the data are supplied to. The uptake of data from website analytics and report orders are recorded if available.





## B.7. Report on findings

This report summarises the findings of the research for each country, some multi-state collections and global collections such as held by the World Bank.

It details the models that are successfully being used in these jurisdictions and identifies where best practice may be located that is relevant to Australia's freight data requirements.



## Appendix C Transport & Logistics Data Repositories

CUSTODIAN/SPONSOR	COVERAGE	GLOBAL	LINK
GOVERNMENT	GLOBAL	World Economic Forum Global Competitiveness Index	<a href="https://www.weforum.org/reports/the-global-competitiveness-report-2018">https://www.weforum.org/reports/the-global-competitiveness-report-2018</a>
		OECD International Transport Forum	<a href="https://www.itf-oecd.org/research-centre">https://www.itf-oecd.org/research-centre</a>
		World Bank Logistics Performance Index	<a href="https://lpi.worldbank.org/">https://lpi.worldbank.org/</a>
		United Nations International Civil Aviation Organisation (ICAO)	<a href="https://www.icao.int/sustainability/Pages/Statistics.aspx">https://www.icao.int/sustainability/Pages/Statistics.aspx</a>
	MULTI-COUNTRY	SSATP Africa	<a href="https://www.ssatp.org/en">https://www.ssatp.org/en</a>
		UNECE Transport Statistics EU and North America	<a href="https://www.unece.org/trans/main/wp6/wp6.html">https://www.unece.org/trans/main/wp6/wp6.html</a>
		French-Italian TransAlpine Transport Observatory	<a href="http://www.interalpes.eu/en/2-transalpine-transport-observatory">http://www.interalpes.eu/en/2-transalpine-transport-observatory</a>
		EU Europa Logistics & Multimodal Transport Statistics	<a href="https://ec.europa.eu/eurostat/statistics-explained/index.php/Freight_transport_statistics">https://ec.europa.eu/eurostat/statistics-explained/index.php/Freight_transport_statistics</a>
		Inter-American Development Bank Logistics Portal	<a href="http://logisticsportal.iadb.org/?language=en">http://logisticsportal.iadb.org/?language=en</a>
		Horizon 2020 CityLab	<a href="http://www.citylab-project.eu/">http://www.citylab-project.eu/</a>
		ASEANStats	<a href="https://data.aseanstats.org/">https://data.aseanstats.org/</a>
		European Data Portal	<a href="https://www.europeandataportal.eu/data/en/dataset?tags=freight">https://www.europeandataportal.eu/data/en/dataset?tags=freight</a>
	COUNTRY	USA Freight Analysis Framework (FAF)	<a href="https://faf.ornl.gov/fafweb/">https://faf.ornl.gov/fafweb/</a>
		Chile Freight Observatory	<a href="https://www.oecd-ilibrary.org/transport/logistics-observatory-for-chile_5jlvvz919fzx-en;jsessionid=hXQYGltrgjmYzViHd6E5aAzO.ip-10-240-5-79">https://www.oecd-ilibrary.org/transport/logistics-observatory-for-chile_5jlvvz919fzx-en;jsessionid=hXQYGltrgjmYzViHd6E5aAzO.ip-10-240-5-79</a>
		France - OPSTE Freight Observatory	<a href="http://www.developpement-durable.gouv.fr/Presentation-de-l-OPSTE.html">http://www.developpement-durable.gouv.fr/Presentation-de-l-OPSTE.html</a>
		Observatory for Energy and Environment in Transport	<a href="https://www.ademe.fr/en/expertise/mobility-and-transport/dossier/observatory-for-energy-and-environment-in-transport/freight-transport">https://www.ademe.fr/en/expertise/mobility-and-transport/dossier/observatory-for-energy-and-environment-in-transport/freight-transport</a>



CUSTODIAN/SPONSOR	COVERAGE	GLOBAL	LINK
		Brazil National Observatory of Logistics and Transportation	<a href="https://www.ontl.epl.gov.br/">https://www.ontl.epl.gov.br/</a>
		Argentina National Transport Observatory	<a href="http://estadisticas.cepal.org/cepalstat/portada.html?idioma=english">http://estadisticas.cepal.org/cepalstat/portada.html?idioma=english</a>
		Spain - Transport Observatory	<a href="http://observatoriotransporte.fomento.es/BDOTLE/inicioBD.aspx?s=1">http://observatoriotransporte.fomento.es/BDOTLE/inicioBD.aspx?s=1</a>
		Thailand - MOTOC	<a href="http://motoc.mot.go.th/stat/maincen.php">http://motoc.mot.go.th/stat/maincen.php</a>
		UK National Rail Trend Portal	<a href="https://dataportal.orr.gov.uk/">https://dataportal.orr.gov.uk/</a>
INDUSTRY- GOVERNMENT	GLOBAL	UNCTAD International Trade Statistics	<a href="https://unctad.org/en/Pages/Home.aspx">https://unctad.org/en/Pages/Home.aspx</a>
	PROVINCE/REGION	Catalan Logistics Observatory	<a href="http://www.cimalsa.cat/observatori/Indicadors_2016VR_ang.pdf">http://www.cimalsa.cat/observatori/Indicadors_2016VR_ang.pdf</a>
	MULTI-COUNTRY	Alsace Logistics Observatory (ORTAL)	<a href="http://www.ortal.eu/#">http://www.ortal.eu/#</a>
		AEOLIX (Horizon2020 EU)	<a href="http://aeolix.eu/">http://aeolix.eu/</a>
INDUSTRY	GLOBAL	Novelog	<a href="http://novelog.eu/">http://novelog.eu/</a>
		International Union of Railways (UIC) database	<a href="https://uic.org/statistics">https://uic.org/statistics</a>
	MULTI-COUNTRY	World Shipping Council	<a href="http://www.worldshipping.org/about-the-industry/global-trade/trade-statistics">http://www.worldshipping.org/about-the-industry/global-trade/trade-statistics</a>
		ERTICO	<a href="http://ertico.com/focus-areas/transport-logistics/">http://ertico.com/focus-areas/transport-logistics/</a>
	COUNTRY	BCG Rail Performance Index	<a href="https://www.bcg.com/en-au/publications/2017/transportation-travel-tourism-2017-european-railway-performance-index.aspx">https://www.bcg.com/en-au/publications/2017/transportation-travel-tourism-2017-european-railway-performance-index.aspx</a>
	COUNTRY	American Transport Research Institute (ATRI)	<a href="http://atri-online.org/">http://atri-online.org/</a>
	MULTI-COUNTRY	Association of American Railroads Data Centre (USA-Canada)	<a href="https://www.aar.org/data-center/">https://www.aar.org/data-center/</a>
COUNTRY	Italy CONFETRA	<a href="https://www.confetra.com/centro-studi-statistiche/">https://www.confetra.com/centro-studi-statistiche/</a>	
ACADEMIA	PROVINCE/REGION	University of Hull Humber Region Logistics Observatory	<a href="https://lido.hull.ac.uk/">https://lido.hull.ac.uk/</a>