BREAKING BARRIERS

LEVERAGING MONGOLIA'S TRANSPORT AND LOGISTICS SECTOR

SEPTEMBER 2018

ASIAN DEVELOPMENT BANK

ADB

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Foreword

Mongolia is a landlocked country with vast reserves of mineral wealth that have been a catalyst for its economic growth in the recent past and offer great promise for the future. The mining sector is a major contributor to the economy, accounting for about 20% of its gross domestic product, and 71% of export earnings. But, for Mongolia's mineral wealth to reach global markets and imports to reach domestic customers, an efficient transport and logistics system is an essential prerequisite.

Mongolia is also heavily dependent on international trade, however, its overall role in the regional trade has remained limited. The cost of logistics is significant to trade and commodity prices in the country. Logistics costs account for about 30% of the prices of goods in Mongolia, which is significantly higher compared with other countries.

Ulaanbaatar, the capital city, is the destination of a major proportion of imports from the People's Republic of China and the Russian Federation, but its logistics infrastructure is still inadequate to meet the growing demand for trade. Most bulk commodities are transported by road, which exacerbates environment and economic issues in the country.

Breaking Barriers – Leveraging Mongolia's Transport and Logistics Sector addresses the unique needs and economic profile of Mongolia. It provides a perspective on the existing nature of the logistics sector and its interdependence with trade, and suggests recommendations that address the key concerns that emerged during the study. It also looks at case studies and examples of logistics and transport solutions from other countries relevant to Mongolia.

This publication is a result of extensive consultations with stakeholders and first-hand review of the logistics sector in Mongolia. The insights and recommendations presented can be used by policy makers, as well as by nongovernment organizations and industry associations to delve deeper into some of the key areas of the trade and logistics sector in Mongolia, and take steps for improvements.

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Director, Sustainable Infrastructure Division
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Abbreviations

3PL	third-party logistics
ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
BCP	border crossing point
CAREC	Central Asia Regional Economic Cooperation
CFS	container freight station
CHP	combined heat and power plant
CONCOR	Container Corporation of India
GASI	General Agency for Specialized Inspection
GDP	gross domestic product
GVZ	German freight village
ILC	integrated logistics center
km	kilometer
LPI	Logistics Performance Index
MCGA	Mongolia Customs General Authority
mm	millimeter
PPP	public–private partnership
PRC	People's Republic of China
TIR	Transports Internationaux Routiers (International Road Transport)
TSF	transshipment facility
UBTZ	Ulaanbaatar Tumur Zam (Ulaanbaatar Railways)
UCC	urban consolidation center
UNECE	United Nations Economic Commission for Europe

Executive Summary

Scope of the Study

The efficient movement of goods is essential for national development. Without transportation, there is little opportunity for the exchange of products and services. Therefore, efficient and reliable transportation is necessary for a country's economic growth and prosperity. The concept of logistics integrates transport, distribution, storage, material handling, and the flow of information and funds in support of production and consumption. It is essential that an efficient logistics system is in place for growth.

This publication analyzes the logistics and transport sector of Mongolia from the perspective of its importance to the national economy of the country as well as its impact on the lives of Mongolia's people. The study investigate issues and gaps in Mongolia's logistics and transport sector in the context of its international trade, domestic trade, and transit movement of freight through the country. Each issue or gap is provided with a recommendation, which can be adopted and implemented by the policy makers or even nongovernment stakeholders. These recommendations are supported with case studies from around the world where similar situations are encountered.

Critical Issues Regarding Logistics in Mongolia

Mongolia's international trade has been the foundation of its economic growth. Its total exports stood at $4.91 billion dominated by mineral products and precious stones, while its imports were worth $3.36 billion in 2016 comprising fuel (gasoline and diesel), machinery, automobiles, food products, and chemicals. Its largest trading partners are its neighbors: the Russian Federation and the People's Republic of China (PRC).

Seventy percent of Mongolia's imports are containerized, but transporting these containers experiences long lead times and uncertain delivery schedules due to inefficiencies in the supply chain. Multiple freight terminals are served by Ulaanbaatar Tumur Zam railway station, which creates an inefficient system leading to redundancy of assets, higher handling costs, and longer turnaround times. Significant delays lead to higher total costs for consumers. A large proportion of the time and cost related to transport of containers is also caused by issues outside of Mongolia such as long detention times at external ports.

Likewise, Mongolia's exports face challenges in terms of poor mine to border connectivity. Only three border crossing points (BCPs) have rail connectivity, and the road connectivity at the remaining BCPs is also inadequate. Infrastructure is considerably inadequate at BCPs across Mongolia.

Another key issue which impacts the movement of goods across the borders is the variation in the railway gauge of Mongolia and the PRC. This necessitates the transfer of freight between railway wagons of different gauges at the BCP. This additional handling of freight entails additional time and cost during transport. Currently, such a transfer takes place manually by unloading the freight from one wagon and then reloading the freight onto another wagon. Inefficient cross-border processes also contribute to delay in the movement of goods. Different government entities in charge of cross-border process require the same data, but freight forwarders need to submit to every government agency. There is a need to streamline cross-border processes. Gaps in the physical infrastructure as well as issues in procedures for exports and imports hamper Mongolia's trade competitiveness in comparison with other countries.

Poor storage facilities and inefficient distribution mechanisms are the two major hindrances for the distribution, transport, and storage of domestically produced goods in Ulaanbaatar. This inefficient logistics system not only leads to highly priced goods, but creates congestion and pollution in the city.

Mongolia acts as a land bridge between the the Russian Federation and the PRC. It provides passage of goods between the two countries. Rail is the conventional transport for these transit goods. However, road transit is now being tested between the two countries. There are two major challenges for the transit movement of goods by rail between the Russian Federation and the PRC through Mongolia. Aside from the difference of the railway gauge between Mongolia and the PRC, the second challenge is the lack of available locomotives and wagons in Mongolia to operate trains carrying transit cargo. Moreover, a major part of Mongolia's fleet of existing locomotives and wagons is expected to be out of service soon since most locomotives are approaching the end of their economic life.

Overview of Recommendations

1. **Develop an integrated multimodal logistics facility.** Mongolia's imports are characterized by significant container-based freight. This can be addressed by replacing the existing system with an integrated multimodal logistics facility. One example is the model of the integrated multimodal freight terminal at Dadri, India. Such a model can provide effective public–private partnership opportunities, while addressing issues that impact containerized imports.

2. **Provide rail connectivity between the mines and border crossing points.** BCPs and mines should be linked with railway wherever feasible, and the border infrastructure should be upgraded. The Northern Railway Corridor can act as a model, which can be replicated across other mines and BCPs where the mining

company also develops the railway link together with the Government of Mongolia. This is one alternative for delivery and/or operations of major projects in tight fiscal times, while still recognizing that planning and other public sector responsibilities still need other improvements.

3. **Construct an automated bogie exchange facility at the border crossing point.** Current manual operation at the bogie exchange facility should be automated to improve throughput at BCPs significantly.

4. **Create urban consolidation centers.** Movement, storage, and distribution of domestic goods can be streamlined and efficiently managed by implementing urban consolidation centers which will help plan, organize, and optimize movement of domestic goods within Ulaanbaatar and in nearby regions.

5. **Promote third-party logistics service providers.** Third-party logistics service providers take over the noncore operation of enterprises and provide common infrastructure that is shared between customers. These facilities include transport, storage, aggregation, and distribution. These service providers also facilitate tracking and tracing of shipments for long-haul transport, and can complement urban consolidation centers and have a significant impact in reducing costs and congestion in the city.

6. **Improve and develop agricultural supply chain.** Logistics for domestic non-mining freight in Mongolia is dominated by transport and storage of agricultural products within the country's various *aimags* to Ulaanbaatar. The country's extreme winters strongly influence the production cycles of its agricultural produce, thereby making proper temperature-controlled storage and transport facilities essential to reduce wastage and ensure round-the-year availability of perishable commodities.

7. **Implement a national electronic single window.** It is essential that the Mongolia Customs General Authority, the General Agency for Specialized Inspection, and Mongolia Immigration and Border Security share and exchange information to minimize delays at borders. Implementation of a national electronic single window can achieve these objectives.

8. **Develop and adopt regulatory mechanisms for logistics efficiency.** While a good relationship with Mongolia's neighbors is essential to further develop its trade potential and improve its logistics efficiency, promotion of the Trilateral Economic Corridor should be augmented by the creation of rail and road infrastructure along with the implementation of requisite regulatory mechanisms. While the Agreement on International Goods Transport by Rail Convention for rail-based transit movement already exists, adoption of the Transports Internationaux Routiers carnets for road-based transit movement can greatly boost the movement of transit freight across Mongolia.

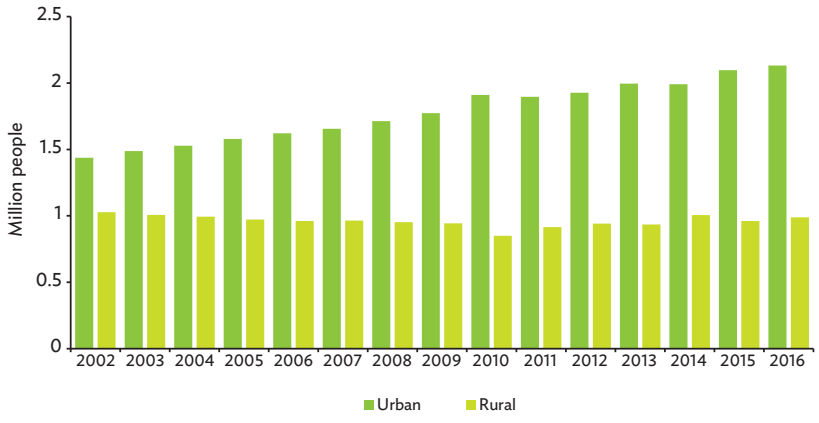
1 Introduction to Mongolia's Trade and Logistics Sector

Union is the source of success.
—Mongolian proverb

Mongolia's Socioeconomic Profile

Mongolia is a landlocked country with the Russian Federation to the north and the People's Republic of China (PRC) to the south. Mongolia's economy has been predominantly agrarian and a majority of the population has been traditionally engaged in herding and rearing of livestock for a living. As of December 2016, Mongolia's total population was 3,119,935; out of which 46% of the population resides in the capital city of Ulaanbaatar.[1] The urban population of the country in 2016 was 68% of the total population, whereas the remaining 32% population was rural. The conventional agrarian population has been migrating to the urban areas over the last decade and a half, and the proportion of the urban population of the country has increased since 2002. Figure 1 illustrates the change in the proportion of the urban and rural population of Mongolia over the last 15 years.

Figure 1: Urban and Rural Population Trend for Mongolia



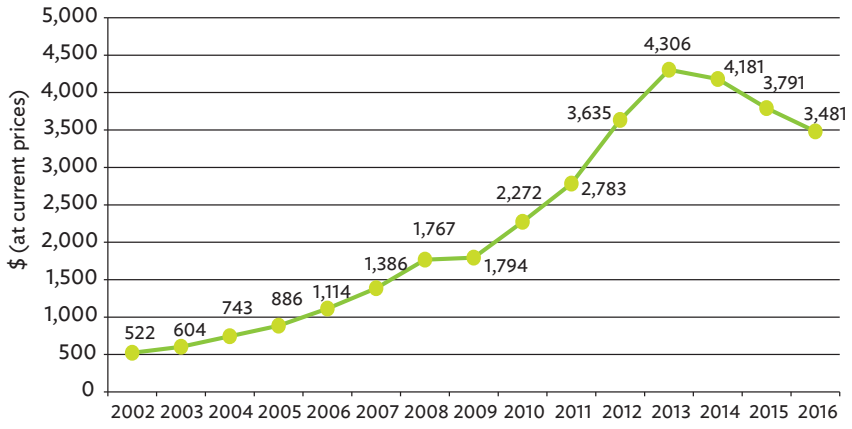
Source: National Statistical Office of Mongolia.

One of the main reasons for this change is the proliferation of mining and related economic activities. Since Mongolia is blessed with vast reserves of mineral wealth such as coal, iron ore, copper, crude oil, and gold, the mining industry has been a catalyst for Mongolia's

[1] National Statistical Office of Mongolia.

economic growth in the recent past. For the year 2016, the mining and quarrying industry offered a national average monthly wage of $1,068.40, which is the highest among all industries in Mongolia; whereas traditional occupations such as agriculture, forestry, fisheries, and hunting only offered an average monthly wage of $334 for Mongolia's population. Figure 2 illustrates the trend of Mongolia's gross national per capita income (current prices) over the last 15 years.

Figure 2: Per Capita Gross National Income Trend



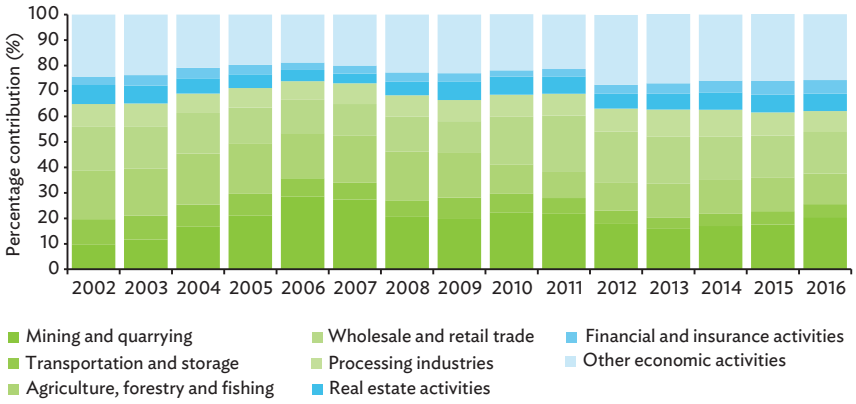
Source: National Statistical Office of Mongolia.

As seen in Figure 2, per capita gross national income witnessed a steep rise between 2009 and 2013, after which it declined consistently.

Mining's contribution to Mongolia's gross domestic product (GDP) peaked in 2006, declined for the past 10 years, and has not reached its previous peak. Similarly, the contribution of agriculture and related activities was reduced over the last 15 years (Figure 3).

Another key characteristic of Mongolia is its small domestic market coupled with harsh weather conditions, which have prevented the development of the domestic manufacturing base in the country. Thus, most capital goods, consumer products, and other commodities are imported from other countries. Likewise, the output of the mining industry is primarily exported from Mongolia and only a small portion is processed domestically.

Figure 3: Industry-Wide Contribution to Mongolia's Gross Domestic Product



Note: Other economic activities include public administration and defense; compulsory social insurance; education services; construction, information, and communication; professional, scientific, and technical activities; public utilities (electricity, water, sanitation); activities of households as employers; accommodation and food service activities; administrative and support service activities; arts, entertainment, and recreation; water supply; and sewerage, waste management, and remediation activities.

Source: National Statistical Office of Mongolia.

Mongolia's Trade Profile

The domestic population's reliance on imports of consumer goods and the exports of mining sector have put international trade at the center of Mongolia's economy. Figure 4 shows the import and export trends of Mongolia over the last 7 years.

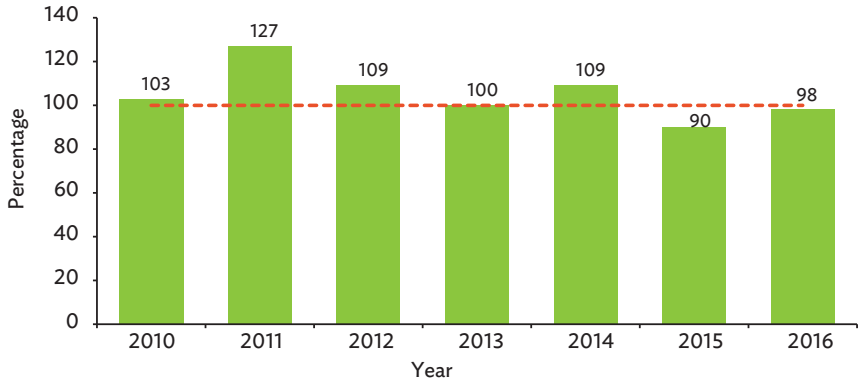
Mongolia's trade is a key enabler of growth of the national economy, which is evident from the fact that Mongolia's international trade as a percentage of Mongolia's GDP

Figure 4: Mongolia's International Trade Turnover Trend

Source: National Statistical Office of Mongolia.

has been consistently close to 100% over the past 7 years. The ratio of trade (value) and Mongolia's GDP (value) are shown in Figure 5.

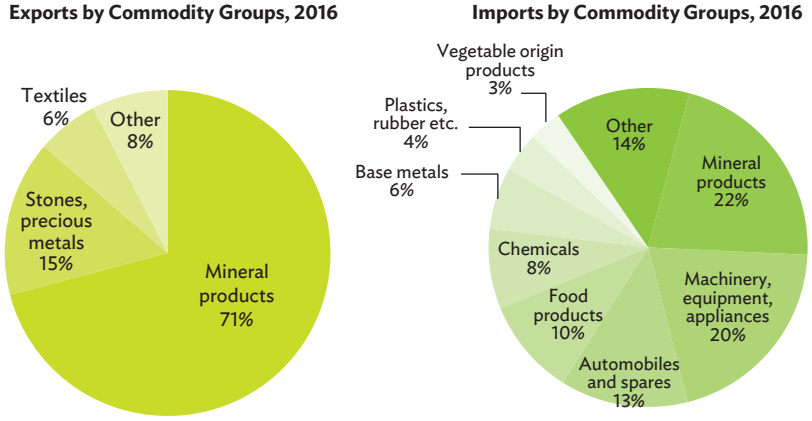
Figure 5: Mongolia's Trade as a Percentage of Its Gross Domestic Product



Source: World Bank database. World Development Indicators.

However, being landlocked, Mongolia depends on the Russian Federation and the PRC for the physical movement of goods in and out of the country. Also, being neighbors, the Russian Federation and the PRC are Mongolia's largest trade partners. Mongolia imports a significant portion of its consumption requirements from various countries, including food products, fruits and vegetables, groceries, beverages, home appliances, garments, cosmetics, machinery and mining equipment, as well as automobiles, gasoline, and diesel. Mongolia exports a large quantum of mineral commodities led by coal, copper concentrate, iron ore, and crude oil from its mines to the PRC and a few other countries. The brief trade profile of Mongolia in terms of the commodity mix is presented in Figure 6.

Figure 6: Export and Import Commodity Mix of Mongolia
(by value of trade)

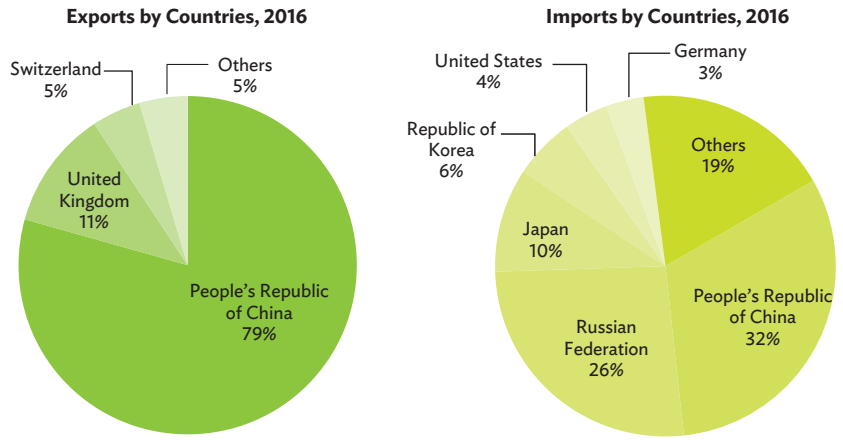


Source: National Statistical Office of Mongolia.

The total exports of Mongolia stood at $4.91 billion, whereas the imports were worth $3.36 billion in 2016 resulting in a total trade surplus of $1.55 billion (footnote 1). While exports are dominated by mineral products and precious stones, the import mix comprises fuel (gasoline and diesel), machinery, automobiles, food products, and chemicals. The commodities of exports are predominantly transported in bulk form, whereas imports are largely transported in containers.

Figure 7 provides a snapshot of Mongolia's import and export trade partners for the year 2016.

Figure 7: Mongolia's Trade Partners
(by value of trade)



Source: National Statistical Office of Mongolia.

In terms of the trade partners, the PRC is the largest trade partner for Mongolia for its imports as well as exports due to proximity and access. The Russian Federation is the next major trade partner for imports. The United Kingdom and Japan are also major trade partners for exports and imports, respectively.

While Mongolia's trade is concentrated with its neighbors in the north and south, the transport and logistics sector has a crucial role to play in ensuring timeliness and cost-effectiveness of shipments. Being a landlocked country, most of Mongolia's international trade and all domestic trade rely on surface-based transport and logistics infrastructure. Since the logistics and transport sector is crucial for national trade, the following section elaborates on Mongolia's performance in terms of logistics and transport activities.

The transport and logistics sector [of Mongolia] has a crucial role to play in ensuring timeliness and cost-effectiveness of shipments.

Mongolia's Logistics Performance

Mongolia was ranked 108 out of 160 countries surveyed as per the 2016 Logistics Performance Index (LPI) published by the World Bank. This is a significant improvement from its rank of 135 in the 2014 LPI. However, this performance improvement has not been uniform across all parameters. Table 1 shows the changes in Mongolia's logistics performance between 2010 and 2016 according to LPI.

Table 1: Mongolia's Logistics Performance Index

		2010	2012	2014	2016
Overall Logistics Performance Index score	Score	2.25	2.25	2.36	2.51
Overall Logistics Performance Index rank	Rank	141	140	135	108
Customs	Score	1.81	1.98	2.2	2.39
	Rank	149	144	132	100
Infrastructure	Score	1.94	2.22	2.29	2.05
	Rank	133	125	120	140
International shipments	Score	2.46	2.13	2.62	2.37
	Rank	119	142	110	129
Logistics quality and competence	Score	2.24	1.88	2.33	2.31
	Rank	128	152	126	129
Tracking and tracing	Score	2.42	2.29	2.13	2.47
	Rank	122	134	149	108
Timeliness	Score	2.55	2.99	2.51	3.4
	Rank	147	97	147	65

Source: World Bank Logistics Performance Index.

