International Transport Forum

Logistics Strategy and Performance Measurement

Mexico's National Observatory for Transport and Logistics

Case-Specific Policy Analysis

OECD

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INTERNATIONAL TRANSPORT FORUM

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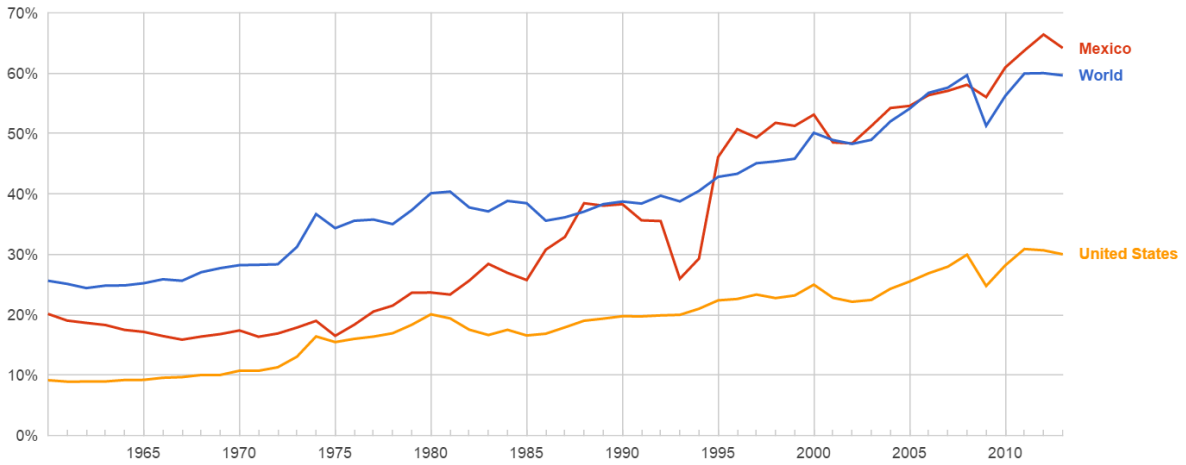
Introduction

Mexico has an effective transport and logistics sector that has provided the backbone for growth in the economy and a rapid expansion of foreign trade (Figure 1). Development of the sector has been enabled by the deregulation of road haulage and rail services in the 1990s, which saw prices for transport decline substantially and stimulated investment by the private sector in vehicles and in rail infrastructure. This has been accompanied by major public investments in roads and ports and a range of policies that have promoted the development of industrial parks, multimodal infrastructure, and logistics clusters along trade corridors, facilitating inward investment as a motor for regional development.

Figure 1. **Trade as a % of GDP**



Source: Google Public Data based on World Bank, updated 2015 www.google.fr/publicdata

The 2007 National Infrastructure Plan included investment in expansion of capacity at the main Pacific and Caribbean ports and a significant new highway from the port of Mazatlan to Durango, completing a northern east-west corridor. The 2014-2018 National Infrastructure Program (PNI)[1] will continue to expand port capacity and reinforce the road network as part as an overall infrastructure investment strategy that aims to release the productive potential of all sectors and regions of Mexico. In relation to transport the PNI has two overarching objectives:

- Develop Mexico as a logistics platform through investment in multi-modal transport infrastructure that improves cost-competitiveness and generates added value, improves safety and drives social and economic development.
- Create the infrastructure necessary for passenger mobility that is modern, integrated, flexible, safe, sustainable and inclusive.

1 Programa Nacional de Infraestructura 2014-2018, http://presidencia.gob.mx/pni/

At a more specific level, the objective in relation to logistics is to raise performance on the World Bank's Logistics Performance Index[2]. Mexico's score on the LPI has been stable, showing no significant movement up or down, with an aggregated weighted rank for 2007-2014 of 49 out of 166 countries.

The PNI aims at investment of 646 billion pesos[3] (USD 42 billion) in transport sector projects, to be funded from private as well as public resources. It includes major port expansion and modernisation projects and freight rail links totalling over 80 billion pesos (USD 5 billion) of the total (see Table 1) but is dominated by road improvements. It also includes major public transport investments, in metro and BRT systems in a number of cities.

Table 1. **Major Freight Transport Projects Identified in the 2014-18 National Infrastructure Program**

Major Port and Rail Projects	Planned investment, Billion Pesos
Ports	
Veracruz expansion	24
Mazatlan expansion	10
Altamira expansion	11
Lazaro Cardenas container port expansion	6
Lazaro Cardenas expansion	2
Lazaro Cardenas industrial park	1
Manzanillo container port expansion	3
Progreso logistics platform	2
Vallarta road access	2
Escondido expansion	1
Escondido port road link	6
Ciudad del Carmen expansion	1
Rail	
Celaya bypass	6
Coatzacoalcos bypass	3
Hermosillo junction	1
Colima tunnel	1

Source: Programa Nacional de Infraestructura 2014-2018, http://presidencia.gob.mx/pni/

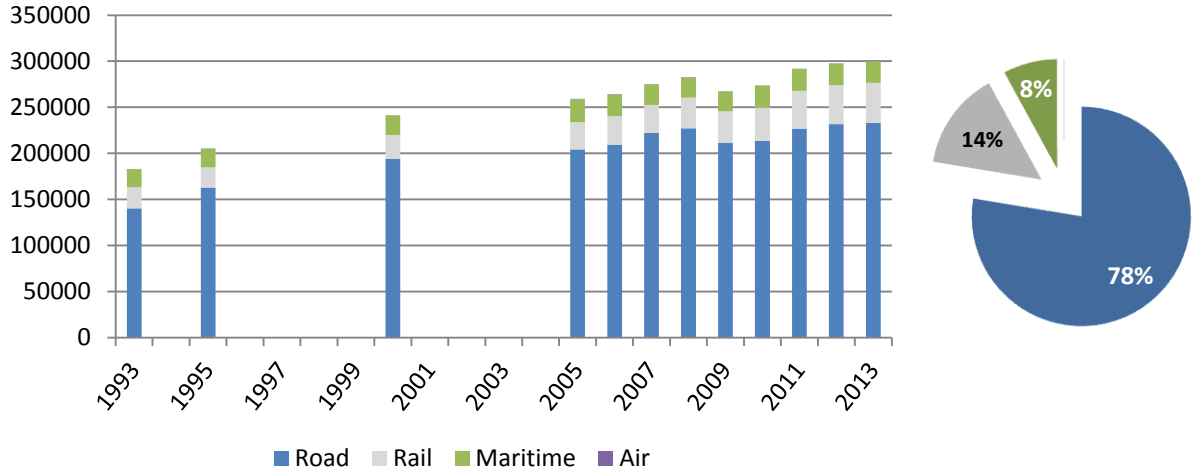
The transport sector accounts for an estimated 9% of GDP. Opportunities to expand output and employment particularly in relation to trade make development of the sector a strategic priority for the government. Domestic freight transport is dominated by road haulage (Figure 2). The USA is Mexico's largest trading partner and the major part of imports and exports cross the northern land border, mainly by road (Figure 3). In 2014, 80% of exports and 49% of imports by value were traded with the USA.[4] At the same time there are inefficiencies where reform or better implementation of existing regulations and enhancement of supply chain processes could improve performance. Border crossings are congested and administrative procedures in the ports are poorly coordinated.

2 Programa de Inversiones en Infraestructura de Transporte y Comunicaciones 2013-2018, SCT 2012, http://www.sct.gob.mx/fileadmin/GITS/PIITC_-_SCT.pdf

3 1 320 billion pesos for 223 transport and communications projects altogether.

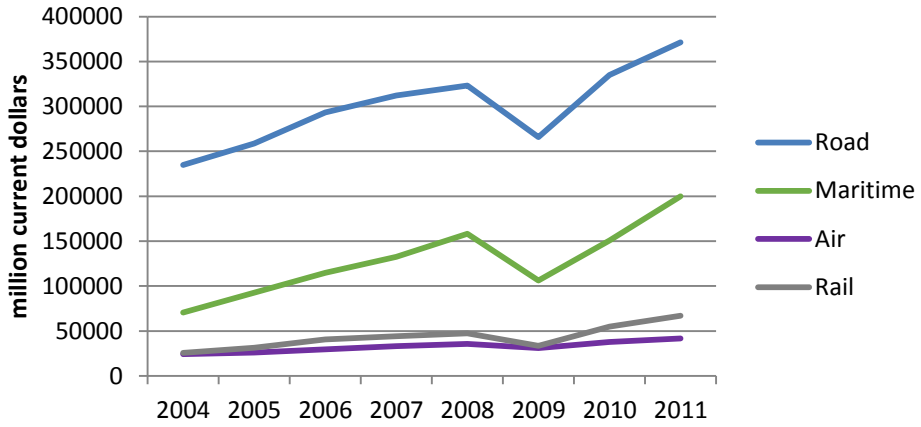
4 ITC data, http://www.trademap.org/tradestat/Bilateral_TS.aspx

Figure 2. **Domestic freight transport by mode and split in 2013** (million tonne-kilometres)



Source: Manual Estadístico del Sector Transporte 2013. Instituto Mexicano del Transporte-SCT.

Figure 3. **Imports and exports by mode of transport 2004-2011**



Source: Manual Estadístico del Sector Transporte 2013. Instituto Mexicano del Transporte-SCT.

Mexico's National Observatory for Transport and Logistics

A wealth of data is collected on the transport and logistics sector in Mexico by a wide range of government agencies and private sector organisations. There are gaps, but using existing data more effectively is as important as filling the gaps. Good data is needed to provide the evidence basis for efficient regulation and underpin sometimes difficult reforms to improve performance. Marshalling this evidence to make it accessible to decision-makers will be the objective for the National Observatory for Transport and Logistics (NOTL) currently being established, initially under Mexico's Institute of Transport (IMT). Careful design of key performance indicators to provide leverage for real improvement will be one of its most important tasks.

The Observatory will need to develop productive links with industry, not least to fill the gaps, as well as with the many data generating and data using departments and agencies of government. Overall the Observatory will be expected to provide the empirical evidence needed to mobilise political support for regulatory change and more effective implementation of policies to facilitate trade and economic development. The academic community will also need to be engaged as they are likely to be involved in some of the data collection and much of the analysis

Logistics observatories

Freight transport and logistics activities have substantially increased in volume in recent years almost everywhere. The sector's growing importance has increased the need for data on its economic contribution and negative impacts on the environment. Such data are needed by private entities seeking to improve their business strategies and by authorities and institutions that seek to improve public policies in this area. This need for information stands in contrast to the weakness of the statistics and analyses that are available on the sector. As the Inter-American Development Bank notes, the discrepancy between the information needed and the information available has made observatories an attractive organisational model for meeting this need.[5] The IDB summarises their functions as:

1. Generating and disseminating information.
2. Fostering inter-institutional cooperation and public-private cooperation.
3. Gathering and developing expert knowledge.
4. Defining, standardizing, and developing indicators.
5. Conducting studies and contributing to existing knowledge.
6. Supporting the functioning of the market.

The Bank notes that among the most important factors that contribute to an observatory's success include are the ability to respond effectively to users' needs, the quality of their work and the prestige that accrues to them as a result, and stable funding, which enables observatories to maintain the continuity of their work.