Among the six categories assessed in LPI 2016, the most significant improvement was in timeliness along with some improvements in customs, and tracking and tracing categories. These improvements can be attributed to various steps undertaken by the Government of Mongolia over the past few years to improve customs processes. The implementation of Customs Automated Information System in 2011 is one of the key reasons for improvements in these three parameters.[2] However, LPI scores for infrastructure, international shipments, and logistics quality and competence have deteriorated since 2014, implying that transport and logistics infrastructure and services remain as the weak link in the country's logistics supply chains.

While Mongolia has undertaken measures to improve its overall transport and logistics, much still remains to the done to achieve significant improvements. Moreover, the approach to improving logistics needs to cater to Mongolia's unique trade mix and its national development plans.

[2] The Customs Automated Information System was implemented as part of Asian Development Bank (ADB). 2006. Report and Recommendation of the President to the Board of Directors: Proposed Loan to Mongolia for the Customs Modernization Project. Manila. (Loan 2307-MON).

Approach to Analysis of Mongolia's Transport and Logistics Sector

Freight generated from mining activities constitutes a large part of the total freight movement. Thus, based on freight type, the logistics industry can be categorized into the following two components:

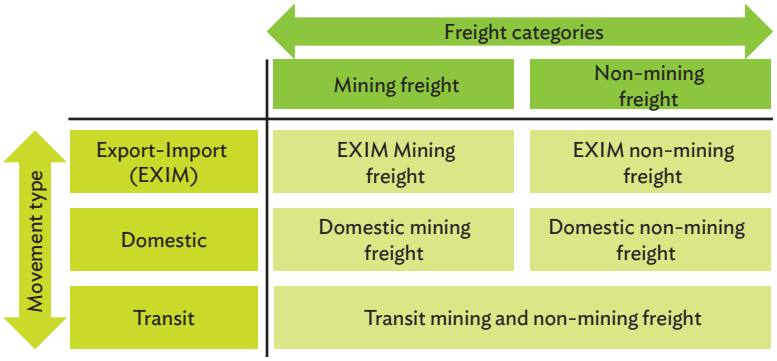
(i) logistics for mining sector, and
(ii) logistics for non-mining sector.

The movement pattern of freight in Mongolia can be broadly categorized as follows:

(i) domestic movement (movement within Mongolia),
(ii) export/import movement (movement across Mongolia's border with source or destination in Mongolia), and
(iii) transit movement (movement across Mongolia's borders with both source and destination outside Mongolia).

The two freight types and the three types of movement were analyzed within a broad framework, which gives rise to five subgroups. The key challenges faced by the country's transport and logistics ecosystem were further analyzed within these five subgroups. The broad framework along with the five subgroups are represented in Figure 8.

Figure 8: Approach Framework



EXIM = export-import.
Source: Asian Development Bank.

(i) **Domestic mining freight.** Domestic mining freight movement of minerals and ores is primarily focused on the movement of coal from various mines to power plants in Mongolia. The primary mode used for this movement is rail. Coal mines located at Baganuur, Shivee Ovoo, and Shariin Gol supply coal to the power plants in Ulaanbaatar, Erdenet, and Darkhan.
(ii) **Domestic non-mining freight.** The key non-mining logistics movement in Mongolia involves movement of agricultural products within the country's

various *aimags* and from *aimags* to the country's main consumption center—its capital city—Ulaanbaatar.[3]

(iii) **Export–import mining freight.** Iron ore, copper concentrate, coal, other minerals, and ores are the major commodities exported from Mongolia. Petroleum (diesel and gasoline) is the major import commodity in this category.

(iv) **Export–import non-mining freight.** In terms of non-mining exports, cashmere and cashmere products dominate Mongolia's export profile. The composition of non-mining imports to Mongolia comprises automobiles, machinery, spare parts, and food products. Most of these products are carried in containers and transported to Ulaanbaatar by rail.

(v) **Transit freight.** Transit cargo through Mongolia from the Russian Federation to the PRC mainly comprises chemicals, wood, and wood products. On the other hand, transit cargo from the PRC to the Russian Federation constitutes equipment, coal, chemicals, and construction cargo. Transit freight has traditionally been moved by rail using the Trans-Mongolian Railway line. Only recently, road-based transit has been initiated between the three countries as part of trilateral economic cooperation between Mongolia, the Russian Federation, and the PRC. The difference in the railway gauges of Mongolia and the PRC is a key impediment for the rail-based movement of transit freight through Mongolia. Mongolia, and the Russian Federation use the broad-gauge railway lines (1,520 millimeters [mm]), whereas the PRC uses standard gauge railway lines (1,435 mm). This variation requires the transfer of freight from one train (rake) to the other at the BCP between Mongolia and the PRC.[4]

This study focuses on the issues and possible solutions for Mongolia's transport and logistics sector within this broad framework and its five subgroups.

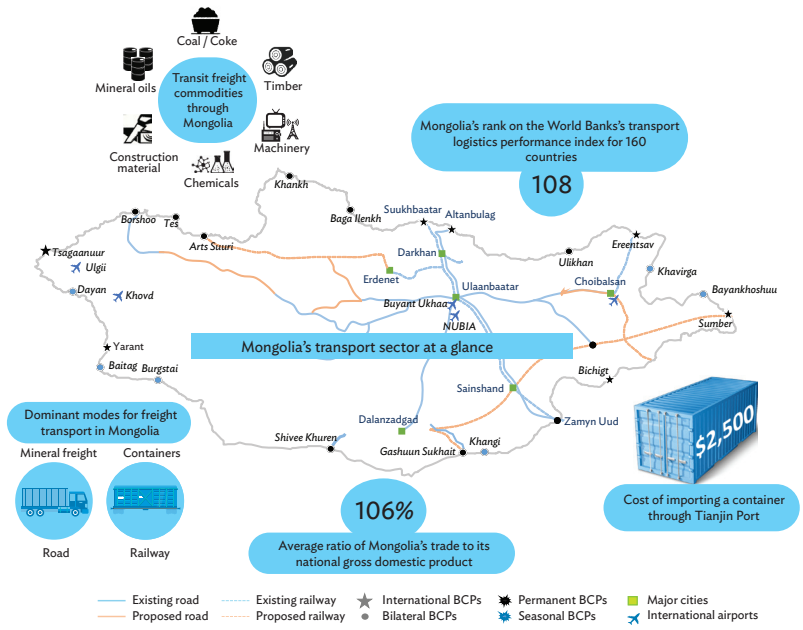
Important Features of Mongolia's Transport and Logistics Sector

Mongolia is a sparsely populated country having a population density of 1.76 persons per square kilometer of its land area. However, Ulaanbaatar, the country's capital, is home to 46% of the total population of the country. As a result, the transport and logistics for domestic or international trade is primarily administered and monitored from Ulaanbaatar. The country's major highways and the Trans-Mongolian Railway line pass through this city. Thus, Ulaanbaatar is the epicenter, either directly or indirectly, for all things that move in Mongolia. Besides Ulaanbaatar, Darkhan, and Erdenet are two other relatively densely populated urban areas of the country. These areas are located along the Trans-Mongolian Railway line as well and imports destined for these places are predominantly transported by railway.

[3] In Mongolia, an ***aimag*** is a geographic administrative subdivision.
[4] Rake is a group of railcars (excluding the locomotive) that move together.

On the other hand, mines in Mongolia are spread all over the country and, in the absence of an extensive railway network, road is the predominant mode for exports of minerals. Figure 9 shows the overview of Mongolia's logistics sector.

Figure 9: Overview of Mongolia's Logistics Sector



BCP = border crossing point.

Source: Asian Development Bank.

Domestic movement of goods uses road as well as rail transport. Most agricultural production, such as food grains, meat, milk, and vegetables by farmers and cattle herders, is located far away from urban areas. Hence, road transport is the only available option in most cases. A commodity, which accounts for a significant volume of the domestic freight basket, is coal destined for power plants in Ulaanbaatar.

Ulaanbaatar's combined heat and power plants (CHPs) rely on the coal mines of Baganuur and Shivee Ovuu to supply their coal. These mines are in the southeast direction of Ulaanbaatar and supply coal to the plants via railway. Ninety percent of the total coal used for power generation in Mongolia is consumed by Ulaanbaatar city's power and heating plants.

Thus, it is evident that Ulaanbaatar has a special significance to logistics in Mongolia. Hence, it becomes essential to understand the issues pertaining to Ulaanbaatar separately. This publication covers the various transport and logistics issues in Mongolia and also those specific to Ulaanbaatar, and possible interventions to address these issues.

The following chapters discuss the issues and recommendations for possible solutions for the five subgroups within the framework of this study.

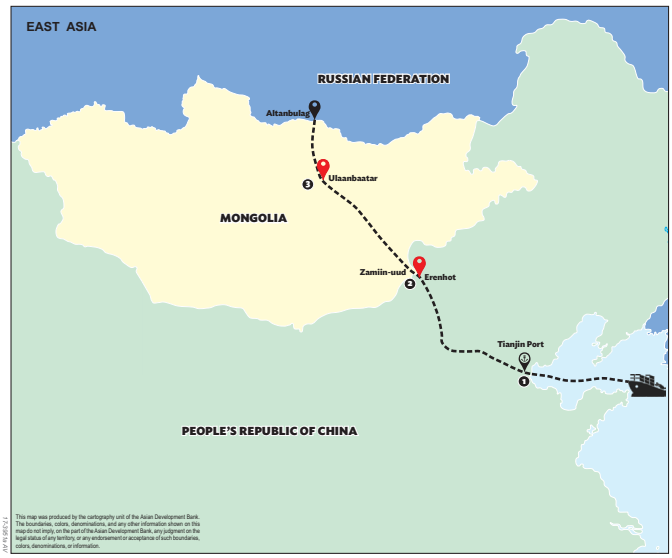
2 Mongolia's International Trade Logistics—Imports

Mongolia's import and export commodity mixes differ significantly. Exports comprise mineral commodities such as iron ore and coal, whereas, containerized freight constitutes less than 10% of Mongolia's exports by volume. On the other hand, nearly 70% of the country's imports are containerized.[5] Automobiles, machinery, spare parts, domestic appliances, telecommunication equipment, and food products are primarily imported in containerized form. Majority of the container imports for Mongolia are through the Tianjin Port in the PRC. The following sections discuss the issues in Mongolia's import of containers via the PRC.

Import of Consumer Goods and Products through Tianjin Port

Most imported containerized freight originates in the PRC and the Russian Federation. Imports from other countries are mainly routed through the port of Tianjin. The following illustration shows the route for containers imported through Tianjin Port.

Figure 10: Import of Containers through Tianjin Port



Source: Asian Development Bank.

[5] Mongolia Customs General Authority.

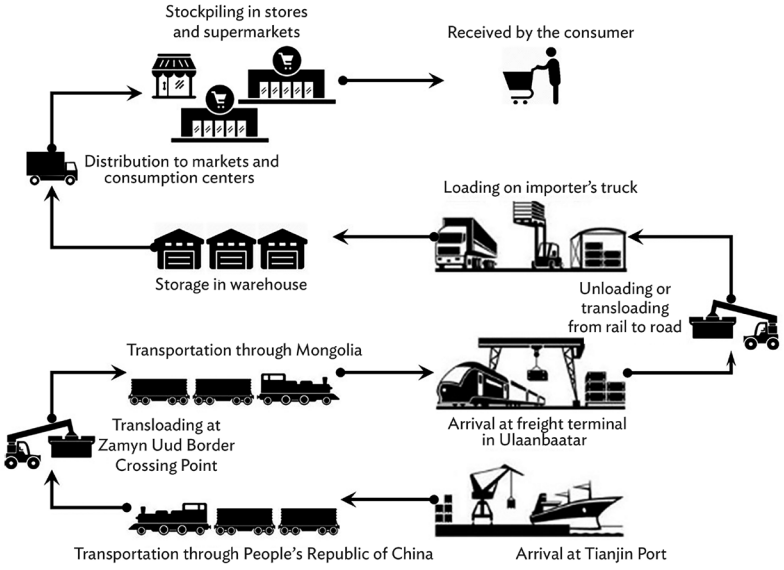
(i) Containers destined for Mongolia from various countries arrive at Tianjin Port. Containers pass through the Customs Authority in Tianjin Port, and are dispatched to Mongolia after clearance. These containers are transported by rail to the BCP between the PRC and Mongolia.

(ii) Containers arrive at the PRC side of the BCP, Erenhot. After crossing the BCP, containers arrive at Zamyn Uud railway terminal. Then, the containers pass through the Mongolian Customs authorities. After completion of customs procedures, the containers are transferred from the PRC's rakes to Mongolia's rakes due to variation in the railway gauge. After the containers are transferred to Mongolia's rakes, they are dispatched to their destination in Ulaanbaatar, Erdenet, and Darkhan or other places along the Trans-Mongolian Railway line. However, most of the containers are destined for Ulaanbaatar.

(iii) The majority of containers arrive in the Ulaanbaatar Tumur Zam (UBTZ) railway terminal where they are sorted and distributed to various freight terminals across the city, using connecting branch lines or trucks. Thereafter, the containers or goods are cleared by the Mongolia Customs General Authority (MCGA) and finally reach the end customers.

While the overall process appears relatively simple, close investigation reveals inefficiencies in the entire supply chain. The costs incurred in the transport, storage, and handling of these goods and products directly contribute to their prices in the Mongolia's markets and, thus, impact consumers in their day-to-day lives. Longer lead time for delivery and uncertainty of delivery schedules adversely impact the market price for consumers. Figure 11 shows a typical chain of events between the import of goods through Tianjin Port and final delivery to consumers.

Figure 11: Supply Chain for Imports of Mongolia
(illustrative)

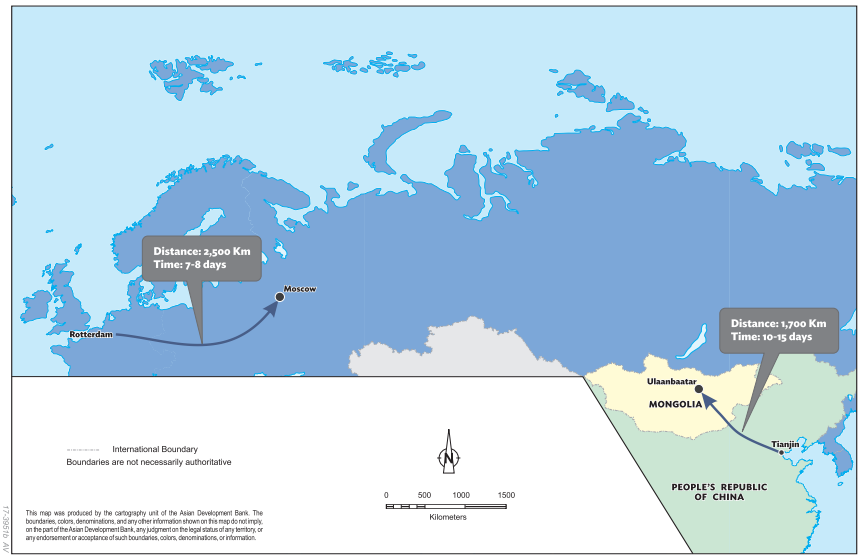


Source: Asian Development Bank.

The imported goods make their way through various agencies and custodians before they finally arrive in the local markets where consumers can buy them. Supermarkets, department stores, and local markets, such as the Naran Tuul in Ulaanbaatar, all rely on these imports.

A significant issue affecting the import of goods in Mongolia is the long lead time for delivery. The longer it takes to deliver goods from source to destination, the higher the costs. The following illustration compares the distance, time, and cost for importing containers for two different origin-destination combinations.

Figure 12: Comparison of Distance, Time, and Cost for Container Movement



km = kilometer.

Source: Asian Development Bank.

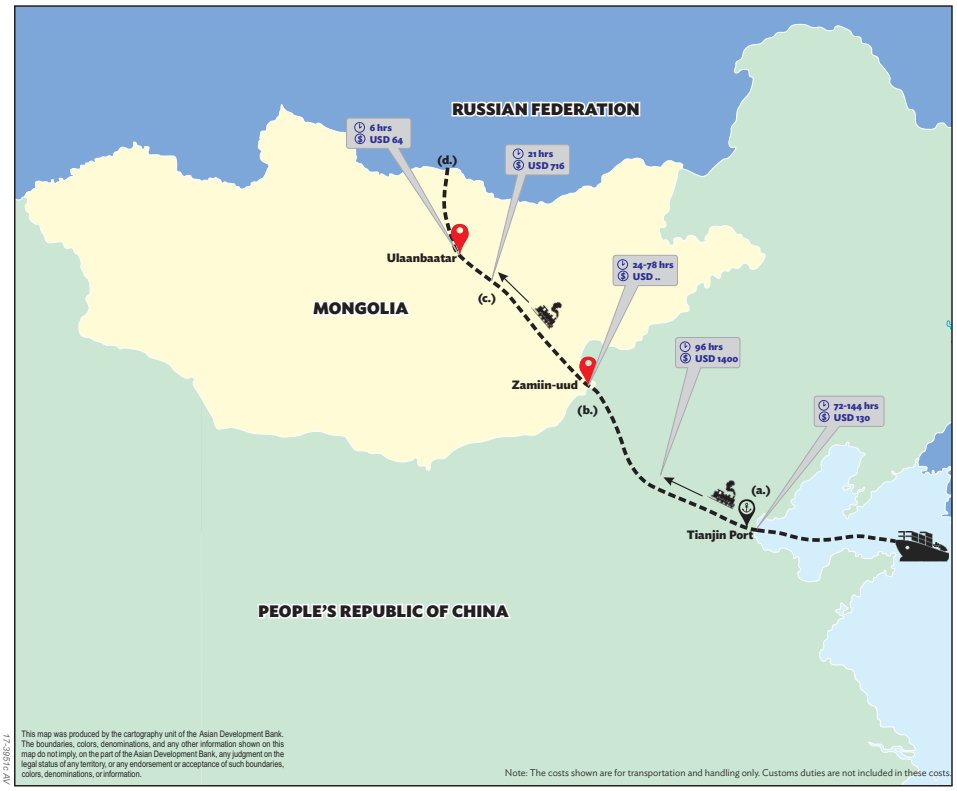
On average, a typical imported container of goods changes hands eight times after arrival at the Tianjin Port, and requires up to 15 days before the goods reach the end consumer.

The transport of a container by railway from Tianjin Port to Ulaanbaatar takes 10–15 days and covers a total distance of 1,700 kilometers (km). Contrary to this, the transportation of a container by railway from Antwerp Port or Rotterdam Port to Moscow takes only 7–8 days over a total transport distance of 2,500 km. The reasons for the relatively higher time and cost of importing containers into Ulaanbaatar via Tianjin Port are examined in the following section.

After arrival at Tianjin, containers usually take between 8 and 10 days to reach Erenhot at the border between the PRC and Mongolia. Congestion at the Tianjin Port, unavailability of dedicated space at Tianjin Port, lack of slot availability on trains in the PRC, and unforeseen detention of containers by PRC's port authorities are some of the major reasons for longer delivery times and uncertainty of delivery schedules. Since the railway gauges are different in both countries, containers change trains at the Zamyn Uud border crossing facility, and then get transported to Ulaanbaatar, which usually takes another 2–3 days. The difference of rail gauges between the two

countries adds to delays in delivery. Uncertainty in the delivery schedules has forced importers to maintain higher inventory stocks to meet demand of consumers. This adds to the total cost and leads to higher prices of goods in the markets. The following analysis examines the time and cost incurred at each step during the import of containers from Tianjin to Ulaanbaatar (Figure 13).

Figure 13: Time and Cost Incurred for Importing Containers via Tianjin Port



Source: Asian Development Bank.

(i) Containerized cargo for import into Mongolia arrives at the Tianjin Port where the PRC's freight forwarder obtains requisite clearances. Besides the customs and other applicable compliances, it may take anywhere between 72 and 144 hours for the container to leave the port. This is because the number of containers destined for Mongolia at any given point may not be sufficient to fill a complete train. Thus, containers have to wait for empty slots on other trains. Alternatively, the containers may be held at Tianjin Port until a sufficient volume is aggregated to constitute a full rake, which can be dispatched to Mongolia's border. The approximate cost incurred for port services is $130.

(ii) The container from Tianjin Port arrives at the Erenhot–Zamyn Uud BCP after dispatch from Tianjin. The cost of transport of a container from Tianjin to Erenhot by railways is approximately $1,400 (which includes the fare for return of the empty container). This usually takes 96 hours after departure from Tianjin Port to reach Erenhot. The container passes through the border

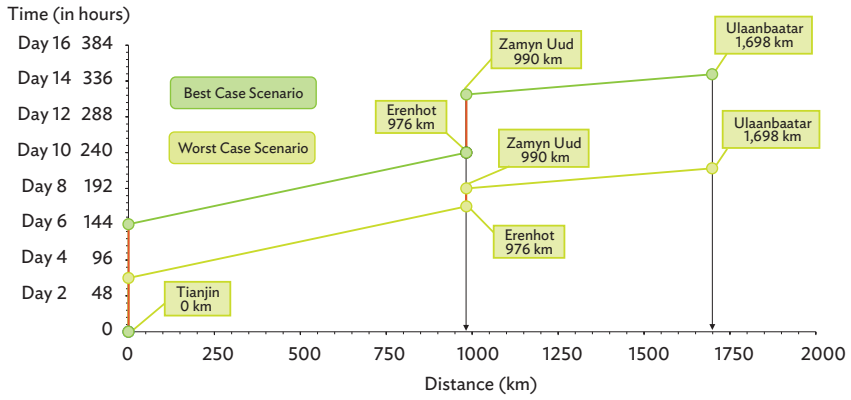
checks at Erenhot. Customs clearance does not take place here for bonded containers. After border checks, the container is transshipped to UBTZ railway wagons at Zamyn Uud or on to trucks and dispatched further. For transshipment to UBTZ railway wagons, additional time is spent due to change-of-gauge at the Zamyn Uud BCP. Crossing the border into Mongolia and other activities take another 24–78 hours.

(iii) The container is then transported by railways to Ulaanbaatar, which takes another 21 hours. The cost of transportation is around $716.

(iv) The container then arrives at UBTZ's Ulaanbaatar railway terminal after dispatch from Zamyn Uud. The railway terminal sorts the cargo and container wagons, and distributes them to the destined freight terminals located within the city via rail. The customs clearance for bonded containers takes place at the freight terminals in Ulaanbaatar, after which the container is received by the consignee at these terminals. Empty containers are sent back after removing cargo by the consignee. It usually takes 6 hours for delivery to the required freight terminal and customs clearance of the cargo. The terminals typically charge about $64 for their services.

The above steps are represented below in the form of a time versus distance chart in Figure 14.

Figure 14: Time versus Distance Model for Container Imports



km = kilometer.

Source: Primary interactions with Mongolia's freight forwarders.

A near horizontal line or sloping line shows rapid movement, whereas a near vertical line depicts slow movement. As seen above, the line is vertical at Tianjin indicating standstill or no movement for 3–6 days. Similarly, there is a holdup of the consignment at Erenhot–Zamyn Uud BCP due to border processes and the change of railway gauge.

This analysis shows that the maximum time taken during the transport chain is at the Tianjin Port but usually the cost incurred is not very significant at the port. Transportation of container from Tianjin Port, to the Zamyn Uud BCP by railway costs roughly $1,400. This high cost is due to the inclusion of the cost of return freight

charges of the empty container from Zamyn Uud to Tianjin. Other issues that impact container transportation from Tianjin to Ulaanbaatar are:

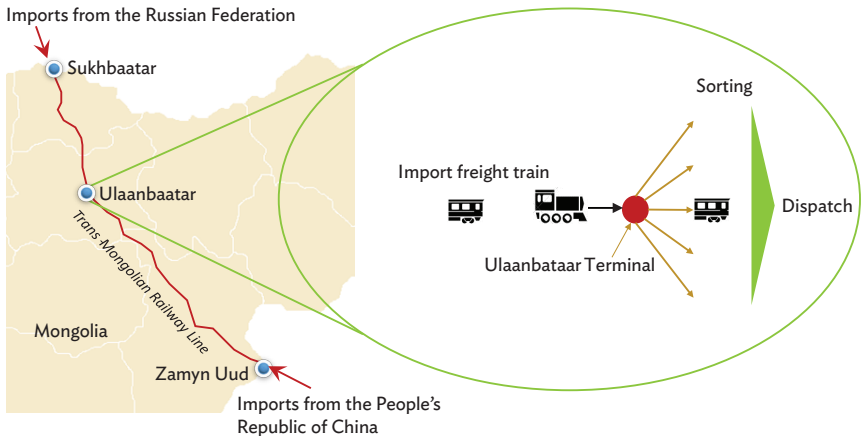
(i) Containers which are destined for Mongolia attract a significantly higher deposit amount' by the shipping lines compared with containers destined only for the PRC.[6]
(ii) PRC customs authorities sometimes randomly detain containers which carry wood, wooden articles, or groceries for physical and x-ray inspection, and levy a detention charge. The detention charges and x-ray tests cost between $80 and $250, depending on the duration of detention period. Such detention may be imposed randomly on containers making it difficult to account for in the overall logistics planning. The detention charge levied by the PRC customs authorities is towards storage, handling, and inspection of containers that may be carrying suspicious cargo. This practice also leads to delays, and there is a possibility of incurring demurrage over and above the detention charges if shipments are not delivered in time.
(iii) Certain inflammable or explosive cargo termed as hazardous cargo is not allowed to be imported through Tianjin Port.

As shown by the above analysis, a large proportion of the time and cost related to transport of containers is caused by issues outside Mongolia. While Mongolia cannot control the factors outside its boundaries, a focused dialogue with the PRC to address the issues related to delays at Tianjin Port and the transit delays to the Erenhot is required.

Last Mile Transportation of Containers

For most of the container imports coming into Mongolia, Ulaanbaatar is the destination. The handling of container imports exhibits a systemic inefficiency once they reach their destination in Ulaanbaatar. Ulaanbaatar has over 10 different freight terminals operated

Figure 15: Sorting Operation at Ulaanbaatar Railway Terminal



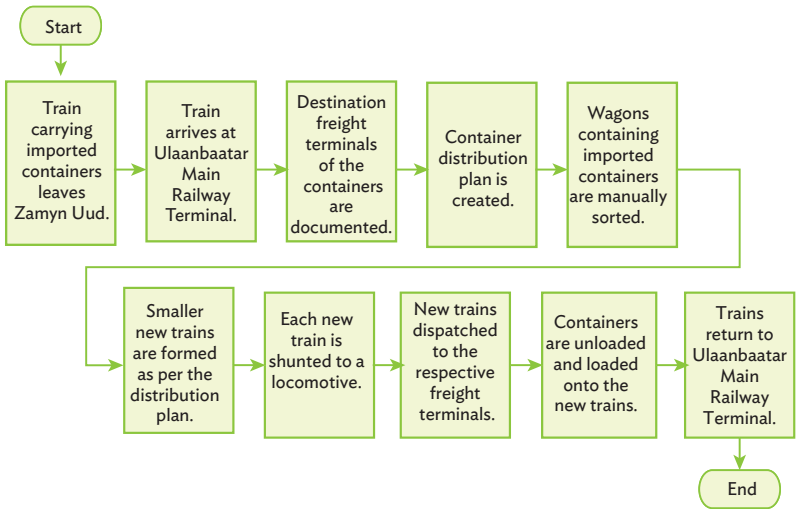
Source: Asian Development Bank.

[6] Deposit amount or security deposit amount is a refundable sum maintained with the container owner (usually shipping lines) by freight forwarders as a collateral against the containers being used by the freight forwarders.

by various companies. As per discussion with stakeholders, it is understood that these freight terminals have been created over time due to the desire of having an exclusive facility aligned to some of the large freight forwarders. The physical manifestation of this setup is that each container received at the main railway terminal in Ulaanbaatar needs to be sorted to be delivered to the respective freight terminal, depending on the importer and/or freight forwarder handling the container. Containers arriving at Ulaanbaatar railway terminal are manually sorted and distributed to the 10 freight terminals in the city.

While some terminals are located close to the Ulaanbaatar Railways terminal, others are scattered along the railway line in the east–west direction all over the city. Post sorting, smaller trains with lesser number of containers in each train are dispatched on the same day for each terminal. This results in increased cost per container since the fuel and manpower costs for each train movement are fixed, irrespective of the number of containers on the train. The process map illustrates this sorting operation at Ulaanbaatar (Figure 16).

Figure 16: Container Sorting and Dispatch Process

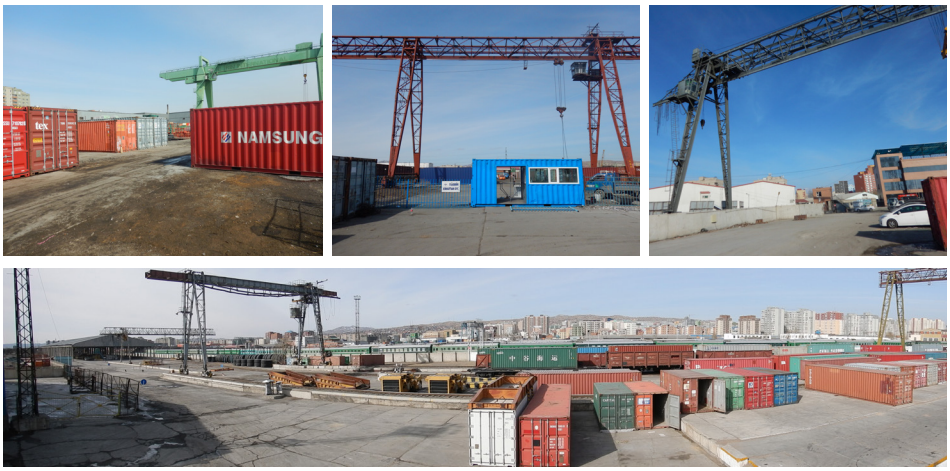


Source: Asian Development Bank.

Redundancy of Terminal Infrastructure

The 10 freight terminals each has its own set of equipment and machinery, which are not fully utilized, resulting in excessive redundancy. The following are common characteristics across these freight terminals:

(i) Each terminal is connected by a separate dedicated branch railway line.
(ii) Two and/or three overhead gantry cranes are owned and operated by each terminal.
(iii) Each terminal has its own warehouse facilities (general purpose and custom-bonded warehouses).

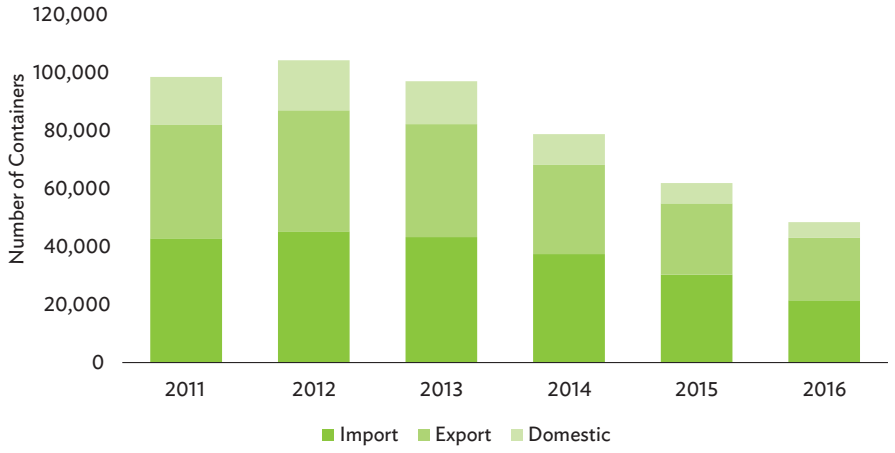


Various freight terminals in Ulaan baatar. Terminals have overhead gantry cranes, warehouses and are connected by a dedicated railway line.

Container traffic volume has been declining over the past few years in Mongolia. Figure 17 shows the container traffic handled by railways in Mongolia since 2011.

The duplication of assets across freight terminals competing for a limited volume of containers has led to suboptimal capacity utilization at these terminals and excessive redundancy in the system. The traffic gets fragmented for each freight terminal, and the fixed costs and/or overheads at each terminal are separately borne by the fragmented traffic. Such operations are neither economically viable nor efficient. This also has implications for urban traffic congestion, which is yet another economic cost.

Figure 17: Container Traffic Handled by Railway



Note: In this case, export containers also include empty containers.

Source: Ulaanbaatar Tumur Zam.

To reduce cost and time, it is necessary to minimize the number of instances where containers (goods) change custodians. This can be achieved by replacing the existing system with an integrated logistics center (ILC) or multimodal logistics hub in Mongolia.

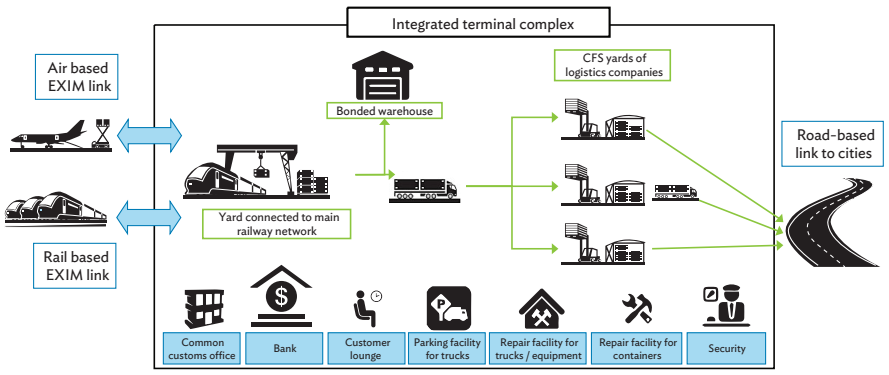
ILCs can greatly simplify the process of transport and handling of goods by combining various facilities in a single physical location, reducing the number of times containers (goods) change hands. They also help to better coordinate supply and distribution activities by providing better accessibility and storage solutions for goods.

Development of an Integrated Logistics Center in Mongolia

An ILC provides connectivity to multiple modes of transport such a rail, road, and air, while also enabling handling, storage, and distribution activities within the same physical facility. It reduces multiple loading and unloading operations and, thus, reduces costs incurred for such activities.

Further, the presence of banks and customs authorities in the facility allows the completion of procedural formalities simultaneously. Such centers can also provide value-added services, such as repair facilities for containers and trucks as well as long-term and temporary storage areas for goods.

Figure 18: Schematic Structure of an Integrated Logistics Center



CFS = container freight station, EXIM = export-import.
Source: Asian Development Bank.

Case Study: Integrated Multimodal Freight Terminal at Dadri

Ulaanbaatar's existing system of multiple freight terminals, operated by individual freight forwarding companies, has led to an inefficient system due to duplication of assets and infrastructure, which are underused. As a result, costs are high and are ultimately passed on to the end customer. This system can be optimized by bringing together various freight terminal operators and freight forwarders in a common facility, which allows sharing of high-value assets among them that ensures

better asset utilization and lower operating costs for each operator, and ultimately benefitting the end customer. The following case study outlines the successful results of implementing a multimodal freight terminal in Dadri, India.

The integrated multimodal freight terminal at Dadri was conceptualized and developed by the Container Corporation of India (CONCOR), which is a public sector enterprise under the Ministry of Railway in India. CONCOR proposed to develop a facility where freight forwarders could operate from a common facility, which had basic heavy infrastructure developed by CONCOR. The following satellite photograph shows the layout of this facility in Dadri.

Facilities at the Dadri Integrated Terminals. The facilities include a common administrative block, a common rail side terminal, container freight stations, common parking facilities, and warehouses.

The facility has a common rail-side terminal to receive and dispatch containerized freight. The facility also has a common administrative block which has banks, restaurants, an infirmary, and other commercial establishments. The freight forwarders have been given place to develop their container freight stations (CFSs) within the facility. Besides these, the facility also provides a common truck parking facility, repair workshop, and warehouses.

The model allows each participant to focus on their core strength and expertise, while minimizing conflicts of interest since each participant has a major stake involved in the growth of the terminal.

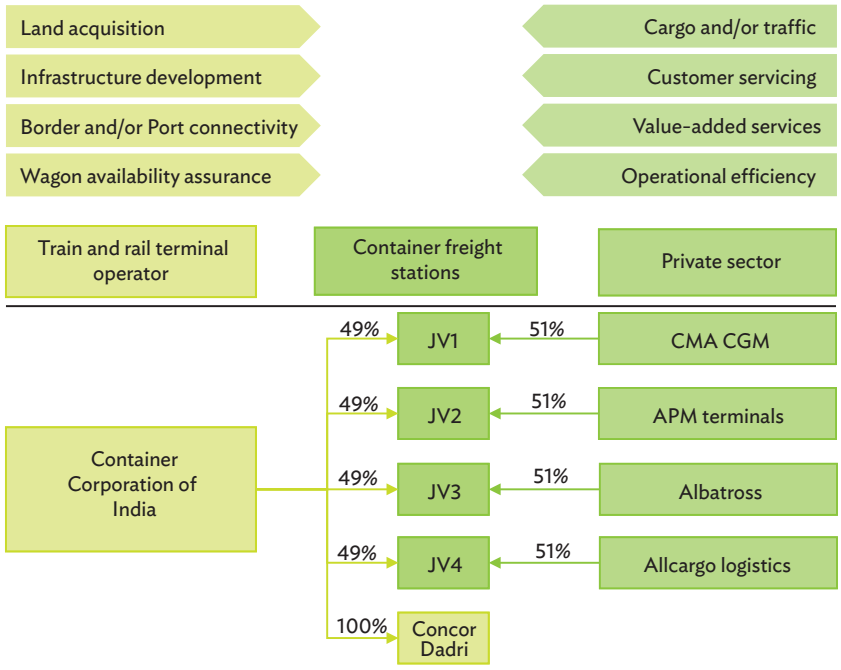
As the public sector representative, CONCOR provided land and developed the railway infrastructure and yards, including common facilities for the terminal, whereas private sector companies were responsible for cargo aggregation, distribution, and customer servicing while ensuring operational efficiency.

Each CFS has its own yard, warehouse, and administrative building developed by private sector companies through their own investment on land leased to them by CONCOR on a long-term basis. The terminal facility layout includes separate areas

for each CFS within the premises. The rail terminal serves all CFS as a common facility. CONCOR operates its own trailers to move containers within the premises between the rail terminal and the individual CFS yard. Each CFS has its own security system and peripheral wall. The parking area for trucks is common to all CFSs operating in the terminal.

The public–private partnership (PPP) model at Dadri is based on the sharing of responsibilities best managed by each of the partners. This enables participants to focus on their core strengths and work for their mutual benefit. The business model at Dadri inland container depot terminal is illustrated in Figure 19. CONCOR holds a 49% ownership stake in each joint venture, while the remaining share of ownership lies with the private company.

Figure 19: Organizational Structure of the Dadri Terminal



JV = joint venture.

Source: KPMG.

The key success factor of Dadri terminal is the joint venture mechanism between private sector logistics companies and CONCOR. The Dadri terminal comprises four joint venture CFS companies and one fully owned CFS of CONCOR. The model has been successful for all stakeholders and has the potential to be replicated in other locations as well. The key objectives achieved by the model are:

(i) consolidating small fragmented container forwarding companies and terminals in one location,
(ii) improving operational and transactional efficiency,

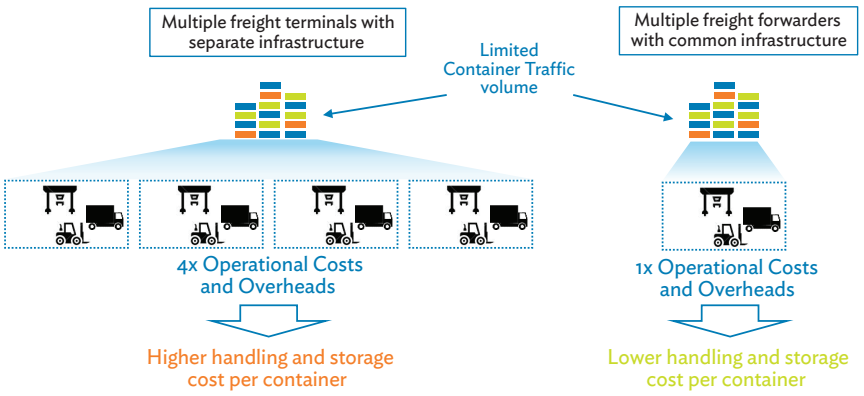
(iii) reducing cost of logistics and congestion on the road,
(iv) providing options to the consumers at a single location,
(v) harnessing economies of scale, and
(vi) providing value-added services for customers.

The terminal at Dadri also promoted the shipment of refrigerated containers in the region and created dedicated facilities within its premises to cater to this traffic. Some of the key benefits for the integrated model at Dadri are:

(i) joint venture partners are able to focus on their core strengths and, in turn, provide the best service levels to the customers;
(ii) costs related to the railway siding and infrastructure are at about one-fourth of what they would have been had each operator developed the siding and infrastructure independently;
(iii) higher asset utilization through aggregation of cargo at one location;
(iv) easier and quicker rake formation, higher rake frequency is possible;
(v) better container volume utilization, minimum less-than-container loads; and
(vi) CONCOR's 49% ownership stake in joint ventures prohibits any chances of unethical business practices.

Figure 20 compares the existing freight terminal setup in Ulaanbaatar and the model of sharing common assets implemented at Dadri.

Figure 20: Comparison of Freight Terminal Systems in Ulaanbaatar and Dadri



Source: Asian Development Bank.

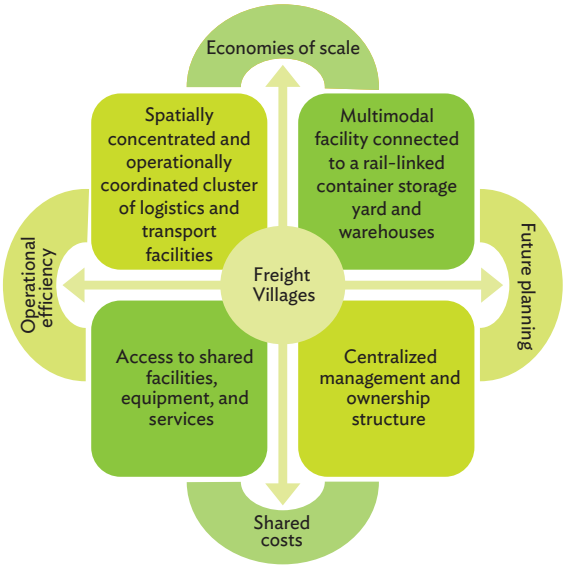
Case Study: Germany's Freight Village: GVZ Bremen

The concept of integrated logistics assumes great importance in today's supply chain scenario and is expected to further evolve as industries increase their focus on lean inventories, just-in-time deliveries, and end-to-end logistics services at lowest costs.

The key to achieving these objectives is to be easily accessible to the production and consumption markets, while also near major gateway ports and/or airports. Minimizing overhead costs and harvesting economies of scale are key enablers to achieving these objectives.

The concept of a freight village is precisely based on these principles and aims at providing end-to-end logistics services in one location. A freight village model is shown in Figure 21.

Figure 21: Conceptual Model of a Freight Village



Source: Deutsche GVZ-Gesellschaft mbH (DGG) . Freight Villages. www.gvz-org.eu.