Transport and Logistics observatories have been established in many countries to provide information on the sector in support of policy-making. Some countries have multiple observatories focusing on specific sub-sectors, some housed by government others by industry. Taking France as an example the following list is not exhaustive:

- The National Road Freight Transport Economics Observatory http://www.cnr.fr/ focusing on information on costs, prices and taxes in the sector.
- Regional transport and logistics observatories, for example for Alsace http://www.ortal.eu/#, covering transport and/or logistics sectors in many of France's regions.
- The French-Italian transport observatory http://osservatoriotrasporti.eu/fr/observatoire-des-transports-franco-italien/, focusing on cross-border transport and development of infrastructure between the two countries.

5 Design and establishment of national observatories on freight transport and logistics. Phases and strategic considerations. IDB 2013 http://publications.iadb.org/handle/11319/5837

- The Observatory of Transport Policy and Strategy in Europe, housed in the Ministry of Transport http://www.developpement-durable.gouv.fr/Presentation-de-l-OPSTE.html, covering all modes and both freight and passenger transport with the mission to set analysis of transport systems and policies in an international, and in particular a European Union, framework.

Each observatory provides statistics and in-depth reports on the sectors of primary concern to it. In the Netherlands, instead of a statistical observatory the Government has established a non-profit institute, Dinalog, the Dutch Institute for Advanced Logistics, with a focus on training and collaborative projects between businesses, government, universities and other knowledge institutions for innovation in logistics. It is supported with 12 million Euros grant funding a year from government and co-financed to the same amount by industry and knowledge institutions. Dinalog was founded in 2009 to make the Netherlands Europe's leader in logistics and supply chain management. Its goals, as set out on its website http://www.dinalog.nl/en/about_us/, are:

- To be the premier European Institute for applied research and executive Post-Experience Education in logistics and supply chain management.
- To act as a catalyst for the retention and attraction of innovative business activities in the area of supply chain control, concentrated on the Supply Chain Campus Breda.
- Develop scientific knowledge on advanced logistics with worldwide acknowledgement, in both the academic and business community.
- Create an environment that attracts world-class researchers and where innovative companies are willing to base their key professionals to work on improving supply chain and logistics management.
- Provide interaction with World-class international researchers.
- Develop, organize and create markets for Post-Experience Education in supply chain management and logistics, closely cooperating with its partner network.

Mexico's NOTL might in due course aim to fulfil Dinalog's role in addition to the core objective of providing data and evidence based analysis for policy making. It will also benefit from cooperation with observatories in the Americas, notably the Inter-American Development Bank's Observatories Network http://logisticsportal.iadb.org/node/5611?language=en, not least for benchmarking performance and developing trade related data.

Another useful point of reference when deciding on the scope and indicators to be applied in Mexico's NOTL is the EU Transport Scoreboard, which was established in spring 2014. It covers four transport modes (Road, Rail, Water transport and Air transport) along eight main categories[6], and provides comparative data – where available - over 28 EU Member States. The choice of indicators is not a model for a national observatory but the presentation and focus on a narrow set of key issues is relevant.

Whilst the USA does not have a transport and logistics observatory, the US Department of Transportation's Bureau of Transportation Statistics and Federal Highway Administration cooperate to produce an annual report *Freight Facts and Figures.* Underpinned by the statistical resources and expertise of the two agencies this provides a comprehensive set of data on the physical characteristics of the national freight transport system and the freight moved, with selected indicators of congestion, environmental impacts, performance in relation to safety and the contribution of the sector to the economy. Some limited, aggregate information on prices for freight transport services is provided but only

6 Single Market; Infrastructure; Environmental impact; Safety; Infringements; Transposition; Innovation; and Logistics; See: http://ec.europa.eu/transport/facts-fundings/scoreboard/index_en.htm

fuel prices are covered in relation to input costs for the sector. The IMT produces a similar, if slightly less comprehensive annual compendium in its Manual Estadístico del Sector Transporte, published by SCT. An observatory could be expected to cover more data relevant to commercial operation of the system and performance indicators in areas such as customs procedures and border controls. The NOTL is expected to include a focus on specific performance indicators related to current national policy imperatives, something that is beyond the scope of existing publications. Another relevant source of US data is the annual State of Logistics report issued annually by the Council of Supply Chain Management Professionals[7], which includes indicators of logistics costs and inventory levels.

Types of data, purposes of indicators

Logistics observatories collect and publish data for a range of purposes. These might be divided as follows.

1. *Descriptive macro-economic data*

Providing information on the contribution of the sector in the economy, its spatial configuration and inter-relationships between markets. The relationship between GDP and freight volumes is also significant because tonnes lifted and tonne-kilometres can be good barometers of the level of economic activity. Trends in freight transport can be used as an early indicator of trends in economic performance. Tracking trends in the GDP:tonne-kilometre ratio can also help to forecast future freight traffic volumes.

This kind of information creates awareness of the importance of the sector to the economy and is also used by Finance and Economics Ministries and National Banks to monitor economic performance. It is utilised to understand the wider economic impacts of infrastructure investment and design regional development policies.

It is also used to understand what determines market prices. For example, are food prices determined by local crop yields and the weather, or by the structure of distribution or by the efficiency of transport nationally? The answer will have implications for the way the government responds to price signals in relation to inflation targets. Macro-level relates both to the economy as a whole and to economic sectors.

Macro-level data can also be used to assess the effectiveness of freight transport policy initiatives and hence support the policy development process.

2. *Operational performance data*

Micro-economic data can be used to describe and understand the way businesses in the sector operate and the impact of government regulation. It covers a wide spectrum, from indicators of trade and traffic volumes to the proportion of truck-kilometres run empty. The object is to measure the performance of transport systems and characteristics of the logistics industry. This includes the performance of services provided by government agencies and the impact of government intervention on individual businesses.

It is used to understand the structure of supply chains and logistics businesses and analyse competition. It is used to examine asset utilisation and infrastructure capacity and measure productivity and business performance. And it can be used to benchmark the efficiency and service quality of truck fleets, rail freight services and ports. With sufficient attention to differences in regulatory environment, reform and restructuring this kind of information can also be used for international benchmarking comparisons.

7 Non-profit industry association, formerly known as the Council of Logistics Management.

Sector specific analysis will require detailed data from industry that can only be collected by questionnaires and interviews. Industry associations sometimes have sufficient interest and confidence from their members to collect, and where necessary anonymise, such information on a regular basis. Cloud computing and Big Data are creating new opportunities for collecting freight data. But occasional in-depth surveys are likely to be needed to complete the picture. Cooperation with industry and academia can greatly facilitate the task for observatories. In the Netherlands, for example, Dinalog's joint research projects produce data that would otherwise be very difficult to obtain.

3. *Performance indicators*

These are derived usually from micro-economic operational data and used to set performance targets. The choice of nominator and denominator employed is far from trivial as key performance indicators (KPIs) are vulnerable to driving inefficient responses. Poorly targeted KPI's can be gamed, altering behaviour to meet the target rather than to improve performance in ways that matter to the ultimate customer or consumer. KPIs are also ineffective if they focus on factors outside the control of the agents monitored.

4. Specific analytical reports

Statistical data and performance indicators will often need to be supported by a narrative, examining in detail how a sector operates and what determines efficient performance, if they are to be of real use to decision-making. Analytical reporting therefore regularly supplements statistical output from logistics observatories.

The importance of developing the narrative to explain changes in performance is discussed in the report of an ITF Roundtable on railway efficiency (ITF 2015). Indicators comparing the performance of European railways over the last two decades, for example, make little sense without accounting for the regulatory and structural reforms each has been subject too as well as the impact of other government intervention, including in response to crashes.

Preparations of a National Observatory for Transport and Logistics in Mexico

Strategic planning for logistics is based on the National Development Plan for 2013-2018 and its' Programme for the Communications and Transport Sector.[8] The Programme's objectives are to:

1. Develop transport and multi-modal logistics infrastructure that provides for competitive costs and improved safety and drives economic and social development.
2. Provides for adequate, efficient and safe logistics and transport services that increase the competitiveness and productivity of economic activities.

Initiatives under the Programme include a National System of Logistics Platforms (SNPL), under joint development by the Secretariat of Communications and Transport (SCT) and the Secretariat of Economy with support from the Inter-American Development Bank (IDB).[9] Preparatory work identifies the country's strategic logistics nodes (Figure 3), proposes 85 logistics platforms of different types for those nodes and outlines public policies to develop them. The strategy is underpinned by modelling of freight movements undertaken by IMT to identify the volumes of traffic carried on the highway and rail networks, section by section (see Figure 11).

8 Plan Nacional de Desarrollo 2013-2018, pnd.gob.mx/ and Programa Sectorial de Comunicaciones y Transportes, http://www.sct.gob.mx/fileadmin/banners/Programa_Sectorial_de_Comunicaciones_y_Transportes.pdf

9 http://logisticsportal.iadb.org/node/5611?language=en

In concert with the development of the SNPL, SCT is funding the IMT to develop the National Observatory for Transport and Logistics to monitor development and performance of the freight transport and the logistics industry and link existing databases, including:

- The National Institute of Statistics and Geography (INEGI) database http://www.inegi.org.mx/est/contenidos/proyectos/estadistica/default.aspx .
- SCT databases for each mode accessed through its web portal http://www.sct.gob.mx .
- The North American Transport Statistics (NATS) database http://nats.sct.gob.mx/, a joint endeavour of agencies in Canada, Mexico and the USA. The primary participating agencies include Statistics Canada and Transport Canada; SCT, IMT and INEGI from Mexico; and the Bureau of Transportation Statistics (BTS) and the U.S. Census Bureau from the United States.

Planning for the National Observatory for Transport and Logistics is underway and will be completed in 2015. Potential data providers have been identified, potential data sets have been mapped and a potential initial list of 120 performance indicators developed with support from the multidisciplinary engineering consulting firm Idom. The next phase of work is to identify strategic priorities on which to focus development.

A US-Mexico Cross-border Observatory is also planned to focus on the particular requirements of Mexico's northern land border crossings. Close cooperation and coordination with the NOTL is clearly desirable.

Figure 4. **Strategic Logistics Nodes**

Source: Sistema Nacional de Plataformas Logísticas (SNPL), SCT, SE and IDB, http://logisticsportal.iadb.org/sites/default/files/presentacion_sistema_nacional_de_plataformas_logisticas.pdf

Performance of transport and logistics sectors in Mexico, some strengths and weaknesses

This section provides three short snap-shots of performance and issues in key areas for growth of the national economy. The object is to illustrate the use to which data and indicators marshalled by the NOTL will be put and gap in readily accessible key data that currently exists and which the Observatory should fill. The examples chosen are designed to illustrate both areas where performance is strong and areas where there are believed to be significant weaknesses where better monitoring of performance and perceptions of service quality would facilitate improvement of regulation and removal of bottlenecks to growth. The three examples are as follows.

1. Road haulage, where regulatory reform has driven large improvements in productivity but impacts on infrastructure, the environment and safety create major policy issues; changes to standards to contain external costs creates data-intensive demands for regulatory impact assessment where the NOTL can provide essential data baselines and monitoring.
2. Rail-based transport services for the automotive manufacturing sector, a highly successful example of high quality logistics services driving inward investment, facilitating integrated production process between plants either side of the Mexico-US border, resulting in one of the fastest growing industrial sectors in the country.
3. The ports sector, where investment in infrastructure has been largely successful in accommodating rapidly growing demand but regulatory and inspection systems have been slow to adjust and create bottlenecks; perceptions of performance among shippers is lower than might be expected and this may deter investment, developing effective responses depends critically on collecting the right data and developing the right indicators of performance.

This section draws on data from publicly available sources. The data is of variable quality and consistency, not always sufficiently well documented to provide a robust empirical basis for policy making. The purpose of the NOTL will be to provide regular publication of reliable data; the starting point for durable analysis of policy issues.