A freight village involves the geographical (spatial) concentration of various logistics and transport facilities in a location connected to or lying at the intersection of at least two modes of transport, i.e., a multimodal facility. Most freight villages, particularly in Germany, have developed at the intersection and/or overlap point of road and railways. The freight village is a cooperative legal entity, which manages the activities and development of the village. It aims to use the synergy from sharing of capital-intensive facilities and allowing access to the shared infrastructure for even the smallest participant of the logistics ecosystem. The idea behind such a model is that the whole is greater than the sum of its parts.

The differentiating factors of freight villages among these four principles shown in Figure 21 are the concepts of shared access, which provides a conducive environment for small and medium-sized firms, and management and monitoring by a separate entity, which makes these freight villages economically more attractive and sustainable. Above all, the freight village is a model which has built-in risk sharing between all its participants which works to the advantage of all.

The greatest advantage of an overseeing body for management of the freight village is the coordinated development and planning it allows, while maintaining freedom for small and medium-sized enterprises to carry out their own planning and management within the village.

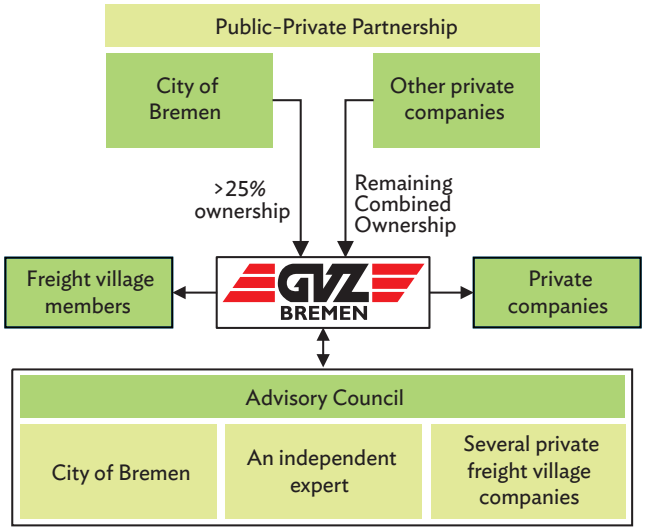
Because of its location, since a freight village is at the intersection of at least two modes, it allows the option to choose the optimal mode that suits the cargo to be transported. Ideally, based on the availability of land and project feasibility, a freight village is planned close to large metropolitan areas and major gateway ports, while also leveraging access to multiple (at least two) modes of transport. An integrated freight village will also facilitate intermodal transfer of goods within its premises through an intermodal and/or multimodal facility.

The concept has done exceptionally well in the European Union, especially in Germany. The following is a brief overview of the top-ranked freight village in Bremen, Germany.

1. GVZ Bremen

The first freight village in Germany was set up in 1985 in Bremen, with a total investment of more than $200 million over 10 years.[7] The initial investment and development of the village infrastructure was done by the City of Bremen, which also included acquisition of additional land for the development. The freight village at Bremen is spread over 895 acres, and is conceived and developed as a PPP wherein the City of Bremen holds the majority stake and the rest of the ownership stake is divided among many private companies. The ownership structure of GVZ Bremen is illustrated in Figure 22.

Figure 22: Ownership Structure of GVZ Bremen



Source: Deutsche GVZ-Gesellschaft mbH (DGG) . Freight Villages. www.gvz-org.eu.

[7] An Exploration of the Freight Village Concept and its Applicability to Ontario. October 2011.

The freight village at Bremen is the oldest, largest, and ranks highest among all such facilities in Germany; and second highest in Europe. It was initially conceptualized to reduce the heavy truck traffic and increase multimodal transport. The Bremen freight village is connected to three modes of transport directly: roads, railways, and inland waterways. It is also within 10 km of the nearest airport and, thus, provides connectivity to all four modes of transport. It also has an inland waterway siding within its premises. The village also has a dedicated zone for truck servicing where facilities such as repair, inspection, refueling station, and sales of spares and parts for trucks are provided. The multimodal railway terminal is connected to a container storage yard and warehouses, and acts as the nodal point for cargo movement across the freight village. There is also a provision for future expansion, and a separate piece of land is earmarked for this purpose. The facility also has banks and restaurants inside and other support infrastructure.

The freight village primarily handles containerized cargo, which includes automobiles, spare parts, food and beverages, as well as chemicals. The overall focus lies on industries that generate break-bulk goods, which are easily containerized.

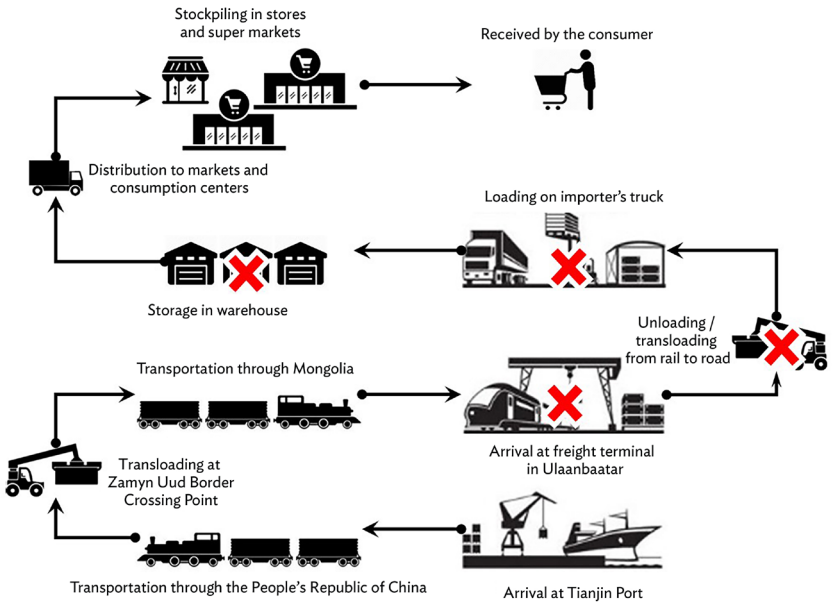
The management also encourages the private companies in the village to volunteer for projects, which try to increase operational and economic efficiency of the transport of goods. Some of the projects undertaken in this direction are use of environment-friendly methane-powered trucks for first mile and last mile transport, coordination, and co-delivery of goods by multiple players to use truck capacity efficiently. Since the model is based on PPP, the public sector still supports the freight village(s) through its policies and directives for industry apart from the initial investment done. The private sector is primarily responsible for additional investments and for ensuring customer satisfaction.

Potential Impact of an Integrated Logistics Center on Mongolia's Imports

The introduction of an ILC can effectively simplify the overall transport chain. Containers are loaded and unloaded fewer times and the overall operations also become efficient. It also allows the better utilization of assets for various transport and logistics services by reducing idle time. Further, consolidation and aggregation of traffic in one place improves container volume utilization and reduces less-than-container load movements. Figure 23 highlights the changes that can be expected in the supply chain for containers through the implementation of an ILC.

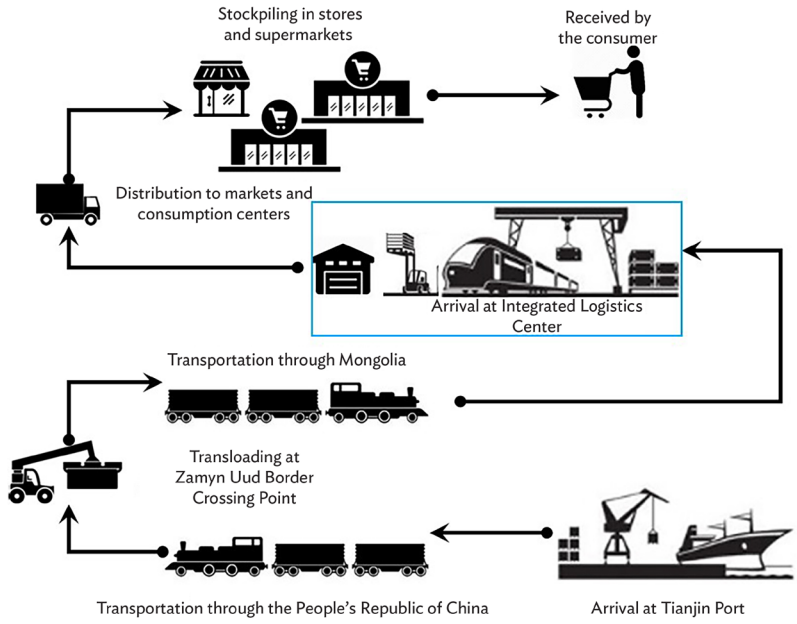
By reducing the number of instances of handling the containers, ILCs cannot only reduce the costs, but also the time it takes for containers and goods to reach their end destination.

Figure 23: Impact of Integrated Logistics Center



Source: Asian Development Bank.

Figure 24: Simplified Container Supply Chain



Source: Asian Development Bank.

The following are features of an ILC facility:

(i) The integrated terminal shall allow various actors like freight forwarders, terminal operators, and third-party logistics service providers to work independently as well as in tandem with each other.
(ii) This will also enable sharing of common large infrastructure, such as railway lines, gantry cranes, container trucks, and repair and maintenance facilities for containers and other equipment.
(iii) All freight operations can be monitored and managed by customs department centrally, thereby reducing infrastructure and manpower costs.
(iv) Besides providing shared crucial infrastructure, a well-designed terminal will consolidate flow of freight in one location and reduce congestion in urban areas.
(v) This will also act as a centralized repository of empty containers, which can be used for exports.
(vi) The integrated terminal will also improve the operational efficiency and reduce the overall turnaround time for freight. The time consumed in the current situation due to the sorting and distribution of the rakes at the UBTZ yard in Ulaanbaatar Railway Terminal 1 can be eliminated through such an integrated terminal.
(vii) Such an integrated facility will also help avoid the cost incurred for sorting operations and cost of distribution of freight by railway to multiple terminals.

(viii) Other facilities in the terminal would provide additional benefits, such as easy access to banks, organized parking facility for external trucks, repair facilities for trucks and containers, and round-the-clock security.

Infrastructure Facilities at Zamyn Uud Border Crossing Point for Rail-Based Imports

Freight movement across Zamyn Uud and Erenhot requires transshipment of cargo due to break-of-gauge because of the Mongolian broad gauge (1,520 mm) railway tracks and the standard gauge (1,435 mm) tracks in the PRC. Both broad gauge and standard gauge track lines are available at Zamyn Uud and Erenhot border ports to handle trains from respective countries for the transshipment of freight.

Following the rules laid down by the Organization for Co-operation between Railways, the break-of-gauge and corresponding transshipment are to be handled by the importing country. Thus, Mongolia undertakes transshipment of its import cargo and transit cargo passing through Mongolia to the Russian Federation at Zamyn Uud, while the PRC conducts transshipment for its imports and transit cargo at the Erenhot border port.

The efficiency of such a transshipment process depends directly on the number and quality of transshipment facilities, as well as the reliability of such facilities. Use of modern equipment can significantly improve the overall efficiency of such transshipment operations. Another factor that impacts transshipment efficiency

is the availability of empty rolling stock at all time to facilitate transportation of transshipped goods into the importing country's hinterland.

As per data from the Central Asia Regional Economic Cooperation (CAREC) Corridor Performance Measurement and Monitoring Annual Report 2015, transloading (i.e., unloading from one wagon and reloading on another wagon) at gauge change on the PRC side is the singular factor contributing to increased transshipment timing at Erenhot border port. The second major factor is the lack of timely availability of reloading facilities at Erenhot border port. For imports into Mongolia, transshipment is performed by the Mongolian authorities. As per the CAREC report, nonavailability of wagons, time taken for train marshalling, and train classification together make up the major reason for increased transshipment timings. Just as in the case of the Erenhot border port, the reloading facilities at Zamyn Uud are also not regularly available, thus increasing the transshipment delays even further.

Zamyn Uud Border Port

Zamyn Uud comprises four transshipment terminals for transport by rail. These transshipment terminals—Transshipment Facility 1 (TSF-1), Transshipment Facility 2 (TSF-2), Transshipment Facility 3 (TSF-3), and the E-Trans Facility—are designed to handle different types of cargo and possess varied facilities. Figure 25 illustrates the locations and equipment for transshipment at these facilities.

The absence of modern equipment results in manual handling of import shipments for further hinterland movement by rail or road into Mongolia. This results in operational delays in evacuation of shipments from Zamyn Uud. Mechanized handling of import cargo can significantly reduce transshipment time and cost at Zamyn Uud.

Chapter 3 discusses in detail the issues with respect to Mongolia's exports, and provides key interventions which can address these issues.

Figure 25: Transshipment Terminals at Zamyn Uud Border Crossing Point

Transshipment Terminal	Cargo Handled	Facilities at the terminal				
		Dual Gauge Lines	Overhead Cranes	Reach Stackers	Bonded Warehouses	Connectivity to Roads
1. TSF 1	Bagged cargo in open wagons, imported cars	✓	✓	×	×	✓
2. TSF 2	Palletized, Containerized Cargo (except cars)	✓	×	✓	×	✓
3. TSF 3	Construction Material Groceries in box wagons	×	×	×	×	✓
4. E-Trans	Cement and other non-container cargo in box wagons	×	×	×	✓	✓

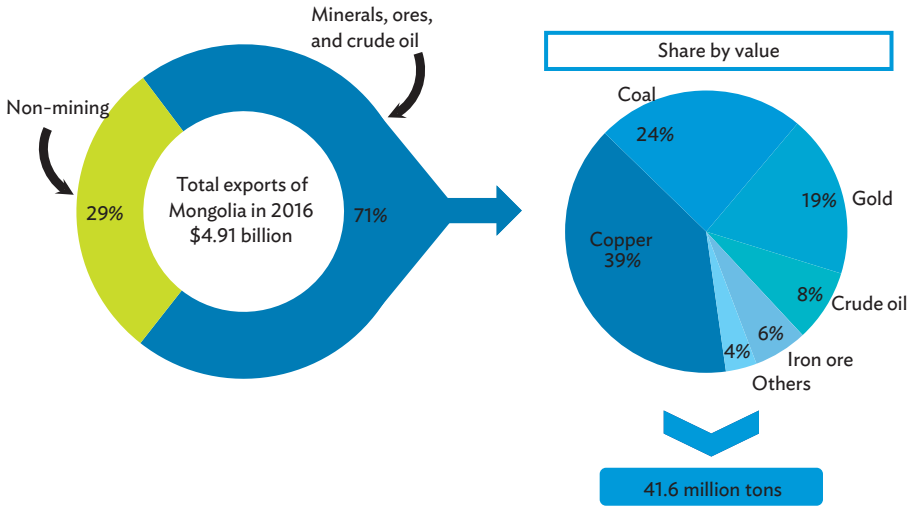
TSF = transshipment facility.

Source: Map of transshipment facilities provided by UlaanbaatarTumur Zam. Equipment and facilities at each terminal sourced through primary interactions and site visits.

3 Mongolia's International Trade Logistics—Exports

The mining industry has been a key driver of Mongolia's economy. Mongolia has vast reserves of coal, iron ore, and copper, which have applications in the steel and copper manufacturing industries. Thus, mineral products form a large part of Mongolia's exports by volume and by value. Figure 26 elaborates on the composition of Mongolia's exports in 2016.

Figure 26: Mongolia's Export Profile, 2016

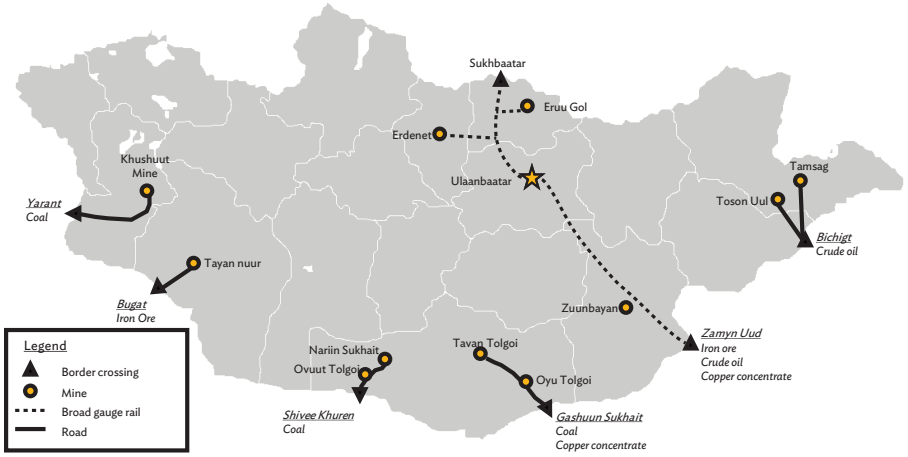


Source: Mongolian National Statistical Office.

Exports of Mineral Commodities from Mongolia's Mines

Mongolia exports large quantities of mineral commodities such as coal, iron ore, copper concentrate, and crude oil to the PRC and other countries from its mines. The mines are in various locations of the country and transportation of the exported mineral commodities takes place through the nearest BCP. Figure 27 shows the connectivity of major mines to the BCP.

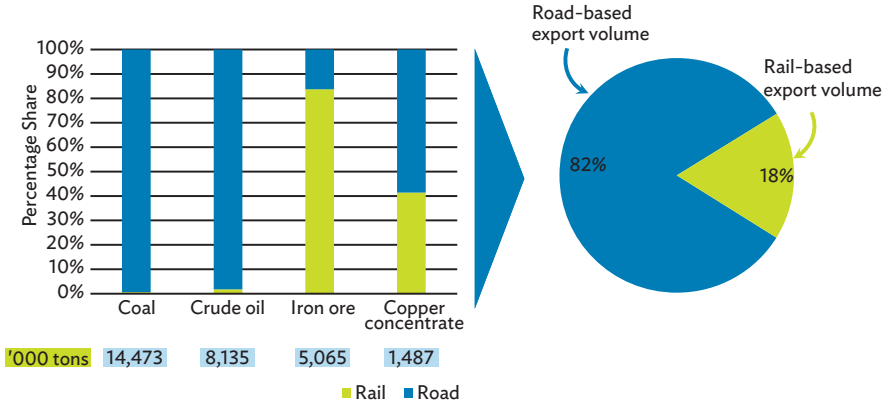
Figure 27: Connectivity of Major Mines to the Border Crossing Points of Mongolia



Source: Asian Development Bank.

While almost all mines are connected to the nearest BCPs by roads, only the copper mines near Erdenet and Eruu Gol iron ore mines in Selenge have rail connectivity to the BCP (Zamyn Uud). Thus, most of the mineral commodity exporters from Mongolia depend on trucks to move the freight out of the country. The distance between the mines and the nearest BCP ranges from 150 km to 300 km for road connected mines. Crude oil and coal almost completely rely on roads, whereas iron ore and copper concentrate exports use rail to some extent. Figure 28 illustrates the share of roads in mineral exports.

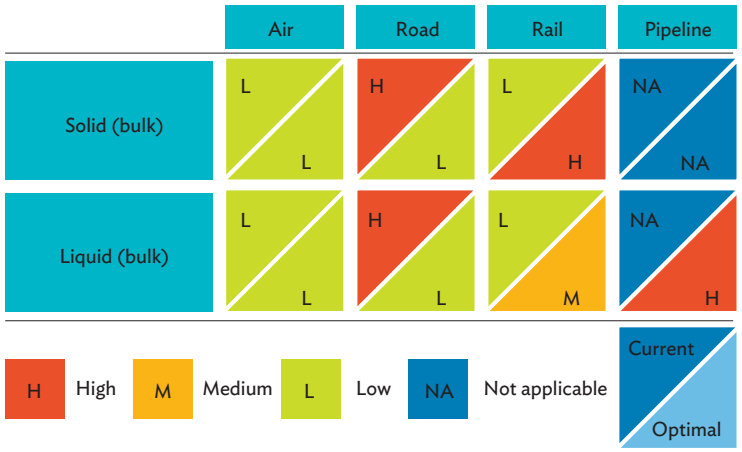
Figure 28: Share of Roads and Railways in Mineral Exports, 2015



Source: Asian Development Bank.

Globally, the transportation of large volumes of bulk commodities such as coal, iron ore, cement, and crude oil is undertaken by railway since it is an economical mode of transportation of larger quantities over longer distances. Figure 29 indicates the current transport mode of bulk commodities in Mongolia, and indicates what the optimal transport mode would be.

Figure 29: Current and Optimal Use of Transport Modes for Bulk Commodities

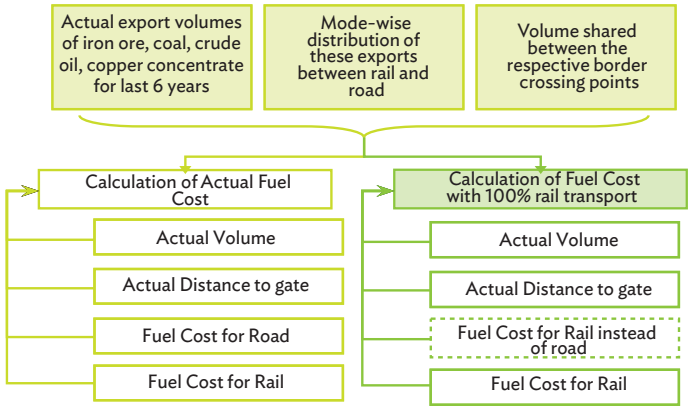


Source: Asian Development Bank.

Case Study: Comparison of Road-Based and Rail-Based Transport

This case study compares cost savings that would be possible through fuel if all the exports from Mongolia were done by rail instead of road. The analysis uses actual volumes of mineral exports through each of the major BCPs over the last 6 years, actual proportion of movement by road and rail, and finally the replacement of the actual road transport component by rail to bring out possible savings in fuel costs. The analysis approach is explained in Figure 30.