Road haulage: Regulation, tariffs and environmental impacts

Regulation of road freight transport

Road freight transport was deregulated between 1989 and 1993[10] when a market-oriented approach replaced a restrictive system of licencing operators as providers of public services that had fostered operation of the market as a cartel. Restrictions on market entry are now limited to ensuring standards of safety and financial security. Many firms entered the market after 1990 and within five years road

10 Ley de Caminos, Puentes y Autotransporte Federal, 1993.

transport prices had dropped by 23% in real terms.[11] The market today is served by own-account transport, large and small for-hire firms and a large number of one or two vehicle owner-operators.

Table 2. **Average number of vehicles per operator**

Uruguay	10.60
Costa Rica	10.18
Guatemala	8.19
Chile	6.40
Argentina	6.20
Colombia	5.60
Dominican Republic	5.00
El Salvador	4.30
Nicaragua	3.08
Honduras	2.88
México	**2.44**
Brazil	2.30
Panamá	1.61

Source: IDB Regional Observatory for Freight Transport and Logistics, 2013. http://publications.iadb.org/handle/11319/6885

The Inter-American Development Bank reports that Mexico has one of the lowest average truck fleet sizes in Latin America (Table 2). This reflects the large number of small owner-operator hauliers in Mexico. Data on the number of vehicles and shares of tonnes lifted and tonne-kilometres performed by type of operator are not readily available. This is a significant gap as understanding the impact of regulatory change on the market requires information on the structure of the industry and the quality of regulatory impact assessments depends on the availability of such data. For example, Mexico's standards for the maximum weight and dimensions of commercial vehicles (NOM-012) were amended in 2014.[12] The amendment reduced the maximum limit from 80 to 76 tons for double articulated freight vehicles. Mexico's Commission for Better Regulation has requested SCT to undertake an ex-post assessment on the impact of the change in relation to the objectives of the amendment: enhancing productivity, preserving road assets, improving road safety and protecting the environment. Such assessment begins with data on the number of trucks affected by the change in maximum weight, distances travelled by these vehicles and proportion of trips that are weight or volume constrained.[13] Also important is data on alliances between carriers and the extent to which services are sub-contracted. It is becoming increasing common in developed countries for smaller hauliers to work on a sub-contract basis for larger logistics providers rather than deal directly with shippers.

Regular surveying to collect such data should be a priority for the NOTL given the recurrent demand for regulatory impact assessment in relation to NOM-012. The law provides for revision of the standards every five years to ensure its objectives are being met and identify opportunities for improvement. A Group of Experts is established by each amendment to report three years after entry into force of new limits on impacts across the board on road wear and infrastructure preservation, productivity, environmental protection and road safety.

11 World Bank tool kit: http://www.ppiaf.org/freighttoolkit/knowledge-map/road/institutional-legislative-framework/regulation

12 Norma Oficial Mexicana NOM-012-SCT-2-2014 Sobre el peso y dimensiones máximas con los que pueden circular los vehículos de autotransporte que transitan en las vías generales de comunicación de jurisdicción federal.

13 See ITF/OECD (2015) and McKinnon (2004) for an outline of the modeling and monitoring involved.

Environmental impacts

Meeting the Mexican government's ambitious carbon reduction targets will require a sharp drop in the carbon intensity of Mexican freight transport. Transport is the largest contributor to the national carbon footprint accounting for approximately 22% of total GHG emissions, equal to energy industries (22%) and ahead of agriculture (12%) and manufacturing /construction (8%). Transport is also the fastest growing source of GHG emissions, with a compound annual rate of growth of 3%. A series of climate change policy measures have been specifically targeted on the transport sector. As over 90% of the freight-related GHG emissions are released by trucks, the main focus of decarbonisation efforts in the sector concerns road transport and includes the following initiatives:

- A national program to control vehicle emissions, including fuel economy standards.
- Scrappage program for older vehicles.
- Construction of bypasses to relieve congestion bottlenecks.
- Improvements to road pavements to allow vehicles to travel at more fuel efficient speeds.
- Shift freight from road to rail (the 2008-2012 Special Program for Climate Change set a target of raising rail's share from 26% to 28.2% of tonne-kilometres).
- Promotion of eco-driving.
- Improved public transport in cities (which will relieve congestion for freight vehicles).

National Appropriate Mitigation Actions (NAMAs) were approved as a mechanism to meet targets under the UN Framework Convention on Climate Change by the Doha Conference of the Parties to the Convention, COP 18, in 2013. NAMAs were defined as 'any action that reduces emissions in developing countries and is prepared under the umbrella of a national governmental initiative.' A NAMA has been established in Mexico to promote the decarbonisation of road freight operations undertaken small operators. This NAMA is run by the Ministry of Environmental and Natural Resources (SEMARNAT) and the Ministry of Communications and Transportation (SCT). Its key elements are:

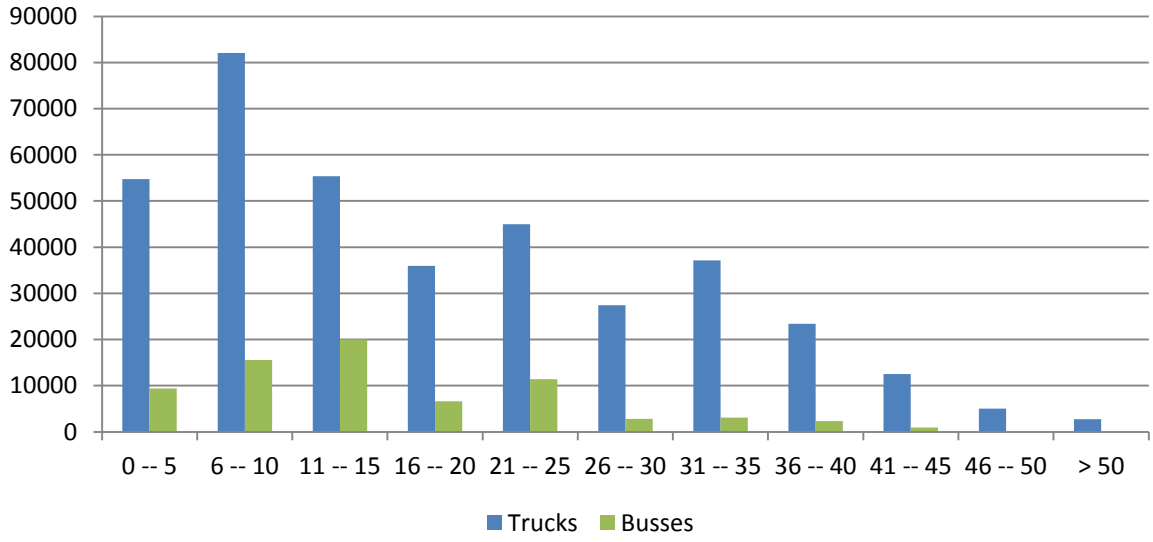
- A truck upgrading scheme, comprising mainly the scrappage and renewal program, but also including incentives to retrofit vehicles with aerodynamic equipment.
- The *Transporte Limpio* (Clean Transport) program for improving fuel efficiency in operations, including though better maintenance. The main measures are subsidised energy-efficient driving courses and fleet upgrades with various fuel saving technologies. It has been suggested that *Transporte Limpio* be co-ordinated more closely with *US SmartWay* and Canadian *FleetSmart* schemes to harmonise the 'collection and sharing of freight performance data and emission factors among the three countries, such that freight policies and programs can be enhanced to ensure maximum effectiveness' (Commission for Environmental Co-operation, 2011). This is an area where NOTL could provide support.

A basic requirement of all NAMAs is a 'measurement, reporting and verification' (MRV) system to ensure that they are delivering the expected GHG reductions. For this purpose, a FLEET model tool and a 'Scrapping Calculator' have been constructed. The new Observatory could play a key role in the MRV process.

Scrapping schemes are only cost effective when there are large differences in performance between the vehicles scrapped and the new vehicles that replace them. The age structure of the Mexican heavy vehicle fleet does include a tail of extremely old vehicles still in regular use (figure 5). The benefits of replacing these trucks will include cutting emissions of particulates and NOx and reducing crash exposure

risks, benefits substantially larger than those from cutting CO2 emissions. While the average age of Mexico's heavy truck fleet is very similar to that of Latin America as a whole (Table 3) the average age is twice that in the USA (Figure 6).

Figure 5. **Heavy Vehicle Fleet in 2013 by Age** (years)



Source: ANPACT/SCT.

Road haulage and intermodal tariffs

The prices of for-hire haulage services are monitored through annual survey carried out by IMT on specific request from SCT. The results are not available as part of any regular database but are used in specific government reports and have been used externally, for example, by the Inter-American Development Bank, to benchmark prices internationally (Table 3 and Figure 6). The vertical axis gives average tariffs for hauling a 40 foot container, although truck size is not standardized across all countries in the IDB database.

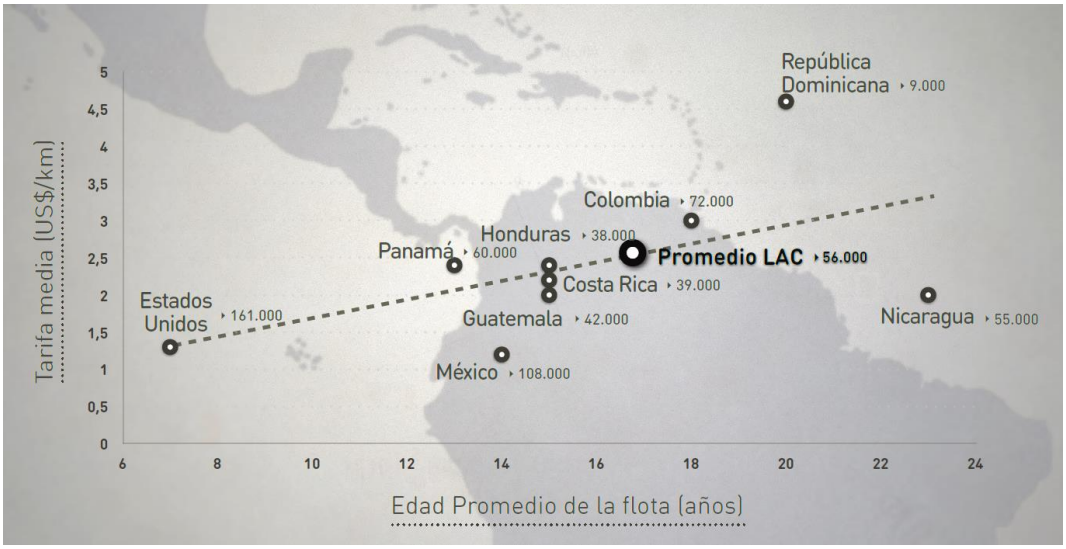
Understanding the drivers of prices in transport markets is important in relation to monitoring how competitive the market is and whether there are regulatory or infrastructure bottlenecks that inflate costs and undermine productivity. For example, empty running rates are believed to be much higher in Mexico than in some European markets and this will tend to increase prices. Statistics on the proportion of truck-kilometres run empty should be cautiously interpreted, however, as much empty running is structural (e.g. reflecting geographical imbalances in traffic flow) and not necessarily an indication of operational inefficiency.