Figure 30: Approach for the Analysis

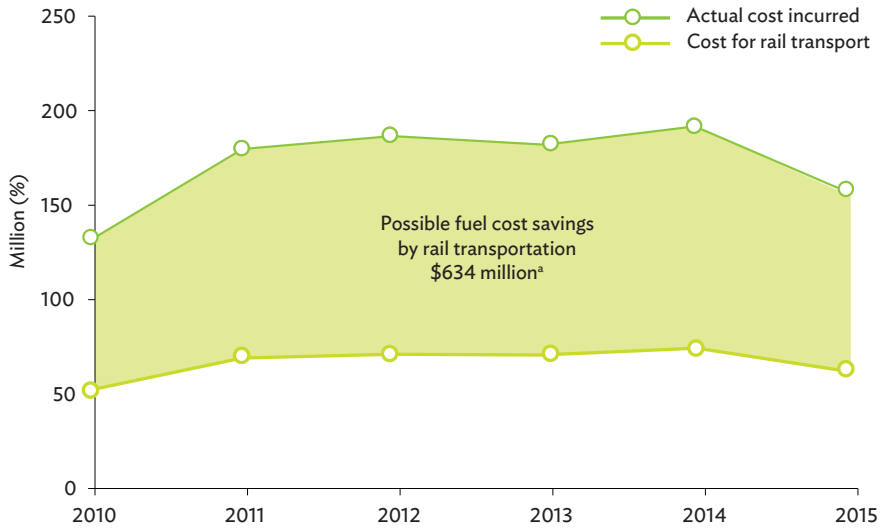


Source: Asian Development Bank.

The analysis is based on the replacement of the existing road connectivity by rail connectivity and calculating the possible savings in fuel consumption and fuel costs for the same volume of exports over last 6 years. The actual fuel cost calculation uses existing volumes of exports, details about road and rail connectivity, and distances as they have been over the last 6 years. The calculation of fuel cost using 100% rail transport assumes that these mines were hypothetically already connected by railways. Using this logic, a basic comparison of the actual fuel costs and the possible fuel costs was carried out as shown in Figure 31.

The analysis shows that a possible fuel cost saving of $634 million could have been achieved if rail connectivity was available for mineral exports.

Figure 31: Possible Fuel Cost Savings by Using Rail Transport



[a] Equivalent to MNT1.548 billion (as of 31 Jul 2017).

Source: Asian Development Bank.

Environmental Impact of Road-Based Mineral Transport

While all BCPs in Mongolia are connected by roads, many of them are not paved so trucks use unpaved roads to transport mineral exports. This results in slower transport rate, increased fuel consumption by trucks, damage or deterioration of trucks and roads, adverse impact on the health of the drivers due to poor road quality, and pollution due to dust on the roads. In addition, transport over unpaved roads also causes environmental pollution from the emissions of trucks as well as dispersion of mineral ores during movement over the roads.

Impact of Conditions on Transport. Loading trucks at a coal mine near Gashuun Sukhait (left); trucks carrying coal over unpaved roads (right).

Tsagaan Khad Customs Control Zone

Mineral exports from Tavan Tolgoi, Oyu Tolgoi, and some other nearby mines use the Gashuun Sukhait border crossing points for transporting exports to the People's Republic of China (PRC). Tsagaan Khad is a customs control zone situated 23 kilometers before the Gashuun Sukhait border crossing point on Mongolia's side. Mines other than Erdenes Tavan Tolgoi and Oyu Tolgoi are required to bring their export coal consignments to this Customs Control Zone for customs clearance. During this process, the coal in trucks from Mongolia are transloaded to trucks from the PRC. This adds to the total logistics cost for the coal exports.

Compared with road, rail-based transport is not only cheaper, but it is also beneficial to the environment since it produces lesser carbon dioxide equivalent emissions per unit of goods and commodities transported (Figure 32).

Figure 32: Comparison of Fuel Cost and Environmental Impact between Roads and Railways

Parameter	Railways	Roads
Primary fuel	Diesel	Diesel
Cost of fuel per liter ($)	0.91	0.91
Consumption per ton-km (liters)	0.0097	0.0270
Economic cost per ton-km ($)	0.0088	0.0246
CO_2 equiv. emissions per ton-km (gm of CO_2)		

CO_2 = carbon dioxide, gm = gram, km = kilometer.

Source: Asian Development Bank.

To reduce the emissions and cost for transport of minerals, it is essential to provide impetus to convert road-based movement to railway to the extent possible. Based on the economic cost analysis of fuel consumption and carbon dioxide equivalent emissions, railways are better suited for transport of large quantities of bulk mineral freight over long distances.

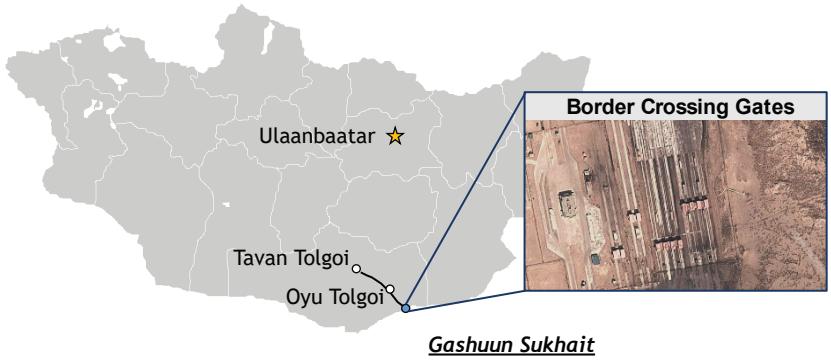
However, the planning and construction of railway connectivity projects in Mongolia has its own set of challenges. The case of Gashuun Sukhait Railway Connectivity illustrates these challenges.

The direct fuel cost of road transportation for freight is 2.8 times more than rail transport. Likewise, carbon dioxide emission from road transport is 2.4 times that of rail transport per unit distance and volume of freight transport.

Gashuun Sukhait Railway Connectivity for Mineral Exports

The Gashuun Sukhait BCP handles the majority of Mongolia's coal and copper concentrate exports, and is connected to the Tavan Tolgoi and Oyu Tolgoi regions by road. The entire export movement of coal and copper concentrate through this BCP is by road.

Figure 33: Gashuun Sukhait Border Crossing Point



Sources: Asian Development Bank; Google Maps.

The Government of Mongolia as well as the mining companies operating in the Tavan Tolgoi and Oyu Tolgoi region attempted to put a railway line in place to connect the mines to Gashuun Sukhait BCP, improve transport efficiency, and reduce costs. However, the construction of the railway line is not yet completed.

The Tavan Tolgoi–Gashuun Sukhait railway line is a 217 km railway line linking the mines in Tavan Tolgoi and Oyu Tolgoi regions with the Gashuun Sukhait BCP. The chronology of events for the railway line project is as follows:

(i) The need for a railway link between the mines and the BCP at Gashuun Sukhait was identified and initiated by Energy Resources LLC, a mining company in Mongolia, in 2008.

(ii) Energy Resources LLC hired Layton Consulting for the project, which in turn hired DBI Consulting (DBI) for the feasibility study and SMEC Holdings Limited (formerly known as Snowy Mountains Engineering Corporation) for the engineering design of the project.
(iii) Geological and other studies were also conducted for the project by Energy Resources LLC through various other agencies.
(iv) The initial feasibility and design of the railway line was based on standard gauge (1,435 mm).
(v) All studies and work for the project were conducted after required approvals from the Government of Mongolia.
(vi) However, the government decided to suspend the project in 2010 due to political and security-related concerns.
(vii) In the wake of this development, Energy Resources LLC built a road connecting the mines to the Gashuun Sukhait BCP for export of coal.
(viii) In June 2012, the government decided to revive the railway line project, but changed the gauge to the Russian broad gauge (1,520 mm).
(ix) Energy Resources LLC then hired AECOM to update the feasibility study done by DBI based on the Russian gauge. SMEC provided the revised designs for the project and Energy Resources LLC issued tenders to hire contractors to undertake the civil, track laying, electrical, and signaling works.
(x) Later in November 2012, the government decided to transfer the ownership and control for the railway project to a state-owned company, and Mongolyn Tumur Zam thus took over the project from Energy Resources LLC.
(xi) Mongolyn Tumur Zam appointed the Republic of Korea's Samsung C&T to construct the railway line. The project was to be financed by the Mongolian Development Bank.
(xii) However, the project is still not complete due to various developments and unforeseen challenges.

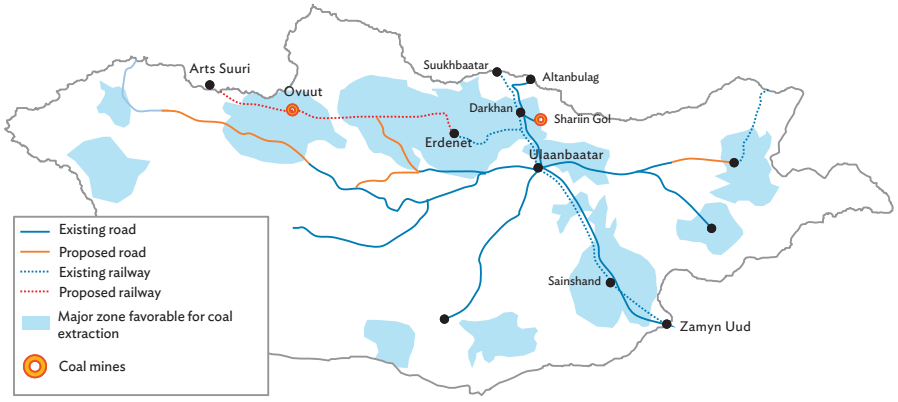
Large-scale infrastructure projects such as construction of railway lines have issues related to financing, political will, and technical and organizational capacity. The need to promote the use of rail should be clearly established. By promoting the use of railways over roads, the exports of Mongolia would effectively become more competitive in the global markets since they will be available at lower price owing to the reduction of transport costs. Further, the adverse impact on the environment will also reduce by use of rail over road, which will directly impact the people of Mongolia by reducing health problems and costs incurred for treatments of ailments caused by environmental pollution.

The key question is what would be a successful mechanism of planning and executing railway line projects in Mongolia. There are various methods followed globally, ranging from construction of railway lines by the government as in India and the PRC, and by the private sector as in the United States. A right model for Mongolia needs to be developed, considering government finances and institutional capacity within the country. The case study of the proposed development of the Northern Railway Corridor is showcased below, which indicates an example of a possible method to approach railway line projects in Mongolia. This is one alternative for delivery and/or operations of major projects in tight fiscal times, while recognizing that planning and other public sector responsibilities still need other improvements.

Case Study: Northern Rail Corridor

The Northern Rail Corridor project led by Aspire Mining Limited is an example of a collaborative effort between the Government of Mongolia and the mine operator, which is being implemented in Mongolia to develop railway infrastructure linking the Ovuut coking coal mine to the Zamyn Uud BCP connecting through the Trans-Mongolian Railway line at Erdenet (Figure 34). The northern link is also expected to provide access to the Arts Suuri BCP in the north for the Ovuut coking coal mine.

Figure 34: Proposed Northern Rail Corridor through Ovuut Mine

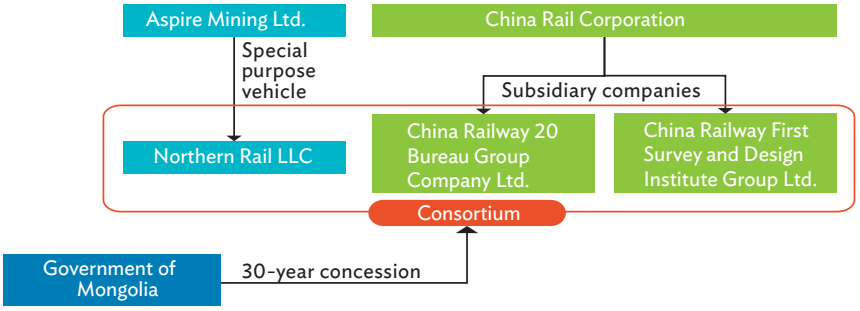


Source: Asian Development Bank.

Aspire Mining is undertaking the construction of the railway link between Ovuut and Erdenet through its subsidiary Northern Railways LLC. The rail project is expected to further link to the Russian Federation in the north through a separate northern rail link which will be constructed in the future, thereby providing railway access to the northern border of Mongolia. The railway link project between Ovuut and Erdenet is currently in its feasibility stage, and is expected to be completed in 5 years after the start of construction in 2017.

The Northern Railway Corridor project is being undertaken through a PPP structure as shown in Figure 35.

Figure 35: Public–Private Parnership Structure for Northern Rail Corridor



Source: Asian Development Bank.

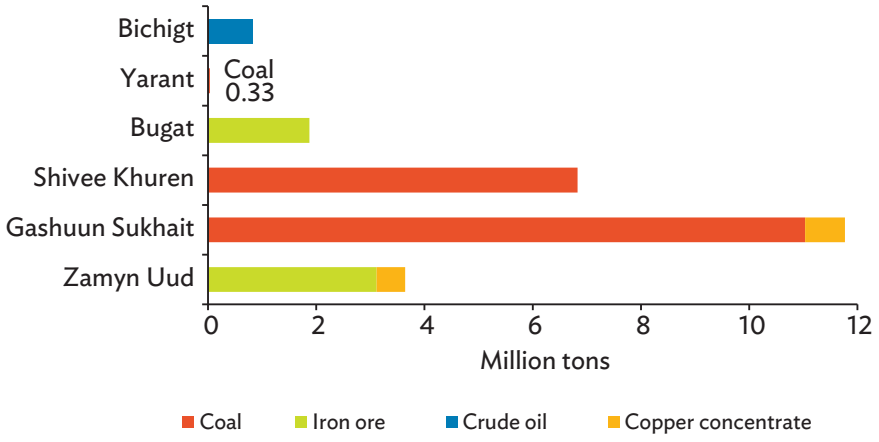
While Northern Rail LLC is the consortium leader, its role is to ensure that the required feasibility studies and other clearances are in place for the development of the railway line as well as ensuring the availability of finance for the project. The China Railway 20 Bureau Group Company Ltd. is responsible for the engineering, procurement, and construction of the project, whereas the China Railway First Survey and Design Institute Group Ltd. is responsible for the engineering and design of the railway line.

Through a Concession Agreement signed in August 2015, the Government of Mongolia extended a 30-year concession to this consortium for the construction and operation of the railway line.

Infrastructure Facilities Available at Border Crossing Points

The six BCPs which are important from the perspective of mineral exports are Bichigt, Yarant, Bugat, Shivee Khuren, Gashuun Sukhait, and Zamyn Uud. The highest volume of mineral exports occurs through Gashuun Sukhait followed by Shivee Khuren and Zamyn Uud. Figure 36 illustrates the volumes of minerals exported through these BCPs in 2014.

Figure 36: Volume of Mineral Exports through Major Border Crossing Points



Source: Mongolia Extractive Industries Transparency Initiative. 2014.

Out of 22 major land-based border crossing points (BCPs), only three (Zamyn Uud, Ereentsav and Suukhbaatar) BCPs have railway connectivity. Other BCPs in Mongolia are connected by paved or unpaved roads.

Bichigt BCP is primarily used for exports of crude oil from Tamsag and Toson Uul oil fields. Bugat BCP is used by Tayan Nuur mine for exports of iron ore. Shivee Khuren BCP primarily exports coal from Nanin Sukhait, and Gashuun Sukhait BCP primarily exports coal from Tavan Tolgoi mines, although, Gashuun Sukhait is also a major BCP of copper concentrate from Oyu Tolgoi mine. Zamyn Uud handles iron

ore and copper concentrate exports as mentioned earlier. Though BCPs mentioned here primarily handle bulk mineral exports, infrastructure and facilities at these BCPs differ significantly. As a result, handling the export movement through these gates efficiently is difficult for the border agencies. In some cases, even basic amenities such as road and/or railway connectivity and internet and communication connectivity are not available, which adversely impacts the competitiveness of Mongolia's exports. Figure 37 compares the availability of infrastructure at the major BCPs in Mongolia.

Figure 37: Comparison of Facilities and Infrastructure at Major Border Crossing Points

Facilities	Zamyn Uud	Gashuun Sukhait	Bichigt	Altanbulag
Paved road connectivity	✓	✓	✗	✓
Internet connectivity	✓	✓	✗	✓
X- ray for freight trucks	✓	✗	✗	✓
Weighbridge	✓	✓	✓	✓
Video surveillance	✓	✗	✗	✓
Radiation detectors	✗	✗	✗	✓

Source: Asian Development Bank.

On comparing the availability of infrastructure at the four main road-based BCPs, it is observed that although the Zamyn Uud and Altanbulag have most basic facilities (except for radiation detectors and weighbridge for export trucks at Zamyn Uud), the other two BCPs at Gashuun Sukhait and Bichigt lack even these basic facilities. In the case of Bichigt, the BCP is connected by an unpaved road. Other facilities such as internet connectivity, X-ray, and radiation detectors are also not available. At Bichigt, out of two weighbridges, the weighbridge on the import lane is functional, whereas the one on export lane is not in operation as per information provided by Mongolia's customs. Radiation detectors at Zamyn Uud are installed on the passenger lanes and not on lanes handing trucks carrying freight. Also, the weighbridge for Gashuun Sukhait is located at Tsagaan Khad and not at the gate of the BCP.

In the absence of such basic facilities, BCPs are unable to carry out processes effectively and efficiently, leading to frequent instances of congestion and delays in goods movement across the borders.

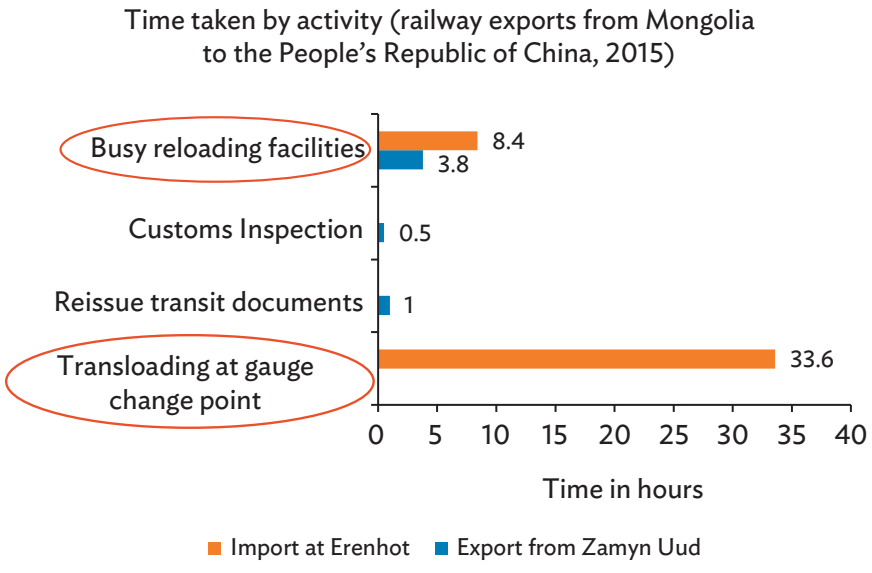
Variation in Gauge at the Mongolia–People's Republic of China Border

Mongolia has only two rail-based BCPs: Suukhbaatar in the north and Zamyn Uud in the south. The exports through the northern rail-based BCP at Suukhbaatar are less than half a million tons and, since railway gauge in Mongolia and the Russian Federation are the same, there are no major issues with rail-based exports or challenges at the BCP in the handling of mineral exports.

The other BCP at Zamyn Uud in the south exports 5 million–7 million tons of mineral cargo every year to the PRC. Since the railway gauge in Mongolia and the PRC is different, there is a need to transload the entire cargo from Mongolia's trains to Chinese trains during exports at the BCP. As a convention, the transloading of mineral cargo takes place within the territory of the importing country which, in this case, is the PRC. The trains carrying iron ore from Bold Tumur Eruu Gol mines and copper concentrate from Erdenet mines arrive at UBTZ Terminal 1 of Zamyn Uud BCP and then move onwards to Erenhot in the PRC, where the mineral cargo is either unloaded from Mongolia's trains or transloaded to Chinese trains or trucks as per arrangements between the buyer and seller. At Erenhot, trains enter transloading facilities for bulk cargo where cargo is either unloaded onto the ground from Mongolia's trains or transloaded onto Chinese trucks or trains. The transshipment operation is crucial and often leads to delays since transloading facilities are busy or unavailable.

The Corridor Performance Measurement and Monitoring Report released under the CAREC Program has highlighted the key issues of the physical infrastructure challenges across the Zamyn Uud–Erenhot BCPs (Figure 38).

Figure 38: Delay Reasons at the Zamyn Uud Border Crossing Point



Source: Central Asia Regional Economic Cooperation Corridor Performance Measurement and Monitoring Report. 2015.

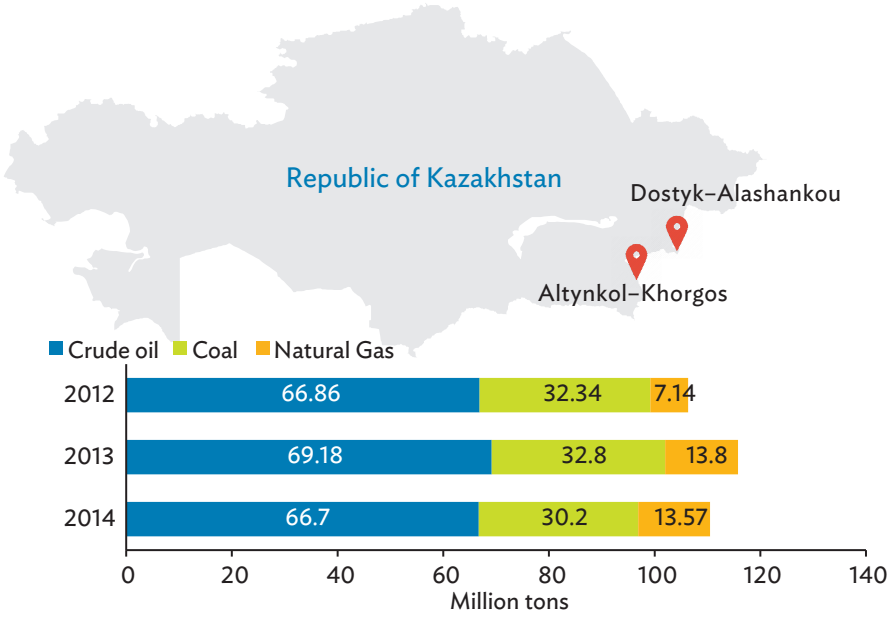
The Corridor Performance Measurement and Monitoring Report specifically highlights the activities which cause delays in the rail-based mineral exports at Zamyn Uud–Erenhot border. As shown in Figure 38, congestion at the reloading facilities and transloading (transshipment) of freight are the two main reasons which cause delays at the BCP. This can be addressed by use of mechanized systems for bogie exchange. A similar facility exists at the Kazakh-Chinese border. The following case study illustrates this mechanism.