Table 3. **Road haulage prices and average age of vehicles in Latin America and the Caribbean**
(USD per ton-km, for 40 foot container)

	Fleet average age: years	Average road freight tariff: US$/t-km (40 ft. container)
Argentina	13	0.10
Belize	31	0.07
Brazil	13	0.19
Chile	10	0.13
Colombia	21	0.08
Costa Rica	15	0.12
El Salvador	11	0.06
Guatemala	15	0.05
Honduras	15	0.07
México	**17**	**0.06**
Nicaragua	23	0.06
Panamá	12	0.07
Peru	13	0.47
Dominican Republic	20	0.14
Uruguay	16	0.11

Source: IDB Regional Observatory for Freight Transport and Logistics, Freight Transport and Logistics Statistics Yearbook, April 2015. http://publications.iadb.org/handle/11319/6885

Figure 6. **Road haulage prices and average age of vehicles in Latin America and the Caribbean**
(USD per km, for 40 foot container)



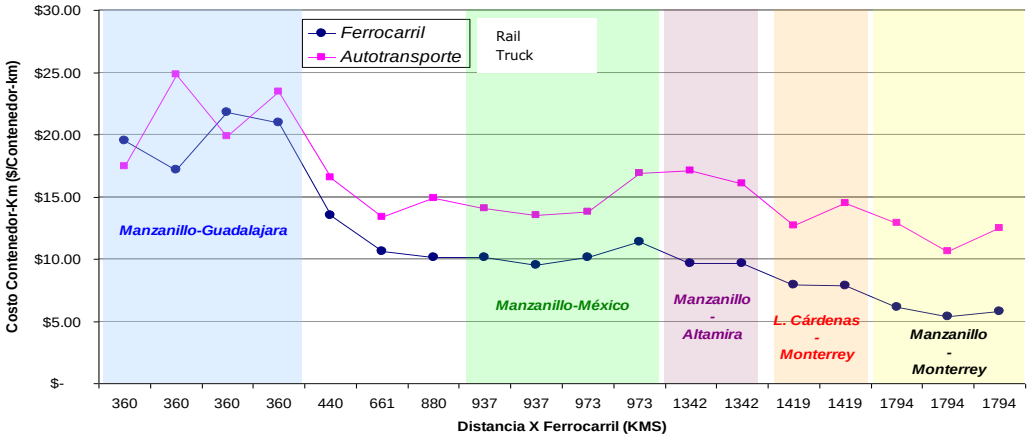
Note: Average fleet age in years on horizontal axis; the data point labels give average annual kilometres driven per vehicle.

Source: IDB Regional Observatory for Freight Transport and Logistics, Freight Transport and Logistics Statistics Yearbook, 2013. http://logisticsportal.iadb.org/sites/default/files/presentacion_bid.pdf

General port inefficiencies and congestion at port terminals, access points and cities are the main factors for high transport costs in the developing world in general and Latin America in particular. Truckers and transport companies incorporate the inefficiencies of the logistics systems in the cost they charge to users. In highly congested urban destinations and with long waiting times to load and unload (6 to 8 hours), trucks make one or less than one trip per day.

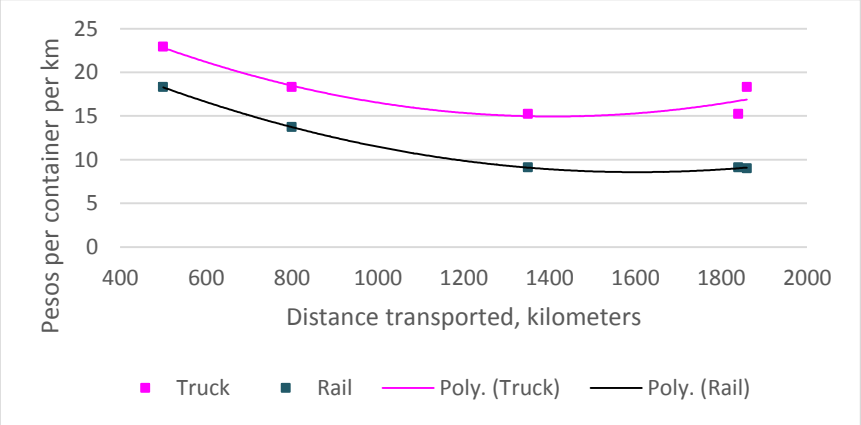
IMT has undertaken sample surveys for rail and road tariffs for carrying intermodal containers (Figure 7). A narrative to explain the differences between the prices recorded and their relation to prices in relevant markets abroad has yet to be developed. Rates are similar to those recorded by the World Bank for the USA (Figure 8) and similar to typical rates in Europe today, typically 1.1 to 1.2 euros per kilometre for a 40 foot container by truck (20 pesos, equivalent to 17 pesos in 2008/9) and 0.8 to 1.0 for a typical international movement (Rotterdam Milan for example). Rates in Mexico might be expected to be lower, however, given lower fuel and salary costs. IDB data suggests that rates are, nevertheless, lower than elsewhere in Latin America (Figure 9) and there is clearly useful analysis to be done in identify cost drivers and explaining the differences.

Figure 7. **Cost per kilometre for Containers carried by Truck and by Rail in Mexico, 2009**
(Pesos per container per km)



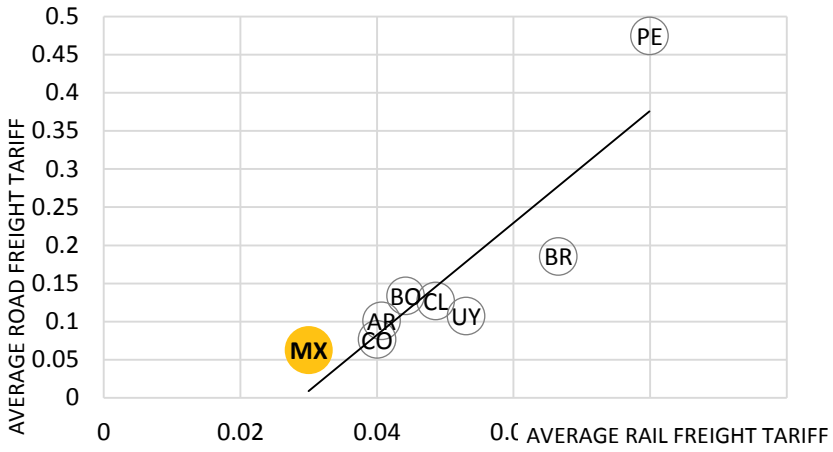
Note: Data organised by main origin-destination markets. X-axis gives distance by rail to markets served by both rail and road (road distance may be longer or shorter). Source: IMT using SCT and survey data.

Figure 8. **Cost per kilometre for Containers carried by Truck and by Rail in USA, 2008**
(Pesos per container per km)



Source: Recalculated from World Bank Railway Reform Toolkit
http://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/railways_toolkit/ch1_1_4.html

Figure 9. **Average road and rail freight tariffs in selected Latin American countries**
(US cents per ton-km)

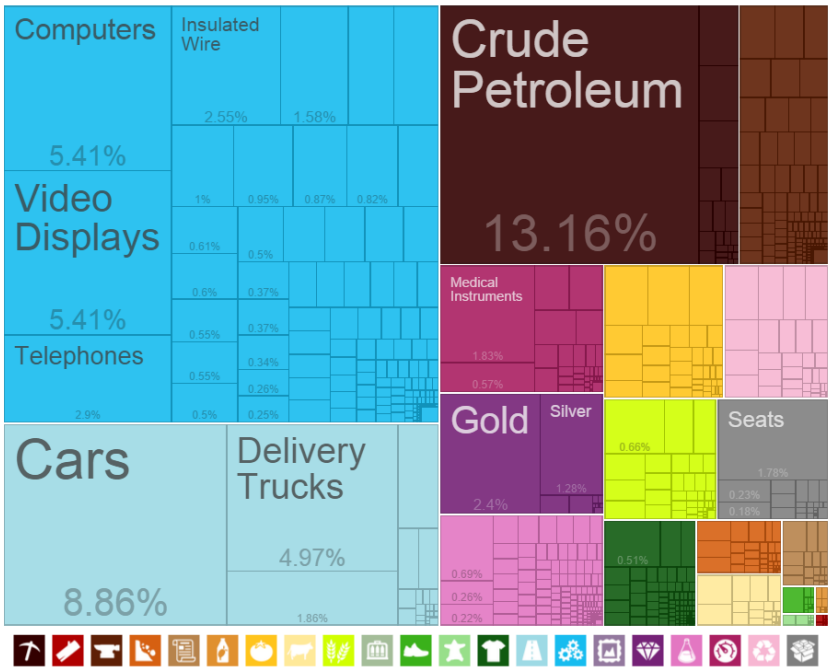


Note: Road tariffs for 40 foot container, rail average tariff for general cargo.
Source: IDB Regional Observatory for Freight Transport and Logistics, 2013 http://publications.iadb.org/handle/11319/6885

Rail container transport and automobile manufacturing supply chain

Rail container services for the automobile manufacturing sector illustrate high performance of the Mexican transport and logistics industry. The automobile sector accounts for the largest category of exports from Mexico, 15% by value for cars, delivery trucks and auto-parts together, ahead of crude oil and oil products 13.5% taken together in 2012, when oil prices were high. Mexico is the seventh largest auto producer in the world and the second largest exporter of automobiles to the USA, after Japan. The performance of the industry has a significant impact on GDP.

Figure 10. **Mexican exports by value in 2012**



Source: MIT Observatory of Economic Complexity http://atlas.media.mit.edu/explore/tree_map/hs/export/mex/all/show/2012/

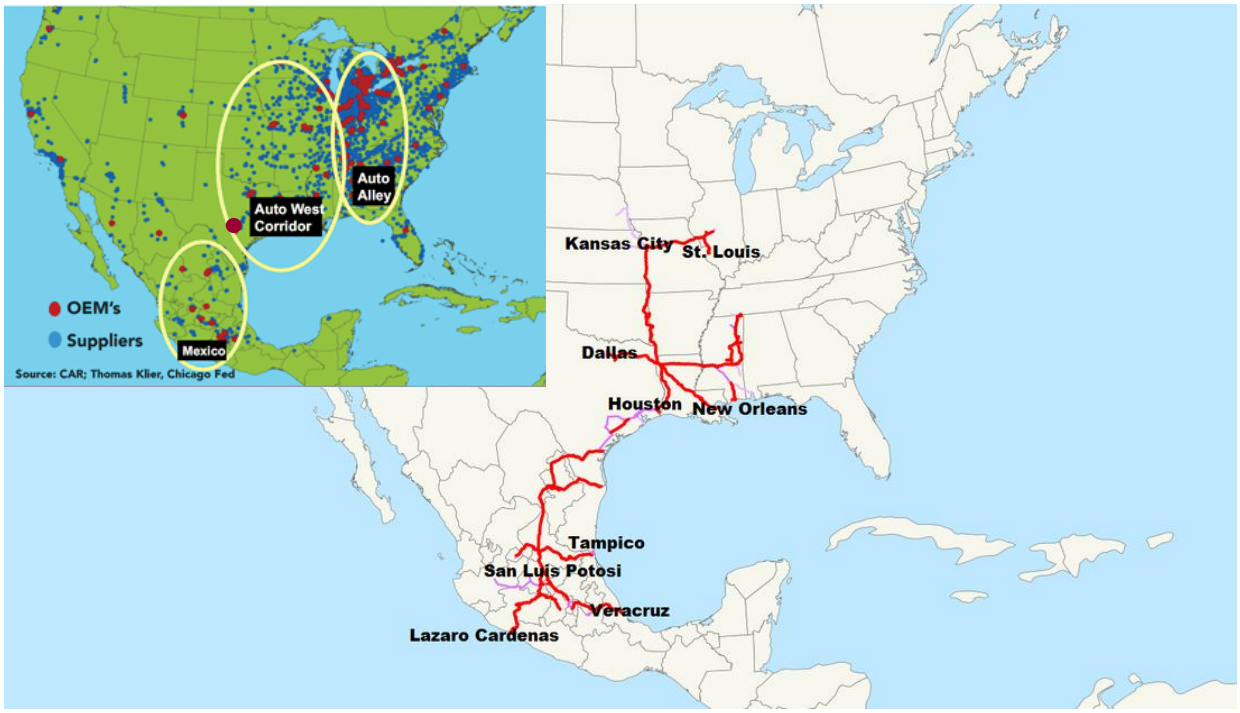
Finished vehicles are exported mainly on unit trains; auto parts are imported and exported mainly by intermodal container trains, so the quality of containerised rail transport services is of particular importance to the auto industry. IMT has modelled rail container flows in Mexico (Figure 11). This reveals the large flows from the three main ports of Manzanillo, Lazaro Cardenas and Veracruz to Mexico City. The two main rail concessions compete to serve Mexico City, with Ferromex operating the line from Manzanillo and Kansas City Southern Mexico (KCSM) operating the line from Lazaro Cardenas. Veracruz is served by lines operated by each of the companies. The map highlights the large flows of containers along KCSMs line from Lazaro Cardenas to Mexico City and from the US border at Nuevo Laredo to Mexico City. This line also allows the port of Lazaro Cardenas to serve markets across the eastern United States. The line links Mexico's car plants and auto component logistics centres to the centres of the US car industry (Figures 12 and 13). Figure 14 localises auto manufacturing plants in Mexico, and the rail network maps in Figure 15 shows that all are connected by rail. Most are served by both KCSM and Ferromex, with direct connections to their tracks or through the use of trackage rights. This includes Ferromex's rights to use the core route on the KCSM network between Queretaro and Saltillo. Ferromex also provides a link across the border from Saltillo to San Antonio in Texas, location of major recent car industry investments, through its shareholder Union Pacific railroad.