Case Study: Bogie Exchange at the Kazakhstan–People's Republic of China Border Crossing

Kazakhstan is a major exporter of minerals to the PRC and uses two major BCPs for its trade with the PRC. The Dostyk-Alashankou and Altynkol-Khorgos BCPs on the Kazakh-Chinese border have rail connectivity and handle majority of the trade volumes between the two countries. The PRC is the largest trade partner of Kazakhstan for mineral commodities. Crude oil is primarily transported from Kazakhstan to the PRC through the Kazakhstan–China Crude Oil Pipeline, while natural gas is through the Central Asia–China Gas Pipeline. Coal and other bulk mineral commodities such as chromium (chromite), copper, lead, zinc, and uranium are exported to the PRC through two BCPs viz Dostyk–Alashankou and Altynkol–Khorgos (Figure 39).

The bogie exchange facility at the Dostyk-Alashankou BCP allows for the transfer of the loaded and/or unloaded wagons between standard (1,435 mm) and broad (1,520 mm) gauges, and eliminates the need for physical evacuation and reloading of the cargo at BCPs (Figure 40). The following process happens at the bogie exchange facility.

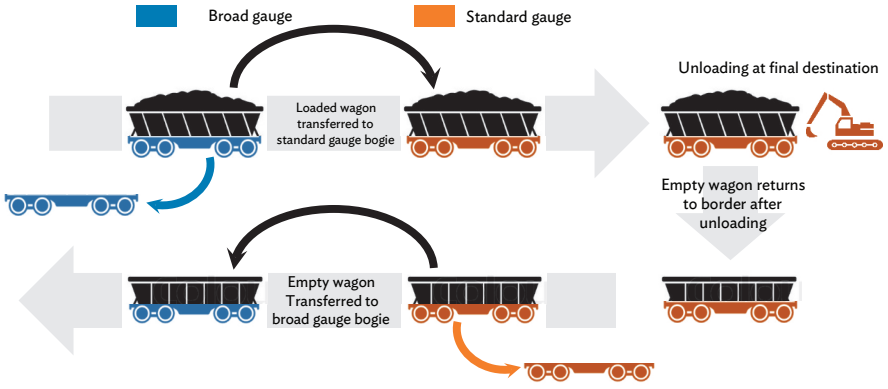
Figure 39: Mineral Exports of Kazakhstan



Source: Asian Development Bank.

(i) Loaded wagons on Russian gauge bogies arrive at the BCP at Dostyk.
(ii) Wagons are detached from the Russian gauge bogie.
(iii) Russian gauge bogies are removed and tracks are freed for standard gauge bogies.
(iv) Standard gauge bogies are placed on the track under the loaded wagons.
(v) Wagons are placed on the standard gauge bogies.
(vi) After placement, the new train moves to the destination.
(vii) Wagons deliver the mineral ores to destination where cargo is unloaded.
(viii) Empty wagons come back to Dostyk after unloading cargo.
(ix) Wagons are detached from the standard gauge bogie.
(x) Standard gauge bogies are removed and tracks are freed for Russian gauge bogies.
(xi) Russian gauge bogies are placed on the track under empty wagons.
(xii) Wagons are placed on the Russian gauge bogies.
(xiii) After placement, the empty train enters Kazakhstan.

Figure 40: Bogie Exchange between Different Gauges



Source: Asian Development Bank.

The use of such mechanized systems to transload bogies instead of the cargo can help reduce the time spent at the gauge change point significantly, although the actual times for transloading may vary, depending on the specific local conditions and the nature of cargo in the bogies.

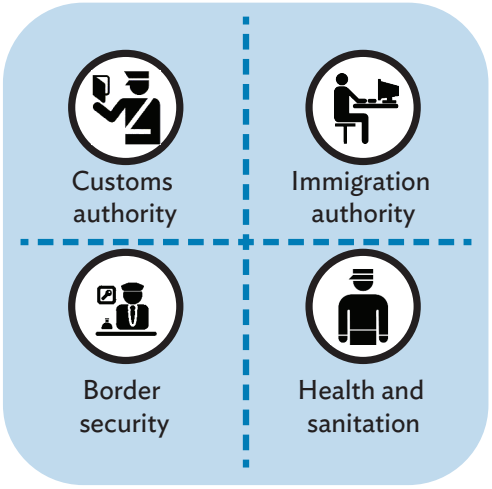
Chapters 2 and 3 focused on the issues related to the physical movement of Mongolia's import and export goods, and the possible interventions that can help improve the operational efficiency and logistics performance. Chapter 4 discusses the issues related to the processes for imports and exports, and the possible interventions to address these issues.

4 Facilitation of Trade-Related Logistics in Mongolia

Mongolia's trade has been a major driving force for its economy over the years which is evident from the fact that the average trade value has been more than the national GDP of Mongolia between 2010 and 2015.[8] Trade and related activities directly or indirectly provide employment to a large part of Mongolia's population. With such a profound importance in the livelihoods of the people and the national economy, the competitiveness of Mongolia's trade will remain a crucial aspect for future growth and development. Trade is the movement of goods or services across a country's national borders. Hence, activities at the borders are a key element of the trade competitiveness and efficiency.

Typically, every international BCP is monitored by national agencies or authorities for the respective countries, which look after the customs and duties on imports and exports, immigration control of people across borders, security against known and unknown threats, and monitoring of health and sanitation issues with respect to movement of goods, animals, or people across border (Figure 41). For Mongolia, the Mongolia Customs General Administration (MCGA), Mongolia Immigration Agency, the General Authority for Border Protection, and GASI are the four agencies which help monitor the international BCPs along Mongolia's borders.

Figure 41: Agencies at International Borders



Source: Asian Development Bank.

[8] World Bank data. Worldbank.org/indicator/NE.TRD.GNFS.ZS?locations=MN.

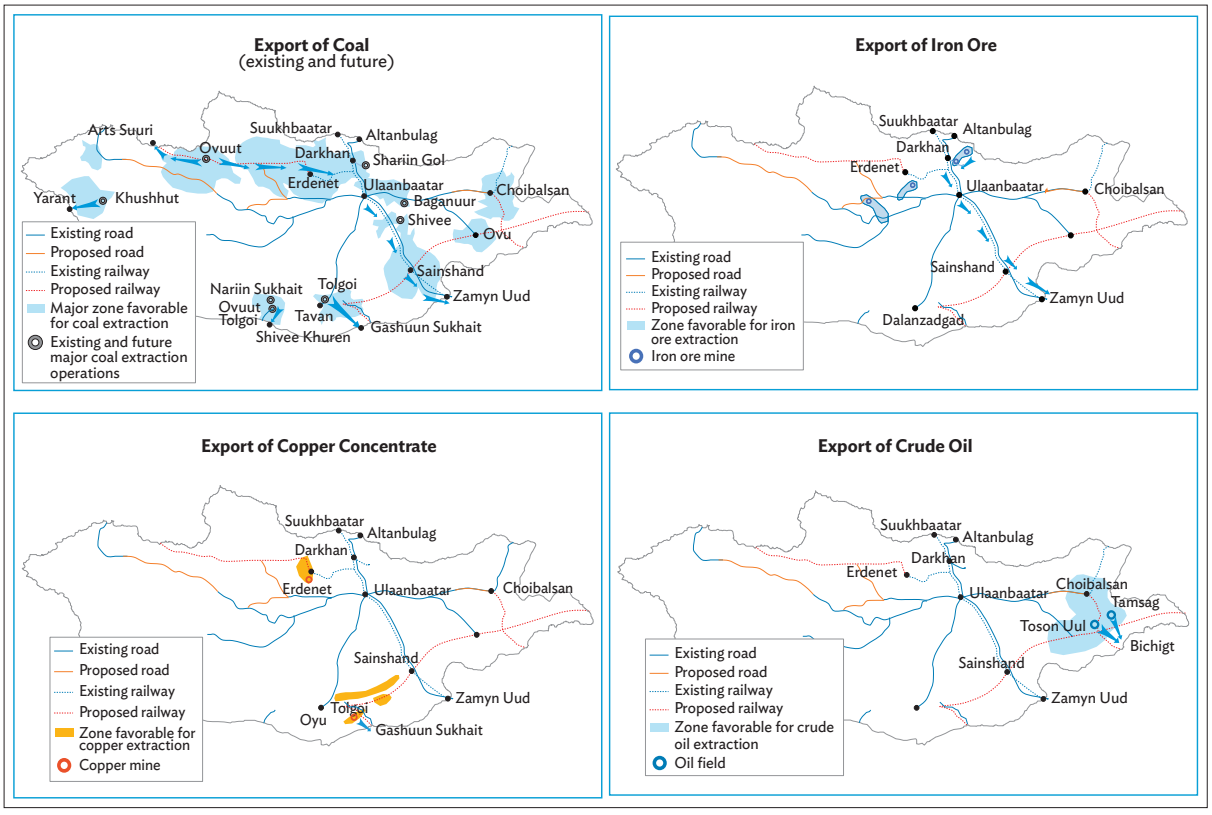
Trade comprises business transactions between countries. The ease of doing business and competitiveness of the traded goods is a direct result of the ease of moving these goods across the border. The efficiency and coordination between the border agencies mentioned earlier is the most important factor influencing the ease of doing business with a country and the competitiveness of its trade.

Processes at the Borders for Mineral Exports of Mongolia

As discussed in Chapter 3, Mongolia's exports are dominated by mineral commodities such as coal, iron ore, copper concentrates, crude oil, and other minerals which are primarily moved by roads and to some extent by rail.

These commodities exit the country through various BCPs situated near the respective mines. In terms of the absolute volume of mineral goods exported, the Gashuun Sukhait BCP is the most important since it handles the largest volume of mineral exports. Figure 42 depicts the movement of the four major mineral exports of Mongolia.

Figure 42: Export Movement of Four Major Minerals from Mongolia

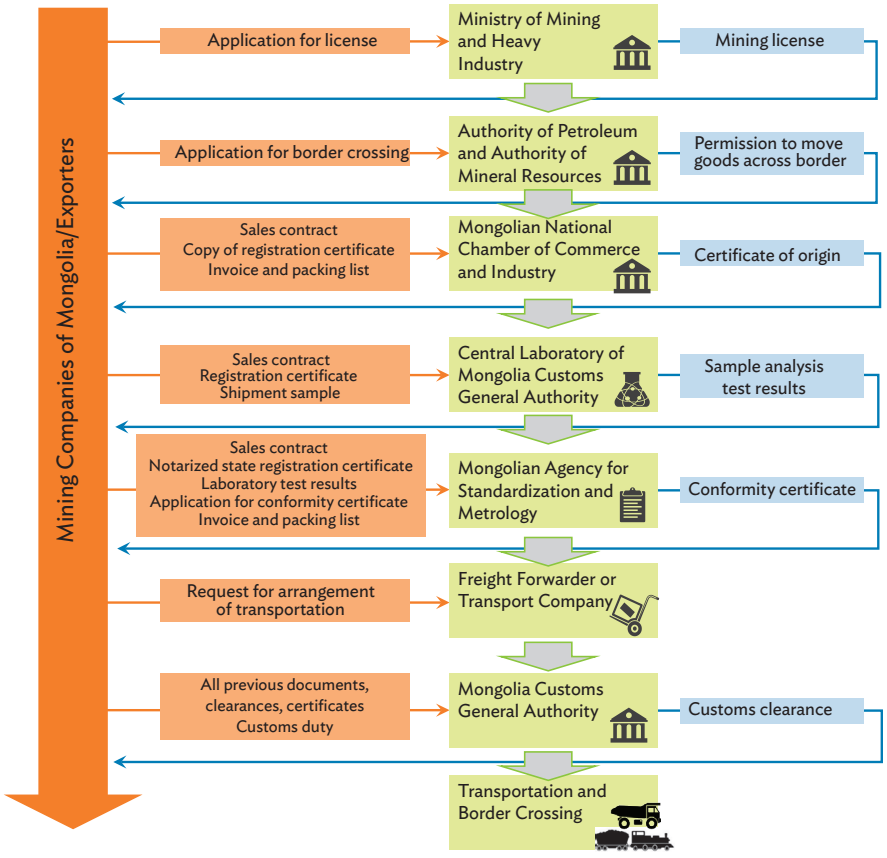


Note: Clockwise from top to left: areas favorable for coal extraction and existing and future coal export flows; areas favorable for iron ore extraction and export flows; areas favorable for crude oil extraction and export flows; areas favorable for copper concentrate extraction and export flows.

Source: Asian Development Bank.

To export goods (mineral commodities) from Mongolia, the exporter has to interact with seven agencies before the consignment leaves its source, and then with additional four agencies at the border when the goods reach the BCP. Most of these agencies require similar or common documents based on which they grant their respective permissions and clearances. However, since these agencies do not coordinate or communicate with each other, the documents must be submitted to each agency separately and in hard copies since the use of information technology is also limited with these agencies. This consumes time and effort for the exporter and the agencies to process each consignment due for export. These steps are repeated for each export consignment except in obtaining the mining license (Figure 43).

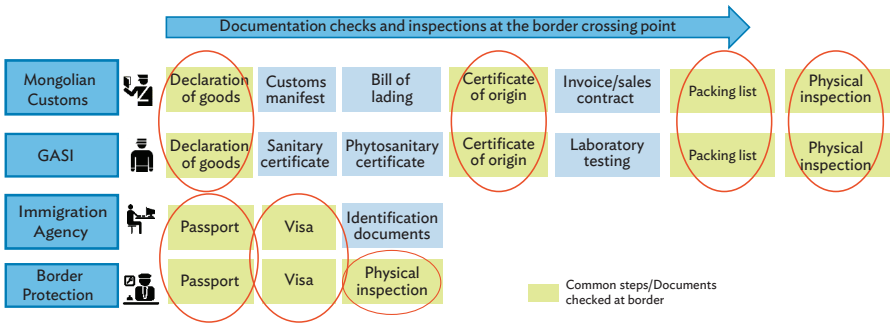
Figure 43: Entities Involved and Documentation Requirement for Exporting Goods from Mongolia



Source: Mongolian National Chamber of Commerce and Industry.

Once initial clearances are obtained, mineral commodities are transported from the mines (source) to the respective BCPs for exports, where the four border agencies conduct their physical inspections and document verifications before the exports finally cross the border. As in the case of previous clearances, these border agencies also require common documents and conduct similar examinations for export consignments. But, since there is a lack of coordination and exchange of information between these agencies as well, documents and inspections are conducted in a repetitive manner and consume significant time at BCPs. Figure 44 highlights the common documents checked at the border.

Figure 44: Common Steps and Documents Checked at the Border

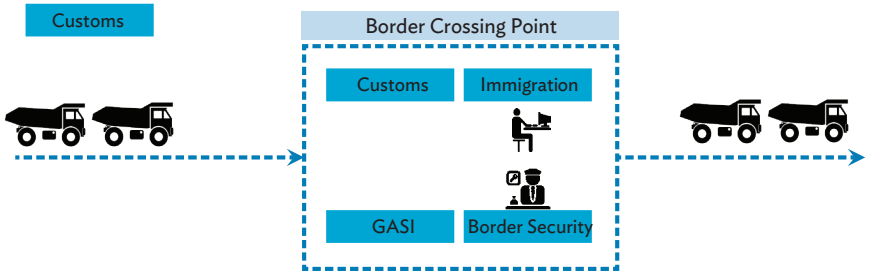


GASI = General Agency for Specialized Inspection.

Source: Asian Development Bank.

There are also inconsistencies in the way border clearance processes are carried out. For example, customs clearances are provided at the source to some large mines, whereas all other exporters get the final clearance after arriving at BCPs. Since all consignments are checked at BCPs by MCGA officers, congestion and delays occur at BCPs (Figure 45).

Figure 45: Summary of Issues in Border Clearance Processes



Current border crossing scenario for mineral exports

Inconsistent physical location for customs clearance	Lack of coordination and information exchange between agencies at the Border Crossing Points	Limited use of information technology for clearances at the Border Crossing Points

GASI = General Agency for Specialized Inspection.

Source: Asian Development Bank.

The overall process, including steps before the actual shipment starts moving and the steps involved after shipment arrives at the BCP, are summarized in Table 2:

Table 2: Process Steps for Mineral Exports

Sr. No.	Involved Agency	Documents to be submitted	Outcome
1	Ministry of Mining and Heavy Industry, Government of Mongolia	• Application for grant of mining license with necessary information	Mining license
2	Authority of Minerals and Authority of Petroleum	• Application to permit goods to cross Mongolia's border	Permission for goods to cross Mongolia's border
3	Mongolian National Chamber of Commerce and Industry	• Sales contract • Copy of registration certificate of company • Invoice • Packing list	Certificate of Origin
4	Central Laboratory of Mongolia Customs General Authority	• Sales contract • Copy of registration certificate of company • Shipment sample	Test results of shipment sample
5	Mongolian Agency for Standardization and Metrology	• Notarized state registration certificate • Test results of shipment sample • Application for conformity certificate • Invoice • Packing list	Conformity certificate for shipment
6	Freight forwarder or transport company	• Request for arrangement of transport and border clearance	Agreement for transportation
7	Mongolia Customs General Authority (at the point of origin or at Ulaanbaatar)	• All documents submitted earlier • All clearances, certificates, permissions, and test results obtained • Customs duty (if applicable)	Customs clearance
Agencies at the Border Crossing Point			
8	Mongolia Customs General Authority (at the Border Crossing Point)	• Customs clearance (if obtained already) • All documents for customs clearance and customs duty (if not obtained already)	Border clearance/ customs clearance
9	Mongolia Immigration Agency	• Passport • Visa (for truck drivers and staff)	Immigration clearance
10	General Agency for Specialized Inspection (GASI)	• Conformity certificate • Certificate of origin • Invoice and packing list • Sales contract • Test results from laboratory • Other documents requested by GASI	GASI clearance
11	General Authority for Border Protection	• Passport • Visa (for truck and/or train drivers and staff) • Physical inspection of vehicle	Border clearance

GASI = Generalized Agency for Specialized Inspection.

Source: National Chamber of Commerce, Mongolia.

Processes at the Borders for Non-Mining Imports of Mongolia

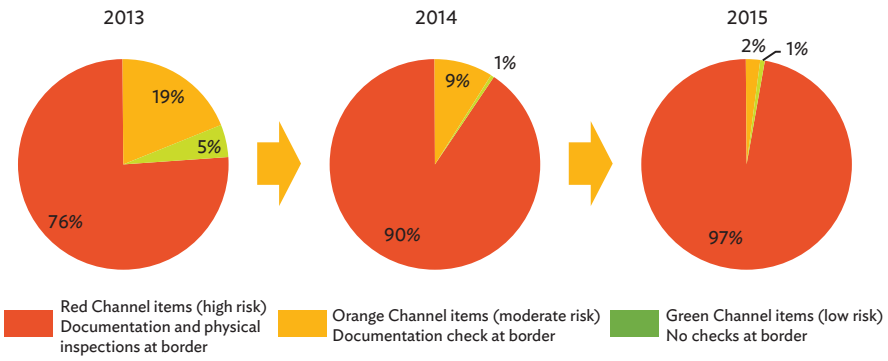
Besides the thorough inspections by the Mongolia Customs General Authority; the General Agency for Specialized Inspection also conducts its own physical inspection of imported goods based on its own classification and discretion.

While Mongolia's exports are dominated by mineral commodities, its imports are dominated by finished products such as consumer goods, food products, refined petroleum (diesel and gasoline), and machinery for the mining industry. Although the nature of imports differs from exports, the issues that affect imports are similar. Issues such as interfacing with multiple agencies, repetitive documentation checks, and lack of use of information technology for clearances are also applicable to the imports of Mongolia. The four border agencies, MCGA, the Mongolia Immigration Agency, the General Authority for Border Protection, and GASI also deal with imports in a similar manner. All documentation checks and inspections are carried out at the BCP, which lead to congestion and slow movement across the border.

Besides these issues, the risk-based classification of the MCGA, classifies more than 95% of all commodities and goods as high-risk items. As a result, almost every consignment that enters Mongolia is subjected to very high levels of scrutiny and verification by customs authorities. This slows down the process of border crossing, and goods take longer to reach the consumers in Mongolia. Since imports are mostly consumer products, the delay directly impacts Mongolia's population.

Inspections at a border crossing point of Mongolia. *Clockwise from top left*: 1. A truck entering at the border of Mongolia is approached by an officer from the Quarantine Department (General Agency for Specialized Inspection) for inspection; 2. truck entering Mongolian territory; 3. documents of the consignment being checked by an officer of the General Authority of Customs, Mongolia at the border crossing point.

Figure 46: Change in the Classification Structure for Imports by Mongolia Customs General Authority



Source: Mongolia Customs General Authority.

Between 2013 and 2015, the classification was changed to increase items in the Red Channel inspections from 76% to 97%, which led to the physical inspection of almost every import consignment. Physically inspecting all goods at BCPs leads to delays in the delivery of goods to consumers. Figure 46 shows the change in the classification structure for imports in Mongolia from 2013–2015.