The reliability, price and level of service offered by the competing rail companies in Mexico have been critical to the large inward investments in the auto manufacturing and parts industry. The US and Mexican industries are highly integrated: Mexico supplies a third of US auto parts imports and accounts for a third of US auto parts exports. Mexican plants supply assembly lines under lean production and logistics systems that minimise storage and depend on just in time delivery. Some manufacturers run virtually integrated production across the border with sub-assemblies transported across the border more than once before the vehicle is complete. Rail transport enjoys an advantage over road in being able to organise customs inspections at the plants and carry the components across the border in bonded containers, avoiding delays at the frontier. 80% of exported finished vehicles are carried by rail, the majority over the northern land border.

Figure 11. **Containerised rail freight by route**

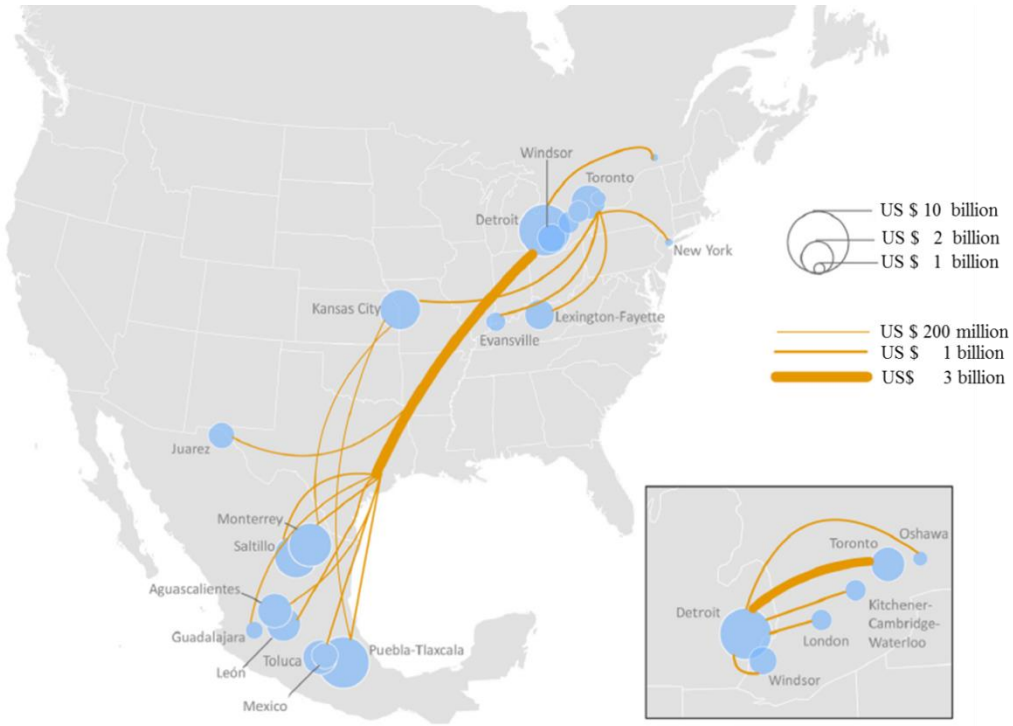
Source: IMT.

Figure 12. **Rail link to the centres of US car manufacturing**



Sources: CAR; Thomas Klier, Chicago Federal Bank; KCSM.

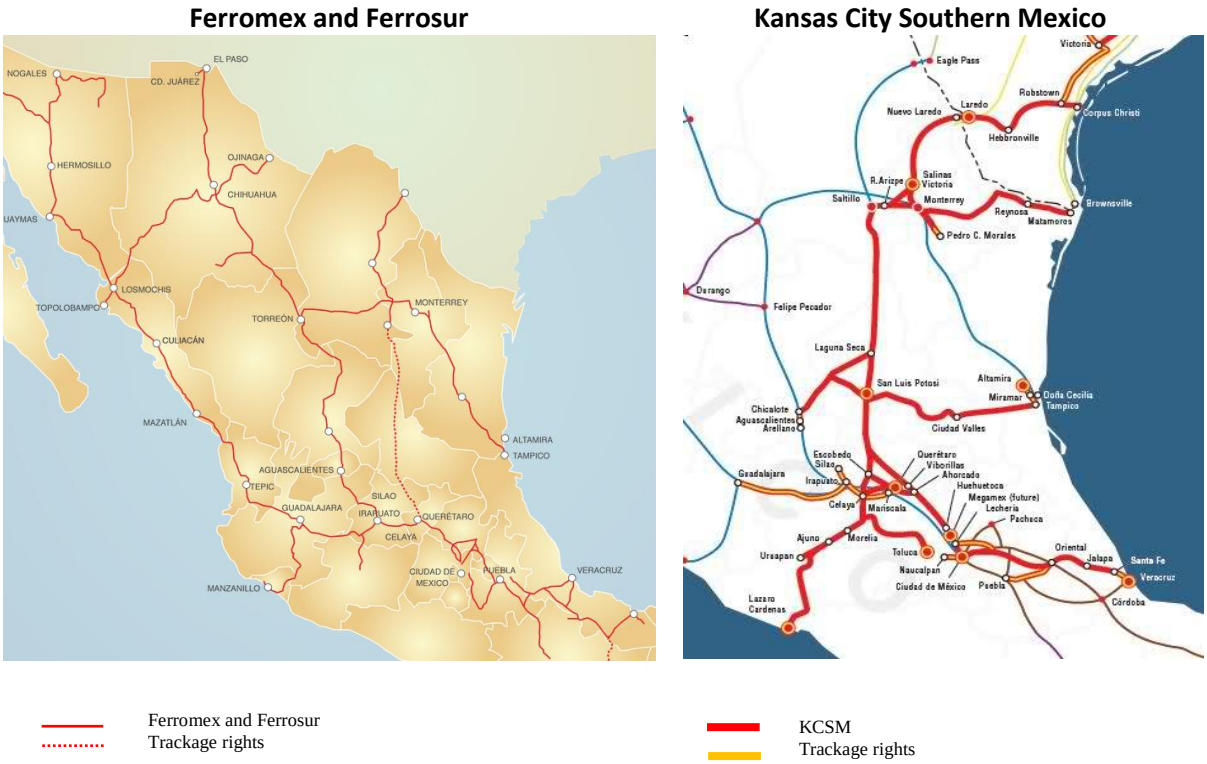
Figure 13. **Automotive production and trade in the Detroit-Mexico corridor 2010**



Source: Brookings Analysis of Economic Development Research Group. Data: Moody's Analytics, INEGI, Statistics Canada. http://www.brookings.edu/~/media/research/files/reports/2013/11/07-metro-north-america/bmpp_metrona_final.pdf

Figure 14. **Location of car manufacturing plants in Mexico**

Figure 15. **Competing rail networks**



Source: Ferromex and KCSM websites.

Intermodal container services for the auto industry have fixed departure dates, 5 days a week with cut-off times for loading and scheduled transit times (around 5 days to Chicago, 6 to Atlanta). Data on schedule reliability is not currently published. Compiling and publishing data to describe the performance of the transport and logistics services available to industry would support initiatives for promoting inward investment, such as the efforts of Promexico.[14] It is also important for providing law-makers with a true picture of performance when regulatory reforms are under consideration.

Port performance

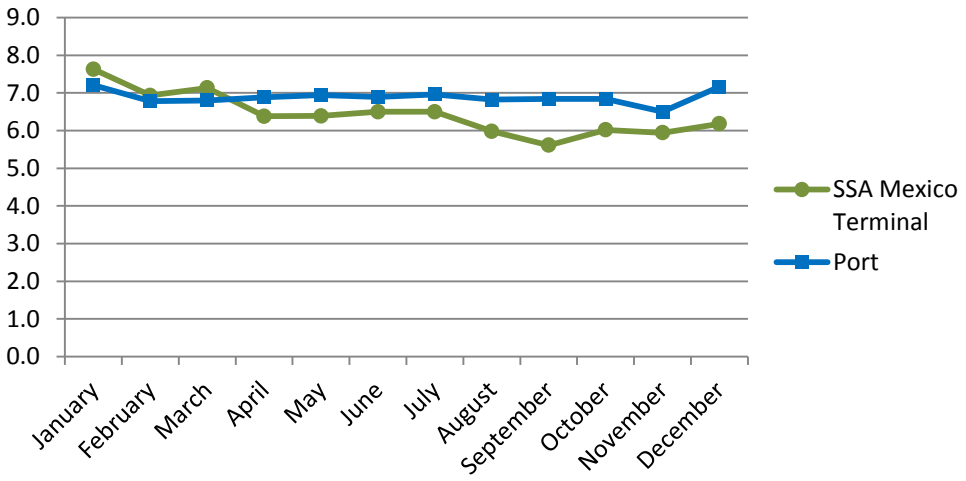
SCT monitors the productivity of Mexico's ports, publishing statistics monthly. For containers it records the number of boxes loaded and unloaded per hour (Table 4). The data is reported publicly on its website and regularly updated. The scope of regularly published data on performance is, however, limited. Container dwell times in storage, for example, are monitored but the data is not included in the main public dataset.

Table 4. **Container Port Productivity 2014**

Port	Containers handled TEUs	Boxes per hour ship in port	Boxes per hour, ship at quay	Boxes per hour of operation	Boxes per hour per crane
Ensenada	139 938	34.6	37.8	46.1	23.1
Lazaro Cardenas	996 654	70.2	85.3	110.6	37.6
Manzanillo	2 368 741	46.0	53.0	62.0	23.0
Progresso	65 583	8.3	9.9	33.9	29.5
Veracruz	847 370	46.7	61.2	83.8	26.2

Source: SCT http://www.sct.gob.mx/fileadmin/CGPMM/U_DGP/estadisticas/2014/Mensuales/12_diciembre_2014.pdf
http://www.sct.gob.mx/puertos-y-marina/direccion-general-de-puertos/estadisticas/rendimientos/

Figure 16. **Container dwell times (days) in Manzanillo: SSA Mexico terminal and Port average, 2014**



Source: IMT.