Such measures can drastically reduce the speed at which goods move across borders. This also increases the work pressure on the ground staff of the MCGA as well as on the physical infrastructure at BCPs. Moreover, since Mongolia's import movement is concentrated at the Zamyn Uud BCP, the chances of congestion and delays are much higher.

Roles and Responsibilities of Border Agencies

The four border management agencies in Mongolia are MCGA, the Mongolia Immigration Agency, GASI, and the General Authority for Border Protection, with different roles and responsibilities that are discussed below.

Mongolia Customs General Authority

MCGA operates under the Ministry of Finance, and is responsible for ensuring that applicable customs duties pertaining to cross-border movement of goods moving in and out of Mongolia are paid by the consignor and/or consignee as applicable. Further, it is also responsible for the enforcement of customs' legislation, imposition and collection of customs' duties and value-added tax; overall control on imports and exports; compilation of foreign trade statistics; and enforcement of disciplinary action against customs offenses. The administration of MCGA comprises 14 customs houses and 4 customs branch offices managing all BCPs on Mongolia's international

borders. There are 77 customs control zones and 33 customs bonded zones under the administration.[9] Figure 47 describes the roles and responsibilities of MCGA.

Figure 47: Roles and Responsibilities of Mongolia Customs General Authority

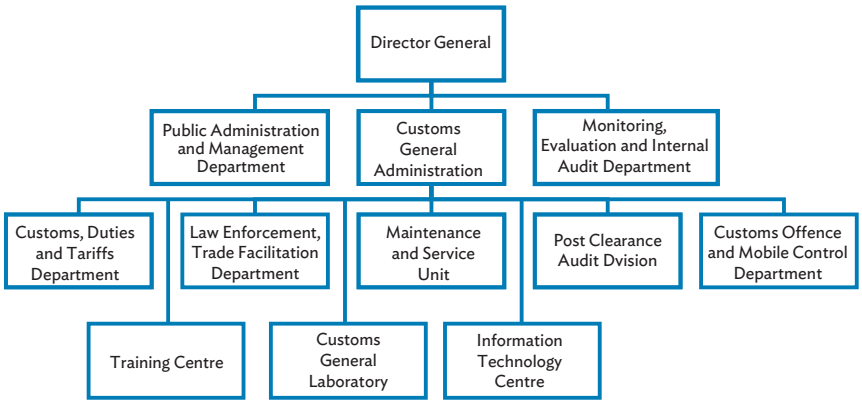
Mongolia Customs General Authority (MCGA)

Objective	• MCGA is responsible for collection of applicable duties on the international goods trade of Mongolia, and for compliance to prohibited movement of goods across Mongolia's international borders.
Scope	• All finished and semifinished goods, raw materials, and resources traded across Mongolia's international borders
Specific Purpose	• To ensure that importing and exporting companies pay applicable duties and taxes for the goods moving across Mongolia's borders and enforce the International Commercial Terms • To check for pilferage of goods or movement of unauthorized goods across Mongolia's borders

Sources: Mongolia Customs General Authority and Central Asia Regional Economic Cooperation Program.

The MCGA is headed by the director general. The authority has the organizational structure shown in Figure 48.

Figure 48: Organizational Structure of Mongolia Customs General Authority



Sources: Mongolian Customs website and Central Asia Regional Economic Cooperation Program.

[9] Mongolia Customs General Authority website.

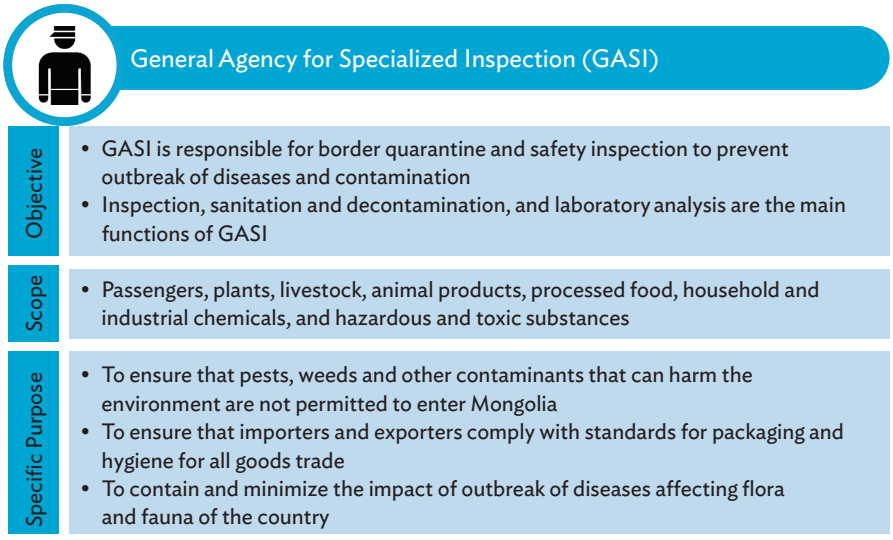
MCGA has three main divisions; Public Administration and Management Department, Customs General Administration and Monitoring, and Evaluation and Internal Audit Department. Of these, the Customs General Administration is further comprised of various subunits, such as, Customs, Duties, and Tariffs Department; Law Enforcement, Trade Facilitation Department; Maintenance and Service Unit; Post Clearance Audit Division; Customs Offence and Mobile Control Department; Training Center; Customs General Laboratory; and Information Technology Center.

The customs clearance for export goods can be obtained at the point of origin of the consignment if customs facility is available, or at the BCP during transport after submission of the requisite documents and payment of applicable duties.

General Agency for Specialized Inspection (or the State Professional Inspection Agency)

GASI is a regulatory agency governed by the Office of the Deputy Prime Minister of Mongolia. GASI is primarily responsible for ensuring safety and quarantine inspections of all cross-border movements in and out of Mongolia. It uses inspection, sanitation, laboratory analysis, and decontamination as measures to ensure effective quarantine. GASI's scope includes passengers, plants, livestock, animal products, processed food, household and industrial chemicals, and hazardous or toxic substances. GASI ensures that any potential threats in the form of contaminants, infections, and carriers of disease-causing pathogens are prevented from entering Mongolia. Figure 49 describes the roles and responsibilities of GASI.

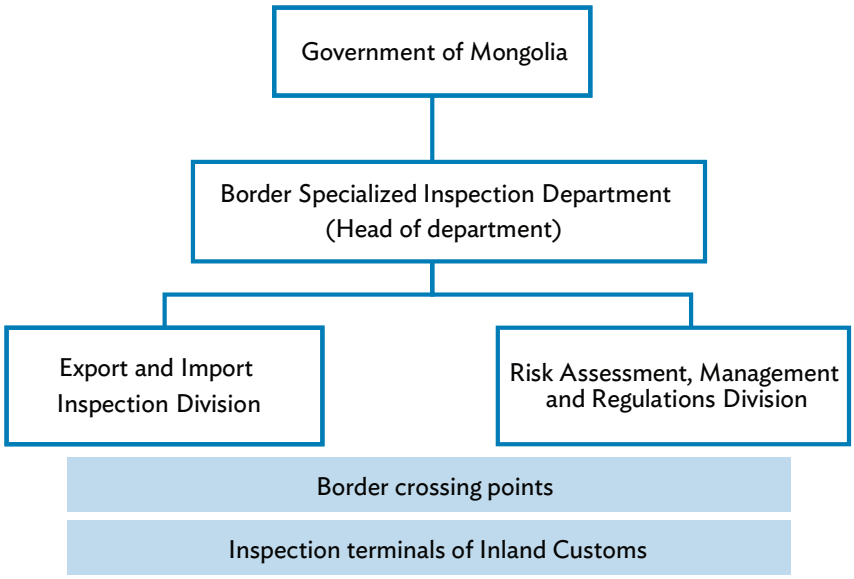
Figure 49: Roles and Responsibilities of the General Agency for Specialized Inspection



Source: Border Quarantine and Safety Inspection, General Agency for Specialized Inspection. 2014.

To deliver its objectives, GASI conducts inspections and ensures that importers and exporters comply with standards for handling, packaging, and transport of goods across the border.

Figure 50: Organizational Structure of the General Agency for Specialized Inspection



Source: Border Quarantine and Safety Inspection, General Agency for Specialized Inspection. 2014.

Broadly, GASI is comprised of two divisions: Export and Import Inspection Division, and Risk Assessment, Management and Regulations Division. The two divisions operate out of all BCPs of Mongolia as well as the inspection terminals of inland customs in Mongolia. The Export and Import Inspection Division is GASI's executive arm while the Risk Assessment, Management and Regulations Division is responsible for formulation, review, and ensuring implementation of regulations pertaining to health, sanitation, and quarantine measures for cross-border movement of goods and passengers.

Mongolia Immigration Agency

The Mongolia Immigration Agency operates under the Ministry of Foreign Affairs of the Government of Mongolia, and is responsible for monitoring and control of movement of passengers and vehicles used for crossing borders to prevent unauthorized entry and exit through border ports. The Mongolia Immigration Agency is responsible for issuing visa, residential permits, and invitations to foreign nationals. Figure 51 presents the roles and responsibilities of the immigration agency.

Figure 51: Roles and Responsibilities of Mongolia Immigration Agency

Source: Mongolia Immigration Agency website: http://immigration.gov.mn/introduction/?lang=en.

For the export of mineral and ores, the Mongolia Immigration Agency's role is to monitor the movement of truck drivers and other staff involved in the transport of these minerals and ores across international borders. It ensures that drivers entering and exiting BCPs have valid documents and permissions.

General Authority for Border Protection (or Mongolian Border Protection Agency)

The General Authority for Border Protection operates under the Ministry of Justice, Government of Mongolia, and is entrusted with the responsibility of protecting Mongolia and its national borders against external security threats. The General Authority for Border Protection conducts physical inspections and verifies documents of all vehicles and passengers moving across Mongolia's borders to check against potential security threats. It is also the implementing agency for obligations of all border-related treaties of Mongolia and prevention of border violations.

These four border management agencies are crucial to the movement of mineral exports since their processing efficiency directly impacts the movement of such exports across the border. However, these agencies operate under different ministries of the government. Based on primary interactions with representatives of these agencies and other stakeholders, it was observed that these agencies do not actively collaborate with each other or share information among them regarding goods and passenger movement. Figure 52 shows the roles and responsibilities of the Mongolian Border Protection Agency.

Figure 52: Roles and Responsibilities of the General Authority for Border Protection

Source: General Authority for Border Protection website: https://zasag.mn/en/m/border-protection/intro.

The databases and information technology systems of these agencies operate on a stand-alone compartmentalized manner and are not integrated. Hence, little or no information exchange occurs among the agencies. As a result, mining companies have to submit the required documents and obtain clearances from the agencies separately. This leads to repetitive processing of the same shipment by different agencies at BCPs. The Asian Development Bank (ADB) is supporting Mongolia's border agencies systematically to implement some trade facilitation measures, such as

(i) development of a national single window;[10] and
(ii) modernization of sanitary and phytopsanitary measures.[11]

Besides these, ADB is also working towards joint customs control and coordinated border management through various other technical assistance projects. ADB's CAREC Program is also working towards the improvement and facilitation of Mongolia's border infrastructure and processes. There are certain improvement opportunities that can help improve the competitiveness of Mongolia's trade. These are discussed below:

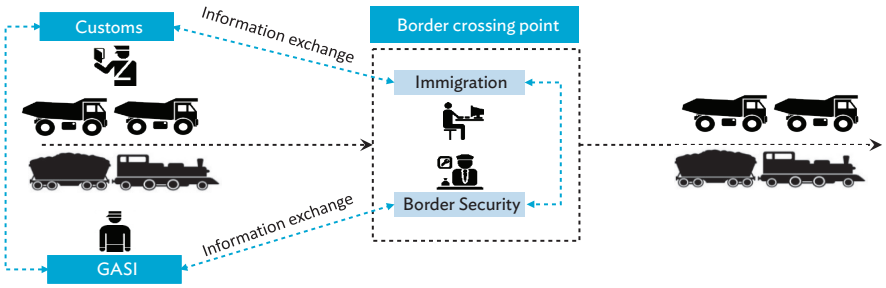
[10] ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to Mongolia for the Regional Improvement of Border Services Project*. Manila.
[11] ADB. 2015. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to Mongolia for the Regional Upgrades of Sanitary and Phytosanitary Measures for Trade Project*. Manila.

Improvement Opportunities for Border Processes

Increasing coordination between the four border agencies, the MCGA, the Mongolia Immigration Agency, the General Authority for Border Protection, and GASI, to optimize and conduct their inspections jointly, wherever possible, would help save time during border crossing procedures. Also, shifting the border clearance physically away from the border can help reduce the congestion at BCPs as well as the pressure on the physical infrastructure at BCPs. This can be done my providing clearances from the General Authority of Customs and GASI at the source for exports.

Figure 53 schematically depicts this approach which requires simple modifications in the processes, but can greatly improve the movement speed through BCPs.

Figure 53: Streamlined Clearance and Border Crossing Processes for Mineral Exports



GASI = General Agency for Specialized Inspection.
Source: Asian Development Bank.

The provision of clearances by customs and GASI at the source reduces the congestion at BCPs as well as the work pressure for the staff. Information exchanged between the agencies reduces the need to separately examine all documents by each agency and can speed up the process of obtaining clearances.

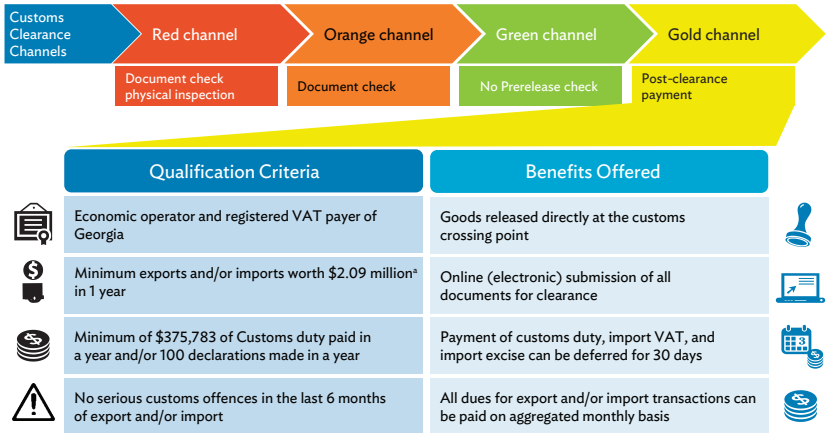
Case Study: Gold Channel Customs Clearance Mechanism of Georgia

Georgia has implemented a simplified customs procedure, which classifies shipments into four categories: Red Channel, Orange Channel, Green Channel, and Gold Channel. While red, orange, and green channel clearance is similar in classification to customs authority of any other country, the gold channel or the "Golden List" status is provided to certain customers who meet a set of criteria that allows them to pay all their duties as a one lump sum payment at the end of every month instead of paying duties for every consignment individually (Figure 54). The "Golden List"

status is offered to certain large and reputable entities, which are able to satisfy the qualification criteria:

(i) economic operator and registered value-added tax payer of Georgia,
(ii) minimum exports and/or imports worth GEL5 million in 1 year,
(iii) minimum of GEL900,000 of customs duty paid in a year and/or 100 declarations made in a year, and
(iv) no serious customs offenses in the last 6 months of export and/or import.

Figure 54: Salient Features of Georgia's Gold Channel Clearance Mechanism for Import and Export



VAT = value-added tax.

[a] GEL5 million ($1 = GEL2.395 as of 1 August 2017).
[b] GEL900,000 ($1 = GEL2.395 as of 1 August 2017).

Sources: Asian Development Bank; and Georgian Revenue Services. www.rs.ge.

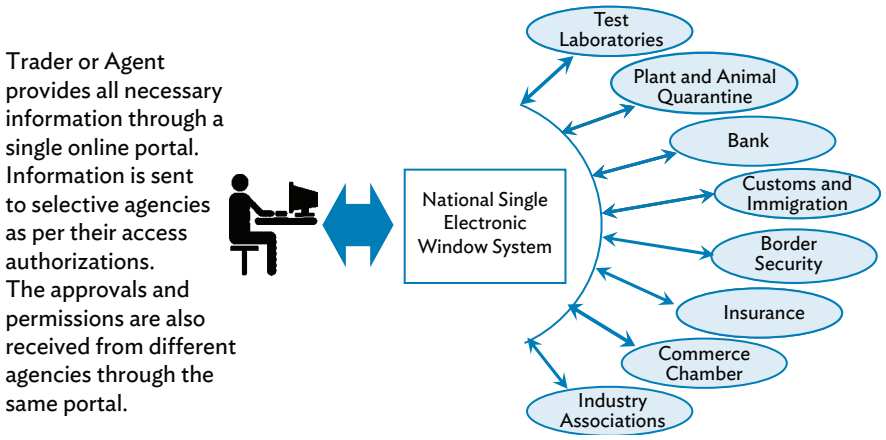
Once the status is granted, Georgian Revenue Services offers facilities such as direct release of goods and checking of documents after release, online submission of documents, and deferred payment of duties for 30 days in a lump sum for all transactions in the period. This simplifies the procedure for routine shipments and reduces the cost of monitoring and collection of duties by the customs authority concerned. Mongolia could consider similar steps for select companies in the country's mining sector for routine exports, and such companies could be offered similar facilities to simplify export procedures.

Case Study: National Single Electronic Window

The increasing complexity in global trade and the increasing demand for lowering cost-to-trade from various stakeholders resulted in many countries adopting the national single electronic window (NSEW) system that makes use of modern information and communication technology as well as adopting a coordinated approach to cross-border exports and imports. The adoption of the single window has gathered steam over the past 10 years. The United Nations Economic Commission for Europe (UNECE) defines the single window as a "facility that allows parties

involved in trade and transport to lodge standardized trade-related information and/or documents to be submitted once at a single entry point to fulfill all import, export, and transit-related regulatory requirements."[12] See Figure 55 for a conceptual illustration of the NSEW based on a secondary research of ADB.

Figure 55: National Single Electronic Window System
(conceptual illustration)



Source: Asian Development Bank.

The idea of a national single window has been an effective solution to the conventional silo-like and compartmentalized functioning of various government agencies, ministries, customs authorities, other government authorities, and stakeholders in trade and transport. In countries such as Thailand, the national single window system has been successful in unifying the operations of as many as 36 different stakeholders since the implementation of the single window system in 2007–2008. However, development and implementation of a national single window system is a complex and cost-intensive process. As a result, many countries have adopted the single window system at the national level in an incremental phased manner, starting with covering either specific processes or specific organizations under the ambit of the single window mechanism. As acceptance and experience of the national single window system increased, the number of agencies and stakeholders as well as processes increased. The following staged approach has been adopted by many countries for developing a single window system:[13]

(i) Stage 1: Paperless customs and e-payment facility for customs + container loading list + simple e-documents exchange with port authority and/or terminal operators

[12] UNECE. 2005. *Guidelines on Establishing a Single Window*. Geneva.
[13] J. Koh Tat Tsen. 2011. Single Windows and Supply Chains in the Next Decade: Ten Years of Single Window Implementation – Lessons Learnt for the Future. Global Trade Facilitation Conference 2011: Connecting International Trade. UNECE and United Nations Economic and Social Commission for Asia and the Pacific.

(ii) State 2: Connecting other government back-end information technology systems and e-permit exchange with paperless customs system
(iii) Stage 3: E-documents exchange stakeholders with the air, sea, and dry port community
(iv) Stage 4: Integrated national logistics platform integrating the traders and logistics service providers + information exchange
(v) Stage 5: A regional information exchange system facilitating regional trade among neighboring countries

In many developing countries, national single windows have simplified and automated processes involved in trade and transport, and increased collaboration among various government and nongovernment entities. National single window systems have also evolved into regional single window systems enabling rapid information exchange at a regional level among multiple countries. This has also helped countries achieve a greater degree of cooperative and joint border control, thus facilitating international trade.

Case Study: National Electronic Single Window System Development in Thailand

Before the national electronic single window system was implemented in Thailand, the country ranked 108 in the World Bank's Trading Across Borders report in 2007. In 2015, Thailand was ranked 56. The Thailand national single window system analogy also applies to Mongolia since exporters and importers had to deal with as many as 36 different entities and organizations for trade transactions and cross-border transport, thereby increasing the time-to-trade and cost-to-trade. The Thailand case also highlights the significance prescribed by the highest levels of the country's government to the swift development and implementation of the national single window system. These lessons can be a beneficial guiding path for Mongolia to further streamline international trade.

The establishment of the national single window system was recognized as an integral and important part of Thailand's national strategy to improve the overall efficiency in trade processes and transport. The Thailand Logistics Master Plan (2005–2009) and the National Logistics Development Strategy (2007–2011) identified the national single window system as the top priority to improve the country's logistics sector.

The Government of Thailand assigned the Customs Department (under the Ministry of Finance) to be the lead agency for development and implementation of the national single window system with support from other relevant agencies. This was in line with the Association of Southeast Asian Nations (ASEAN) agreement to develop and implement the ASEAN single window system. The Thailand national single window system enables electronic data and information sharing between government to government (G2G), government to business (G2B), and business to business (B2B) levels to streamline the export, import, and logistics processes. The system also enables submission of electronic documents by private sector companies and online submission of customs declaration and duty payments for customs clearance.

This system also resulted in the reduction of duplication of data captured among various agencies, reduction in time required for obtaining approvals and clearances for exports and imports, and also reduced the overall cost of doing business in Thailand. The Thailand national single window system has evolved in a phased manner, as have most other single window systems around the world.

(i) Stage 1 focused on the appointment of a single agency (Thailand customs) as the agency responsible for development and implementation of the national single window system, reaching an understanding among all government and nongovernment agencies concerned for development of the system, simplification of the trade and documentation procedures, and development of the e-customs system.
(ii) Stage 2 is aimed at providing the full spectrum of services for paperless trade to domestic companies by requiring them to provide information in a single form for seeking approvals and certificates from various agencies. Private sector companies can also track information online to check the progress of their requests.
(iii) Stage 3 aims to develop an ASEAN regionwide single window system to facilitate regional and international trade.