IMT reports figures of between 6 and 7 days for mean overall port dwell times for containers in Manzanillo (figure 16). This average for 2014 is around a day longer than the previous year, following a

14 A Government agency under the Ministry of the Economy promoting direct foreign investment and the export of goods and services. https://www.promexico.gob.mx/

regulatory change that allowed an extra day before storage charges apply. The response to the change in regulation reflects the fact that the productivity of port terminal operations is not the only factor relevant to the performance of ports and the logistics costs of importing and exporting by sea. The efficiency of customs and other inspections is critical and depends on space being set aside in the ports specifically for inspection as well as coordination of inspection procedures. A range of indicators is required to reflecting the full set of factors that are important to the competitiveness of supply chains. Adding the distribution of dwell times around the mean is a first step as predictability/reliability can be as important as speed. Differentiating between dwell times in triage between ship and yard, at port gate and waiting for inspection is useful for identifying where bottlenecks lie. Root cause analysis can be used to trace the reasons for delays and the interaction between them.

There is a general perception that average port dwell times exceed those typical of major ports in other OECD countries but benchmarks against which to compare performance have not been identified. Indeed many ports are reluctant to make this data available. Some information is publicly available nevertheless. The ocean freight e-commerce platform INTTRA reports dwell times of a similar order, averaging seven days, in New York and some other US ports in the first half of 2014, with all major US and Chinese ports showing a significant increase on the previous year.[15] This contrasts with the port of Vancouver where Transport Canada reports average dwell times of three days or less in 2014.[16] Choosing which ports against which to benchmark performance depends on a number of factors, including physical characteristics of the port (such as depth of berth, typical size of container ships calling, constraints on landside facilities) and markets served (competing ports being particularly relevant).

Developing a reliable picture of port performance benchmarked against an appropriate set of ports, and covering hinterland transport services, will be a priority area for the National Observatory for Transport and Logistics.

One factor driving an increase in dwell times is the arrival of larger container carriers. The introduction of the latest generation very large vessels on Europe-Asia routes has displaced large ships onto other routes in a cascade effect, with larger vessels appearing in Mexican ports too. The very large quantity of containers dropped in one call requires sorting. Port terminals have increased unloading capacity rapidly to handle such new vessels but it can take longer to re-dimension yard, sorting and gate capacity. Whether it is more profitable for the port and logistics businesses to respond by rapidly increasing sorting capacity or absorb the increased lumpiness in the flow of containers through longer average dwell times depends on the premium put on speed of delivery by shipping lines or their cargo customers. This is something that changes with growth in the economy as a whole and cyclical growth patterns in specific markets.

A single indicator of performance is never sufficient. Choosing which indicators to develop depends on the purpose of measuring performance. Griffiths et al.[17] identify three dimensions for setting targets (illustrated in figure 17):

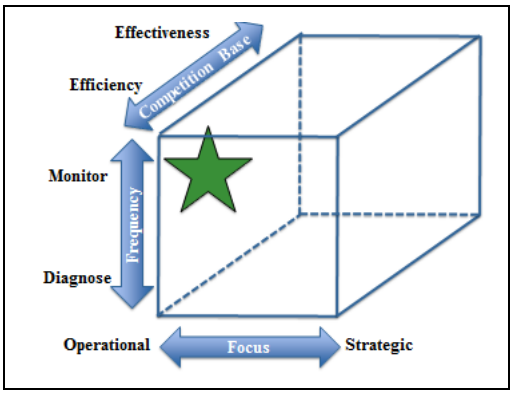
15 JOC 15 October 2014, http://www.joc.com/port-news/port-productivity/inttra-data-shows-containers-staying-longer-ports_20141015.html

16 Gateways and Trade Corridors Fluidity Index, Transport Canada, TRB, May 2014, http://onlinepubs.trb.org/onlinepubs/conferences/2014/FreightFluidity2014/I.%20Deck%20%20Fluidity_TRB%20May%2021%202014.pdf

17 "Aligning Logistics Performance Measures to the Information Needs of the Firm," Stanley E. Griffis, Martha C. Cooper, Thomas J. Goldsby, and David J. Closs, Journal of Business Logistics, Vol. 28, No. 2, 2007, pp. 35-56.

- **The Competitive Basis**: The degree to which the metric is focused on efficiency or customer/organizational responsiveness (sometimes called effectiveness).
- **The Measurement Focus**: Is the metric more geared towards strategic or operational goals?
- **The Measurement Frequency**: Is the metric designed to be a continuous, maybe even real-time performance monitor, or serve a more infrequent diagnostic purpose?

Figure 17. **Choosing performance indicators**



Note: The purpose represented by the star in this matrix would be one of monitoring efficiency for operational improvements.

Source: M. Brooks http://internationaltransportforum.org/jtrc/RoundTables/2015Logistics/index.html

To undertake monitoring of technical efficiency for example (the star in figure 14), performance indicators in the form of outputs divided by inputs could, for example, be based on various combinations of the factors in Table 5. The list is not exhaustive and hints at differences in perspectives between port and terminal operators and their clients and ultimate customers. Regulators may seek different indicators from those sought by industry.

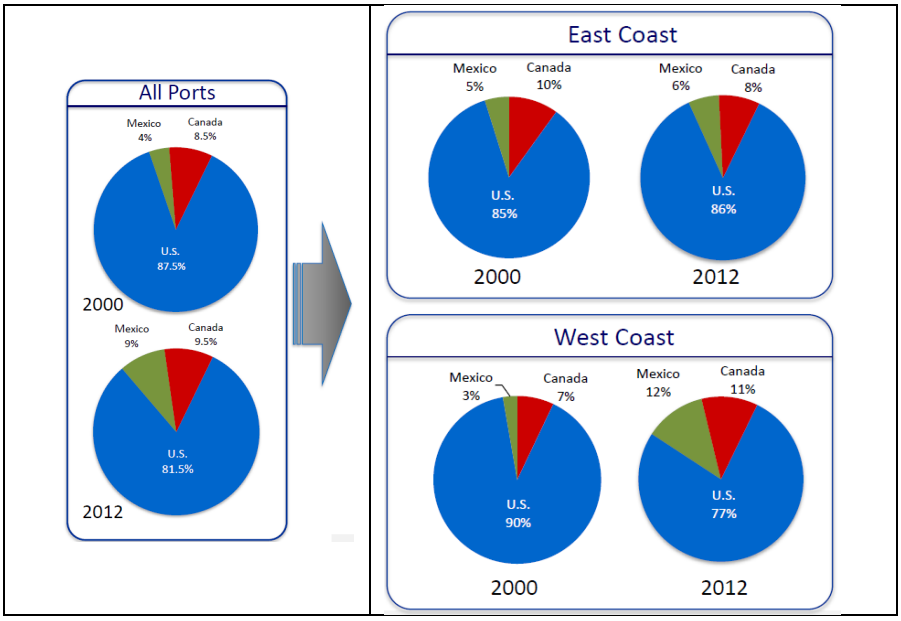
Table 5. **Sample inputs and outputs for port efficiency performance indicators**

Possible Inputs	Possible Outputs
Land (Area in hectares)	Throughput (Tonnes, TEUs)
Labour (Number)	Profit
Capital Invested	Customer Satisfaction
Equipment (Number of cranes)	Ship Turnaround
Port Charges	Berth Utilization

Source: M. Brooks http://internationaltransportforum.org/jtrc/RoundTables/2015Logistics/index.html

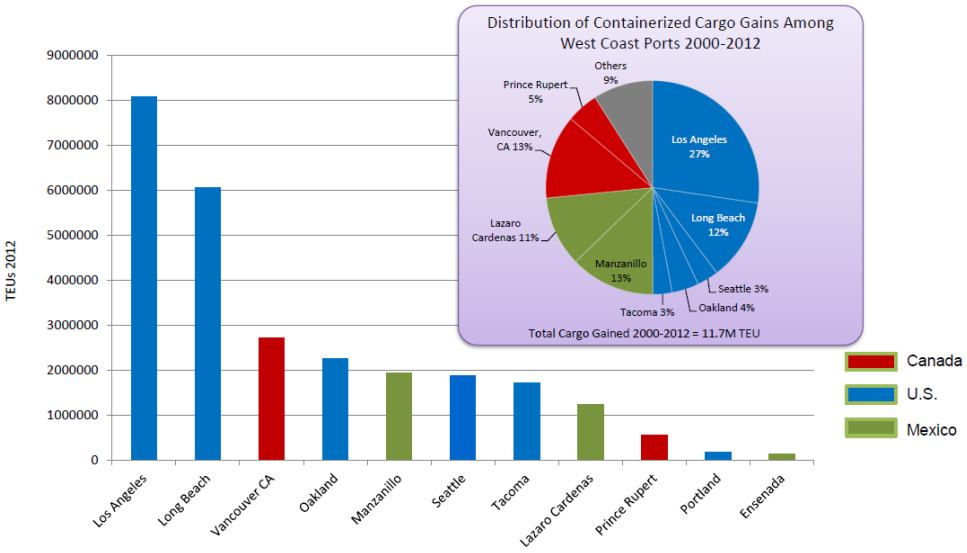
Transport Canada has developed a fluidity indicator based on the subset of potential efficiency indicators that it is currently most interested in to track performance along strategic freight routes where it sees its ports as competing with Mexican as well as US ports in serving inland markets, principally Chicago (figures 18 and 19). Lazaro Cardenas is as much a gateway to US markets as Montreal, Toronto, Vancouver, Prince Rupert or Halifax. The fluidity indicator measures the total transit time of inbound containers from overseas markets to strategic North American inland destinations via various Canadian gateways. A tool has been developed to measure in near real-time the performance of individual segments of the supply chains as well as the end-to-end transit time of freight flows. The metric focuses on identifying bottlenecks and impediments along major trade corridors with special attention given to port infrastructure. The indicators chosen are summarised in Table 6.

Figure 18. **North American Container Port Traffic Market Share (TEU) by Country, 2000 vs. 2012**



Source: Gateways and Trade Corridors Fluidity Index, Transport Canada, TRB, May 2014.

Figure 19. **North American West Coast Container Port Traffic – Selected Ports 2012**



Source: American Association of Port Authorities and Canada Port Authorities in Gateways and Trade Corridors Fluidity Index, Transport Canada, TRB, May 2014.

Table 6. **Indicators of port efficiency chosen for Transport Canada's Fluidity Index**

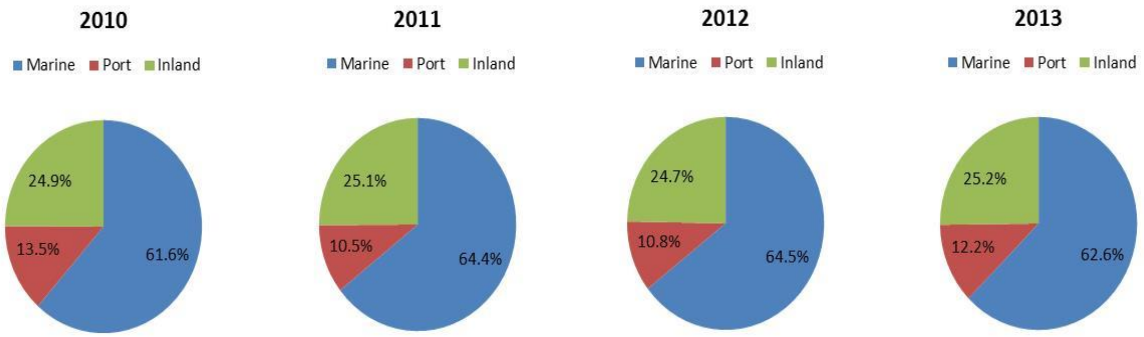
Intermodal Indicators (containers)	Units
Truck turnaround time	Minutes
Vessel turnaround time	Hours
Vessel turnaround time per TEU	Seconds/ TEU
Average vessel call size	TEU
Berth utilization	TEU/ m. of workable berth
Import container dwell time	Days
Dwell target - % under 72 hours	%
Vessel on-time performance	%
Gross port productivity	TEU/ hectare
Gross crane productivity	TEU/ gantry crane
Container throughput	TEU/month
4 Bulk Indicators	**Units**
Vessel turnaround time	Hours
Average vessel call size	Tonnes
Berth occupancy rate	Percent
Gross berth productivity	Tonnes/ hour

Source: Transport Canada Transportation in Canada 2012 and Gateways and Trade Corridors Fluidity Index, May 2014.

Reliability has been identified by Transport Canada as one of the most important performance criteria and this is measured on the scorecard presented in Figure 20. Here again a range of reliability indicators can be envisaged. Changes in annual average transit times may not be as relevant to the profitability of shippers as short term variations in transit time, from one week or one shipment to the next. Similarly shippers and logistics companies may be able to do more to mitigate variability in ocean transit times, when shipments are tracked in real time and information such as forecast delays due to bad weather are available, than to respond to variability in the time it takes to release containers from land-side storage in the ports. Exactly what indicators of reliability will be most relevant to competitiveness requires careful identification.

Figure 20. **Reliability of total transit time from Shanghai to Toronto via Port Metro Vancouver.**

Year	Marine Mean	Marine 95th	Port Mean	Port 95th	Inland Mean	Inland 95th	Total Transit	% Change
2010	14.2	16.3	3.1	7	5.7	7.6	23.1	-
2011	15.1	18.2	2.5	5.8	5.9	7.7	23.4	1.2%
2012	15.8	20.2	2.6	6	6.1	8.4	24.5	4.9%
2013	15.6	19.9	3	6.8	6.3	8.4	24.9	1.4%



Source: Gateways and Trade Corridors Fluidity Index, Transport Canada, TRB, May 2014.

Port and corridor performance needs to be measured from the perspectives of shippers and logistics businesses as well as the operators or ports and shipping lines. The Port Customer Service Initiative of the American Association of Port Authorities uses Dalhousie University to survey perceptions of the effectiveness of participating ports among three groups: cargo interests (shippers), container shipping lines, and supply chain partners (freight forwarders and logistics businesses). A number of effectiveness (or customer responsiveness) metrics have been developed to assess performance in relation to what each group reports matters most in doing business with the ports. Table 8 provides the top four examples of eight cargo interest criteria, 16 shipping line criteria and eight supply chain criteria from the 2012 data. The 2014 criteria have yet to be reported on.

For shippers, the criteria with the strongest influence on both Pacific and Atlantic coasts tended to be those that had to do with customer relationships, responding to and accommodating specific needs and providing useful information. These criteria had either a strong or medium influence on overall performance assessments on both coasts. Cargo Interests rated some ports particularly low in terms of ability to offer tailored services and the ability of employees to accommodate their needs, as well as both the terminal operator and port authority responsiveness to special requests. None of these factors are reflected in figures for average port dwell time or other standard efficiency metrics supporting the need for both efficiency and effectiveness (or responsiveness) metrics.

Table 7. **Sample assessment criteria for AAPA Port Customer Service Initiative**

Cargo Interest Examples (4 of 8)	Shipping Line Examples (4 of 16)	Supply Chain Partner Examples (4 of 8)
Provision of adequate, on-time information.	Provision of adequate, on-time information.	Provision of adequate, on-time information
Terminal operator responsiveness to special requests.	Incidence of cargo damage.	Accessibility to port premises for pick-up & delivery (gate congestion).
Availability of direct service to destination.	Timely vessel turnaround.	Efficiency of documentary processes.
Incidence of cargo damage.	Connectivity/operability to rail/truck or warehousing.	Speed of stevedore's cargo loading/unloading.

Source: M. Brooks http://internationaltransportforum.org/jtrc/RoundTables/2015Logistics/index.html

The logistics performance indicator (LPI) developed for the World Bank (Arvis et al. 2014) relies entirely on surveys of perceptions by shippers to rank performance of each countries logistics sectors in relation to trade facilitation, taking all modes of transport together. The indicator, and more broadly the report *Connecting to Compete: Trade Logistics in the Global Economy: The Logistics Performance Index and its Indicators* published four times since 2007 by the World Bank, has proved a highly effective tool for raising awareness of the importance of logistics performance to international competitiveness. It has also been used successfully to stimulating research into the factors that drive performance and development of relevant key performance indicators. Ojala and Celebi (2015) demonstrate this in a case study of Turkey that finds the key factor driving unsatisfactory dwell times to be customs inspections and more precisely poor coordination between customs inspections and veterinary, phyto-sanitary, contraband and other inspections. Shippers report that this is similarly a major issue in Mexico.

In most other OECD countries customs services have a clear mission to facilitate trade, backed by performance indicators. This has been taken furthest in countries highly dependent on trade, such as New Zealand and Australia. More than 20 aspects of service quality are monitored in Australia, for example, with performance against headline targets published regularly (Table 8). The NOTL should be able to develop a basic set of performance indicators for Mexico's customs and other inspection procedures, which could stimulate these authorities to re-orientate their services to facilitating trade.

Table 8. **Performance against trade facilitation targets in 2010–11, for the Australian Customs and Border Protection Service**

Key performance indicators	Target	Actual
Availability of electronic cargo systems to Customs and Border Protection clients (excluding scheduled outages)	99.7%	99.7%
Proportion of electronically lodged cargo documents where a response message is transmitted within five minutes	98.0%	97.9%

Source: Australian Customs and Border Protection Service, Annual Report 2010-11.

Strategic considerations in establishing the National Transport and Logistics Observatory

Strategic focus for initial development

Preparations for the NOTL have been thorough and a very large data set for potential collection has been identified in order to provide a complete picture of the sector and derive indicators for a full range of potential users. Ultimately the NOTL will become an important repository of data and analytical reports but complete coverage will take several years to achieve. In the short term, priorities need to be set and efforts focussed on a sub-set of areas where data and performance indicators could make a significant difference to policy-making, implementation of legislation and to economic performance. Which areas receive first priority will be determined by data availability, the national policy agenda, the legislative agenda for regulatory reform and areas identified for attention by industry and forwarders - in particular in making decisions to use Mexico as a gateway to North American markets. Local perceptions of particularly weak performance that needs to be improved, and on the other hand of strong performance that should be publicised as a factor in attracting inward investment will also shape priorities.

A clear priority is collecting and analysing data on key factors determining the competitive position of Mexico for trade. This should be a strong area of focus in the first year of development. This will include gateway port performance. Adding container dwell times to the port productivity indicators already collected, isolating and analysing causes of delay, with a focus on inspections are obvious areas for development from the discussion above. Data should gradually be extended to cover hinterland transport services, mirroring developments in Canada and Europe. The NOTL should also identify appropriate ports and corridors in other countries against which to benchmark performance. Physical measures of productivity, speed and reliability will provide core indicators but other factors are also important to the competitiveness of the system and the profitability of business dependent on transport and logistic services, not least responsiveness to customer requests. Surveys of business attitudes will have a place in overall performance measurement.

Information on prices is valuable for a wide range of potential users of NOTL data. Representative information on road haulage rates and intermodal transport rates (containers carried by road or rail) will no doubt be among the priorities. Reporting on indicative rail haulage rates should be developed in cooperation with the Rail Agency to be established in July 2015 by SCT. The main function of the Rail Agency is to regulate competition in the sector and for that it will collect data on tariffs and analyse prices and service quality. Indicators reporting on the efficiency of Mexico's rail container services could be developed with the Mexican Rail Association, AMF. France's National Road Freight Transport Economics Observatory provides a good model for a short list of the most relevant road transport indicators for shippers and logistics businesses.

Road congestion is perennially an issue of high interest to road users, both logistics and freight transport business and the general public. Developing transparent indicators can help focus attention where congestion costs are largest. The Urban Mobility indicators developed by the Texas Transportation Institute, although open to criticism and qualification, might provide a model for development in the medium term. In the shorter term monitoring queuing times at port gates and at border crossings might be the highest priority. Coordination with the planned border crossing observatories will be needed and possibly joint reporting planned.

Road safety is a very important policy issue and data on killed and seriously injured and exposure to crash risks is currently dispersed. IMT collects data on federal roads, the States collect data on other roads. There is no centralised reporting of data for the nation as a whole and no reliable reporting of the incidence, causes and impacts of crashes involving heavy goods vehicles. This might be an area for the NOTL to focus on in the medium term, given the high social cost of crashes. Key risk factors such as the incidence of overloading could be included. The condition of the roads is also relevant to safety. 45 000 km of roads have recently been surveyed under an iRAP project led by SCT. Star ratings are being used to benchmark crash exposure risk in relation to infrastructure quality across a third of all paved roads with surveys also collecting pavement data for asset management. This information could also be used by the NOTL.

Mitigating climate change is among the current government's national priorities. Indicators of CO2 emissions from freight transport could therefore be expected to be among the strategic priorities for NOTL. This can be done most easily on the basis of fuel sales. Estimates of emissions of particulates and NOx from freight transport might also be reported given the size of the health impacts of these emissions, or proxies such as the number of vehicles on the road by age cohort and emissions standard. The government plans to extend heavy vehicle scrapping incentives so these indicators are of direct policy relevance.

Other regulatory imperatives concern ex-post assessment of the impact of recent legislation such as changes to maximum heavy goods vehicle weights, and ex-ante regulatory impact assessment of future legislation in the sector. For this basic data on the truck fleet, disaggregated by vehicle weight, age, configuration, emissions class, use, load factor, commodities carried, etc., and on industry structure, disaggregated by ownership (own account, for hire) and size of business, is fundamental and should be among the priorities for development by NOTL. This information is not readily available to the public today.

Strategic data

Sets of strategic data to focus on for early delivery might include the following:

Trade, competitiveness and productivity

- Port container dwell times.
- Customs and inspection services performance indicators.
- Gateway fluidity indicators, possibly including port gate waiting times and reliability.
- Logistics performance/perception indicators.
- Hinterland connectivity.
- Haulage, rail and intermodal rates.
- Border crossing times and reliability by road.
- Border crossing times and reliability by rail – containers, bonded containers, grain.
- Cost indicators for the transport sector (wages, fuel costs, taxes).
- Data on capacity utilisation in road haulage (fill rates, % empty running).
- Degree of automation in all parts of the supply chain.

Assets

- Road network capacity, quality and safety.
- Road investment.
- Road vehicle fleet by type, weight, age, emissions class, etc.
- Rail network, quality and investment.
- Warehousing capacity.

Data for Economic Development

- Transport sector employment (2.6 million people in 2010), skills, training and education.
- Contribution to GDP (USD 96 billion in 2010, 9% of GDP).
- Volume indices of gross value added in transport sector and annual volume change.
- FDI stock and flow in the transport and logistics sector (by origin).

Structure of sector

- Number of registered businesses by type and size.
- Disaggregation of transport task by commodity and type of haul.
- Structure of strategic supply chains.

External costs

- Structure of road vehicle fleet by pollutant emissions class and fuel efficiency and age
- Emissions of particulates, NOx and CO2.
- Deaths and serious injuries involving heavy vehicles and freight trains with police and accident investigation reports on causes and contributing factors to crashes.
- Congestion and delay costs.

For all of the indicators developed, consistent time series data will be needed to indicate improvement of performance over time. Cross sectional data may be required to make relevant comparisons nationally and internationally to benchmark performance where this is identified as useful. Cooperation with industry and universities will be required to obtain some of the data needed.

Key steps

At this stage in development of the Observatory, with the initial mapping of required and potentially available data completed, it is recommended that a reappraisal of the strategic purpose and priorities is undertaken before proceeding to the construction of databases and indicators. This should encompass the following steps:

- Restate purpose and scope of the observatory, specifying the activities to be covered and uses to which data and indicators will be put in terms of policy making and support for business development.
- Establish a short-list of key current policy issues for which the data for evidence-based decision-making is currently inadequate but relevant data is likely to be accessible.
- Prepare a Work Plan for the next two years encompassing the following points, inter-alia.
    - Identify specific policy and performance issues to focus on.
    - Identify data ideally required for each issue selected.
    - Map this against the data available.
    - Where relevant, establish performance indicators (controlling for any potential to create perverse incentives).
    - Identify second and third round priorities for 1 year/3 years/5 years ahead.
- Draft an institutional agenda.
    - Establish budget and partners for data collection and diagnostic studies.
    - Establish an advisory board that includes a small number of influential individuals from industry and knowledge institutes.
    - Establish links with other relevant observatories nationally and internationally.

Experience with advisory boards elsewhere cautions against appointing too many members and avoiding the temptation to seek broad consensual coverage of the sector. Such boards have proved dysfunctional. Members should be appointed to provide their personal view point not an industry association consensus. Individual accountability usually proves much more effective and dynamic. Appointing people below CEO level is similarly recommended. Dinalog for example has a 7 member advisory council including, since the observatory was founded, the logistics director of Unilever, the logistics director of a major port handling company, a leading university professor, and general directors from Ministries of Transport and Economy.

Consultation with the private sector and with partners in the public sector that will provide data to the Observatory and make use of its outputs will be important. This should be an ongoing / organic process. It will be necessary to find ways of incentivising private companies and associations to provide data and interfaces to facilitate data transfer and ensure confidentiality will need to be established.

Strategic planning for logistics in Mexico has to date focussed on investment in infrastructure. The next strategic plan for the sector should match this with a focus on the ‘soft infrastructure’ of regulation, border management, automation and human capital. The Government recognises this in the review of freight transport sector regulation currently under way by the Ministry of the Economy and the regulatory reform council COFEMER in cooperation with the OECD (ITF/OECD 2015). Addressing regulatory and performance bottlenecks is essential if the major infrastructure investments in ports and roads now coming on stream and the very large new airport under development in Mexico City are not simply to exacerbate existing problems. This makes identification of priorities for the Observatory and quick delivery of key data and indicators in the first phase of development of the Observatory critical.

The team developing the NOTL will need to ensure that the initiative is widely publicised among the relevant stakeholders in the logistics sector, as stressed in the IDB (2013), and should also endeavour to keep high-level political authorities informed of the initiative's progress on a regular basis. Although the strategic analysis will be carried out by a limited number of individuals, the results of the analysis must be presented to broad audiences of public and private sector stakeholders in the logistics sector, in order to maximize support for the initiative. To this end, it will be necessary to develop a concise presentation that highlights the project's benefits, underscoring its positive impact on decision-making processes in the sector for both public and private sector stakeholders.

Resourcing

The NOTL is being developed by the IMT with specific funding from SCT for planning. IMT is expected to carry out the work of the observatory in practice in the early stages largely within its existing budgetary resources, but decisions will need to be made to create a sustainable funding model for the longer term. A procedure for appropriations from Governments will need to be established and a decision on whether to seek contributions from the private sector taken.

The team of professionals needed to set up an observatory is discussed in the Inter-American Development Bank's note on the Design and Establishment of National Observatories (IDB 2013) and repeated here.

The IDB report notes that teams working to set up observatories tend to belong to the line ministries that are interested in advancing the logistics agenda. These teams are small, specialized groups, with experience performing analytical work and putting together events on logistics, and they generally have ad hoc support from external consultants on specific topics.

This refers not to the team that will make up the National Observatory, but rather to the team carrying out the preparatory activities to set up the observatory (although the team's members may continue to serve once the Observatory is established). A representative summary of the types of members needed on the team responsible for the preparatory work is as follows:

- Logistics professional: an economist, civil engineer, or industrial engineer, with experience in transport, logistics, and foreign trade, with at least 10 years of relevant experience.
- Transport professional: a civil, road, or transportation engineer, with at least 10 years of experience in relevant projects.
- Professional in statistics and sampling: an economist or specialist in statistics, with at least 5 years of experience, preferably in the area of transport.
- Systems professional: a systems engineer with at least 5 years of experience in software design.
- Legal specialist: an attorney with at least 3 years of general experience, experience in transport and urban planning projects, and post-graduate studies in administrative and/or commercial law.
- Communications specialist: a journalist or individual with a degree in communications, with experience organizing and moderating events with large audiences and ability to develop media and communications strategies.

Milestones

Preparations for the technical work of the Observatory are well advanced, including development of a needs analysis matrix, establishing where data exist and where there are gaps. At the strategic planning level, the following indicative milestones might be set to guide the initial stages of development and help establish priorities.

Phase 1 (0-4 months)

- IMT leads definition and clarification the objectives and strategy of the Observatory.
- Detailed consultation with the private sector on its contributions and requirements begins.
- IMT names a dedicated Logistics Observatory project manager with the task of drafting:
    - An observatory strategy setting out the objectives.
    - A list of strategic data sets and indicators to produce in year 1.
    - A business plan identifying short term projects.
    - An evaluation of the resource needs of the observatory.

Phase 2 (4-8 months)

- IMT and SCT seek government-wide mandate to implement the Observatory.
- Build on the existing SCT data portal to consolidate existing freight transportation and supply chain information for the identified priority areas and strategic data sets.
- Develop a communication plan which includes a strong brand and social media presence.
- Secure government funding to cover the Observatory's needs until the end of Year 3.
- Launch a web-based data portal with data and analysis on the identified priority, strategic issues.

Phase 3 (8-12 months)

- Establish a Board of Directors and an organisational structure with the leadership of SCT.
- Hire support staff / technical expertise.
- Launch the first observatory project, targeting a data gap that has high priority, a high probability of being filled and a strong likelihood of yielding measurable economic benefit.
- Build a network of like-minded stakeholders, including with academia, neighbouring countries, logistics leaders and international organisations.
- Implement the communication plan.
- Create a logistics roundtable bringing together Ministries, private industry, international organisations and academia.

Further milestones can be established for the ongoing development of the Observatory but the intention now is to ensure the focus is on the essential early development tasks. These can be summarized as: identifying strategic priorities for data collection and analysis; delivering visible, high quality, early outputs to establish a reputation; and building stakeholder relationships with businesses in the sector, the "knowledge community" and the Ministries and government agencies with a stake in the performance of the sector and responsibilities for data collection and analysis.

Conclusion

As is evident from the sections of this report on the Performance of the transport and logistics sectors in Mexico, a wealth of relevant data exists but there are gaps. These hinder policy making and in particular make satisfactory regulatory impact assessment difficult. Much key information is only available from specific reports commissioned sporadically. Policy making would be better served by regular data collection and the kind of concerted effort that a National Observatory would bring to driving delivery of the goals for the transport and logistics sectors in the National Development Plan.

References

Arvis, J-F., D. Saslavsky, L. Ojala, B. Shepherd, C. Busch and A. Raj. 2014. Connecting to Compete: Trade Logistics in the Global Economy: The Logistics Performance Index and its Indicators. Washington, DC: World Bank. Available at http://www.worldbank.org/lpi

Commission for Environmental Co-operation (2011) '*Destination Sustainability: Reducing Greenhouse Gas Emissions from Freight Transportation in North America'. http://www.cec.org/Page.asp?PageID=122&ContentID=17673*

Griffis et al (2007), Aligning Logistics Performance Measures to the Information Needs of the Firm, Stanley E. Griffis, Martha C. Cooper, Thomas J. Goldsby, and David J. Closs, Journal of Business Logistics, Vol. 28, No. 2, 2007, pp. 35-56.

IDB (2013), Design and establishment of national observatories on freight transport and logistics. Phases and strategic considerations. IDB 2013. http://publications.iadb.org/handle/11319/5837

IDB (2013), IDB Regional Observatory for Freight Transport and Logistics, , Freight Transport and Logistics Statistics Yearbook, 2013. http://logisticsportal.iadb.org/sites/default/files/presentacion_bid.pdf

IMT (2014) Manual Estadístico del Sector Transporte 2013, Instituto Mexicano del Transporte, http://imt.mx/archivos/Publicaciones/Manual/mn2012.pdf

ITF/OECD (2015), Review of the Regulation of Freight Transport in Mexico, OECD Publishing 2015 (forthcoming).

McKinnon (2004), The economic and environmental benefits of increasing the maximum track weight: the British experience, Transportation Research Part D, Vol 10, pp. 77-95.

SCT (2013), Sistema Nacional de Plataformas Logísticas (SNPL), SCT, SE and IDB, http://logisticsportal.iadb.org/sites/default/files/presentacion_sistema_nacional_de_plataformas_logisticas.pdf

Transport Canada (2014), Gateways and Trade Corridors Fluidity Index, Transport Canada, TRB, May 2014.

TRB (2014), American Association of Port Authorities and Canada Port Authorities in Gateways and Trade Corridors Fluidity Index, Transport Canada, TRB, May 2014.

US DoT (2013), Freight Facts and Figures 2013, US Department of Transportation Federal Highway Administration and US Department of Transportation Bureau of Transportation Statistics. http://www.rita.dot.gov/bts/node/493771

World Bank, Railway Reform Toolkit http://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/railways_toolkit/ch1_1_4.html

International Transport Forum

Logistics Strategy and Performance Measurement

Mexico's National Observatory for Transport and Logistics

Mexico has an effective transport and logistics sector that has provided the backbone for growth in the economy. Rapidly expanding trade requires improved performance to keep pace with demand. Good data will be needed to provide the evidence basis for efficient regulation and to underpin sometimes difficult reforms to improve performance. Marshalling this evidence will be the objective for the National Observatory for Transport and Logistics currently being established. Careful design of key performance indicators to leverage real improvement will be one of its most important tasks.

Preparations for the Observatory have been thorough and a very large data set for potential collection has been identified. Ultimately the Observatory will become an important repository of data and analytical reports but complete coverage will take several years to achieve.

In the short term, priorities need to be set and efforts focussed on key areas where data could make a significant difference to policy-making. Priorities will be determined by data availability, the legislative agenda for regulatory reform and areas identified for attention by industry and forwarders - in particular in making decisions to use Mexico as a gateway to North American markets. This report was prepared to help set the priorities for its initial phase of development. The issues considered are common to all countries seeking to improve the evidence base for policy-making in the transport and logistics sector.

This report is part of the International Transport Forum's Case-Specific Policy Analysis series. These are topical studies on specific issues carried out by the ITF in agreement with local institutions.

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