The stage-by-stage implementation allowed government authorities time to adjust to the changes in a graduated manner and also to troubleshoot teething issues during implementation phases. This also eased the migration from the conventional system to the new system.

Simplification of processes at the border by relocating clearance processing points away from the border and enabling coordination among different border agencies to share information and conduct inspections jointly can greatly improve the throughput of the gates at BCPs. Solutions such as the Golden Channel or similar mechanisms for processing of routine shipments from large traders would help consolidate operations, reduce paperwork, and simplify monitoring of export and imports in Mongolia.

A national single electronic window system can act as a tool to implement some of these interventions, and also drastically improve the capacity and efficiency of border processing systems. Lastly, to achieve smooth and hassle-free border crossing processes, adequate faculties and infrastructure needs to be provided at BCPs.

Having discussed the logistics and transport for international trade, Chapter 5 brings out the issues with domestic freight in Mongolia and the possible interventions to address these issues.

5 Logistics and Transport for Domestic Freight

Movement of Domestic Freight—Coal

Thermal coal is transported by rail from coal mines of Baganuur, Shivee Ovuu, and Shariin Gol to CHPs in Ulaanbaatar, Darkhan, and Erdenet. The power plant in Choibalsan receives its coal from the Aduunchuluun mines by rail.

This domestic movement of thermal coal is based on consumption demand of the country's thermal power plants and heating plants. Table 3 lists Mongolia's major power and heating plants that provide power, heat, and industrial steam for consumer and industrial purposes. It is interesting to note that domestic coal movement constituted around 99% (by volume) of total rail-based coal movement in Mongolia during 2015. Of this total domestic coal transported by rail during 2015, almost 90% was destined for the thermal power plants at Ulaanbaatar and the heating plant at Amgalan (Table 3).

Table 3: Mongolia's Major Power and Heating Plants

No.	Power/Heating Plant	Installed Capacity (MW)	Location or Province
1	CHP-2	21	Ulaanbaatar
2	CHP-3	198	
3	CHP-4	570 (+100 planned)	
5	Erdenet Power Plant	29	Erdenet
6	Darkhan Power Plant	48	Darkhan
7	Choibalsan Power Plant	36	Choibalsan
8	Dalanzadgad Power Plant	6	Dalanzadgad

CHP = combined heat and power plant, MW = megawatt.

Source: Capacity development technical assistance consultant team secondary research.

Since more than 46% of Mongolia's population lives in the capital city of Ulaanbaatar,[14] the demand for power and heating there is the highest. Hence, thermal plants are concentrated in and around Ulaanbaatar. Besides the thermal power plants listed above, Ulaanbaatar also has a dedicated heating station at Amgalan, which is used seasonally for generating heat during winters.

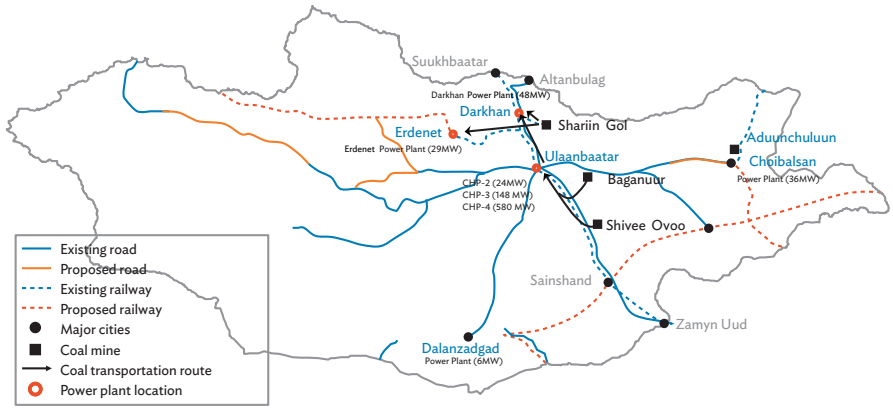
Ulaanbaatar is considering adding an additional CHP (CHP-5) that would increase domestic transport demand for thermal coal. The entire thermal coal transportation

[14] National Statistical Yearbook 2015.

from coal mines to CHPs and heating plants occurs via rail. There is no road-based domestic movement of thermal coal between mines and power and heating plants.

Figure 56 illustrates the locations of major power and heating plants and coal mines, which supply coal to these plants.

Figure 56: Locations of Power Plants and Coal Mines

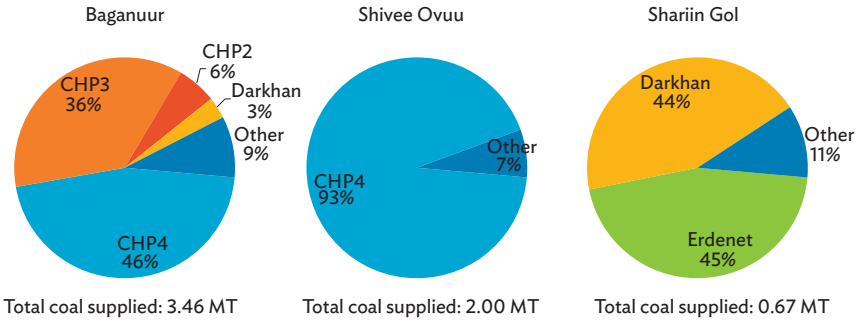


CHP = combined heat and power plant, MW = megawatt.
Source: Asian Development Bank.

The Erdenet and Darkhan thermal power plants receive their coal supply mainly from Shariin Gol mines, whereas CHPs and Amgalan heating plant in Ulaanbaatar receive their coal from Baganuur and Shivee Ovuu coal mines. On some occasions, Baganuur mine also supplies coal to Darkhan and/or Erdenet plants, if such need arises. Figure 57 illustrates coal mined and supplied to plants in Ulaanbaatar, Darkhan, and Erdenet during 2015.

Since the heating-cum-power plants are located within Ulaanbaatar city, the movement of coal through the city for supply to these plants is expected to continue in the future as well.

Figure 57: Supply of Coal from Mines to Power Plants, 2015

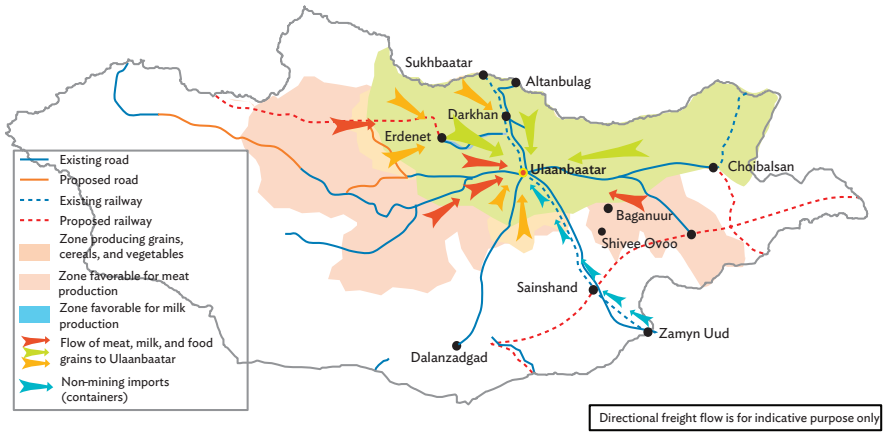


CHP = combined heat and power plant, MT = metric tons.
Source: Ministry of Road and Transportation Development, Government of Mongolia.

Movement of Domestic Freight—Agricultural Products

Ulaanbaatar, Erdenet, Darkhan, and the nearby regions are relatively densely populated areas of Mongolia. The concentration of the population in these regions also drives significant movement of domestic freight in this region. Ulaanbaatar remains the hub for all freight movements. Goods and products produced locally in Mongolia enter the city from various directions. Typically, meat, milk, grains, cereals and vegetables enter the city from the northwestern and western sides, and the eastern side. Figure 58 shows the movement of goods towards Ulaanbaatar.

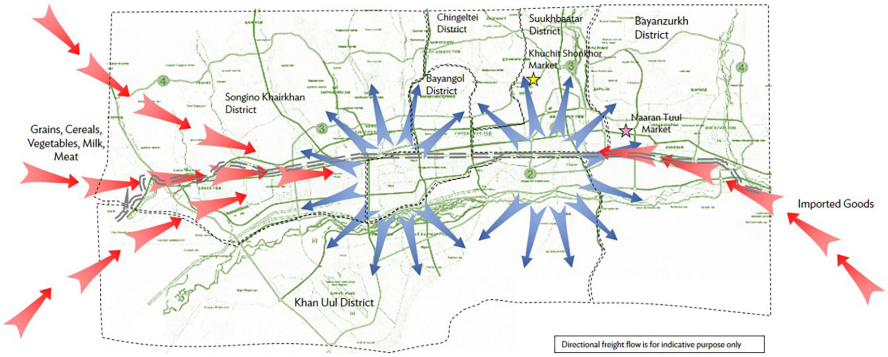
Figure 58: Goods and Products Entering Ulaanbaatar from Various Directions



Source: Asian Development Bank.

Many of the manufacturing units, warehouses, and market places are in the central part of the city. As a result of the natural evolution of the city over the years, residential as well as business establishments have congregated in the central parts of the city. As a result, conventionally, all goods and raw materials are transported all the way into these parts of the city, and then get distributed back across various locations in the city to market places and consumers which are spread all over. This pattern of freight transport requires additional movement of goods within the city and, thus, increases congestion and pollution within the city (Figure 59).

Figure 59: Transport and Distribution Pattern for Ulaanbaatar City



Source: Asian Development Bank.

Goods entering the city are brought to the central parts where the majority of warehouses and manufacturing units are located. After processing and packaging, goods are again distributed throughout the city; typically, by either the importers or manufacturing and processing units themselves using small trucks they own. On average, the truck capacity can vary between 2.5 tons and 5.0 tons of freight, although smaller trucks (2.5-ton capacity) are more popularly used in Ulaanbaatar.

Manufacturers as well as importers of consumer goods, such as milk products, meat products, flour, clothing, appliances, and other similar goods, use their own fleet of such trucks to deliver goods throughout the city from their warehouses to supermarkets, stores, and directly to consumers' locations in some cases. Because of this, such small delivery trucks move throughout the city along with the passenger traffic that leads to congestion. The movement of milk products and meat products has been illustrated as case studies in the following section, based on primary interactions with leading milk- and meat-processing companies located in Ulaanbaatar.

Photograph 5: Trucks Used in Ulaanbaatar for Freight Transport
(left: 5 tons, right: 2.5 tons)

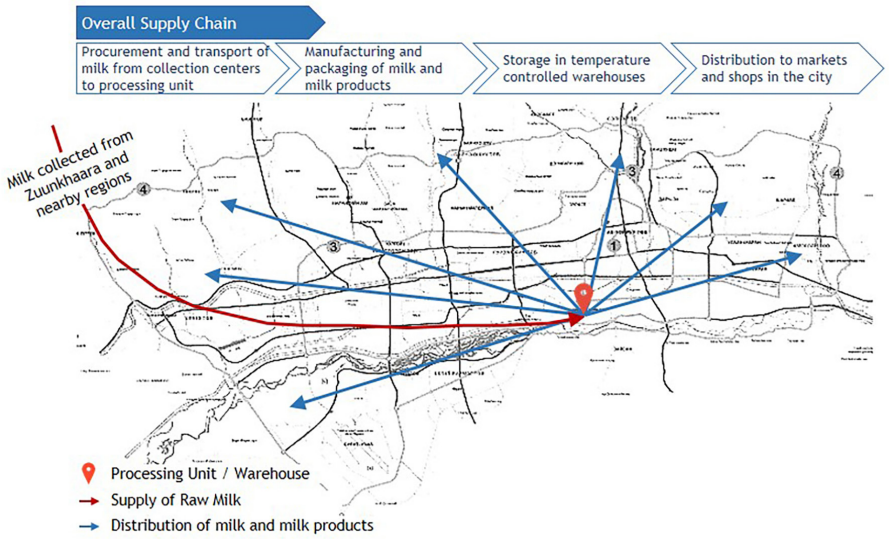
Trucks used in Ulaanbaatar for freight transport. The truck on the left is 5 tons and the truck on the right is 2.5 tons.

Milk and Milk Products

A leading milk and beverage company in Ulaanbaatar primarily sources its milk from the Zuunkhaara region located north of Ulaanbaatar. Milk collected from farms and herders is brought to the processing plant for pasteurization and manufacture of milk products. These milk and milk products are then packaged and stored in the warehouse adjoining the processing unit from where these products are then distributed to large stores and shops all over the city.

To better manage city distribution, the company divided the capital into more than 35 distribution zones, and deliveries are made to each zone using a fleet of 25 mini trucks, each with a capacity between 2 tons and 3 tons. Some zones require daily deliveries, while others require deliveries every alternate day or after 2 alternate days based on demand. Deliveries are made by milk runs within each zone. Trucks make deliveries to each shop in their respective zone during one round-trip before returning to the warehouses. The company uses refrigerated trucks for transport of raw milk as well as for distribution of packaged products across the city. The warehouse adjoining the processing unit is also temperature controlled and is divided into two zones. One for daily deliveries across the city and the other for distribution to *aimags* outside Ulaanbaatar. Figure 60 shows the supply chain of milk in Mongolia.

Figure 60: Transport of Raw Milk and Distribution of Milk Products



Source: Asian Development Bank.

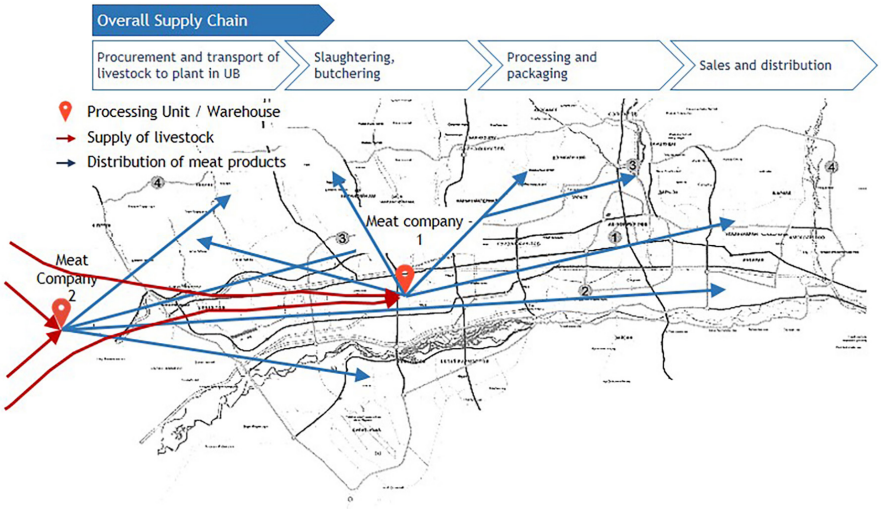
Meat and Meat Products

The two major meat companies transport their livestocks from herders in the northwest, west, and southwest regions adjoining Ulaanbaatar via roads using trucks to their slaughterhouses located in the city. After slaughtering, the meat is processed, packaged, and stored in temperature-controlled warehouses near the meat-processing units. The processed and packaged meat is then transported to major markets such as Naaran Tuul, Khuchit Shonkhor, and stores around the city.

Meat companies use refrigerated mini trucks of 2–3 tons capacity per truck. The fleet size held by each meat company depends upon the scale of its operation and demand for its products. Meat companies also divide the city into zones and deliver goods daily to different zones using refrigerated trucks based on zonal demand. The number of trips made each day varies between 15 and 25 distributing around 30–40 tons of meat products for the two companies put together. These deliveries are also made by milk-runs with each truck delivering to multiple customers during one trip before returning empty to the warehouses. Both companies have one slaughterhouse or processing unit in the city along with two temperature-controlled warehouses with each unit for storage of meat.

Figure 61 illustrates the transport of livestock and distribution of meat products in Mongolia.

Figure 61: Transport of Livestock and Distribution of Meat Products



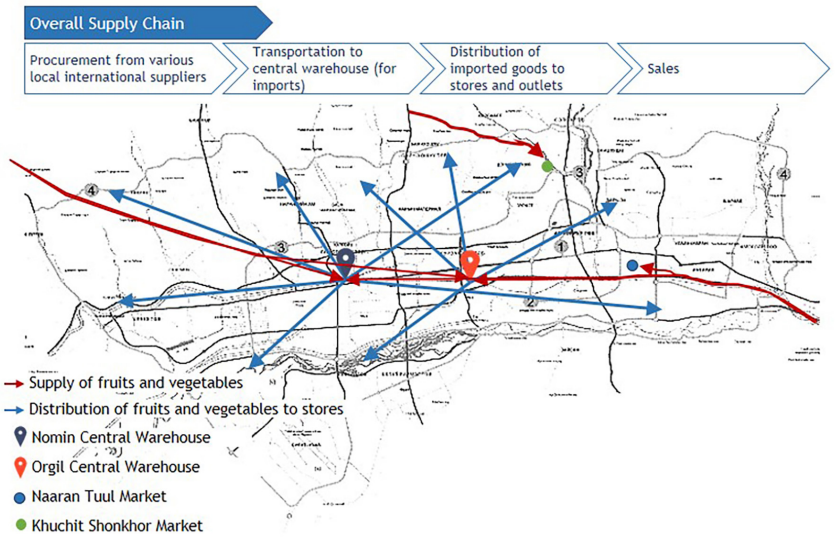
Source: Asian Development Bank.

Vegetables and Fruits

Fruits and vegetables are imported from other countries as well as sourced locally. Major department stores and markets get domestically produced vegetables and fruits directly delivered by respective suppliers to outlets and stores in various parts of the capital city. The imported fruits and vegetables arrive at respective warehouses of these department stores from freight terminals. From these warehouses, vegetables and fruits are then distributed to stores around the city using mini trucks. The two major department store operators in Ulaanbaatar have a total fleet of 40–45 such trucks, which make routine deliveries to stores during the day. The distribution is done either as milk-runs or as direct one-to-one deliveries, depending on the quantity to be delivered and the frequency of demand.

As seen in Figure 62, vegetables arrive at warehouses located in the central part of the city, and then are distributed all over the city to stores and markets.

Figure 62: Transport and Distribution of Vegetables and Fruits



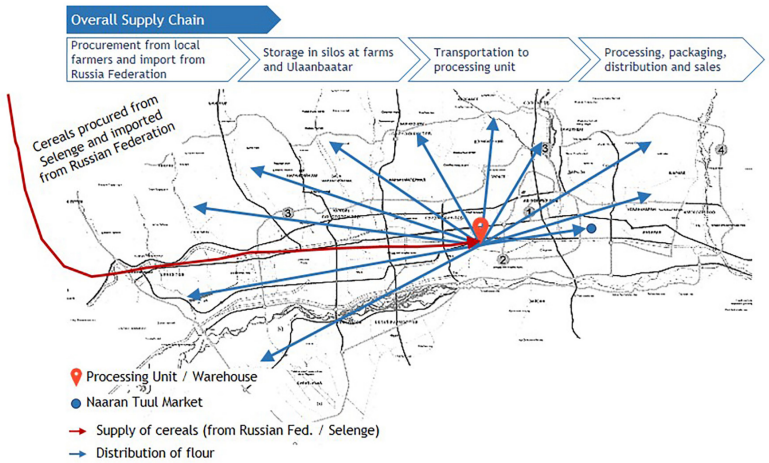
Source: Asian Development Bank.

Wheat and Flour

Wheat is processed into flour and then packaged and distributed throughout the city. Wheat for flour is grown locally in Selenge province as well as imported from the Russian Federation by railways.

The wheat arrives in Ulaanbaatar, is stored in grain silos near the flour mill, then milled into flour, packaged, and stored at warehouses before being distributed to bakeries and stores. The company has a fleet of seven mini trucks each with a capacity to hold 3 tons of freight. These trucks make direct deliveries to end consumers and stores as per demand. Deliveries are typically made daily from the flour mill (Figure 63).

Figure 63: Transport and Distribution of Wheat and Flour



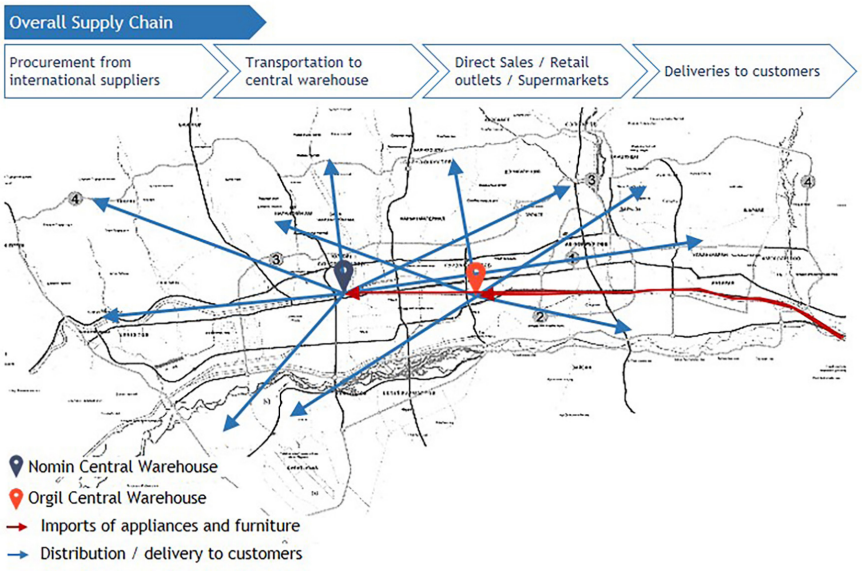
Source: Asian Development Bank.

Imported Goods (Containerized Freight)

Non-mining import containers arrive at respective warehouses of department stores from freight terminals located in Ulaanbaatar. From these warehouses, goods are then distributed to stores around the city using mini trucks. The two major department store operators in Ulaanbaatar have a total fleet of 40–45 such trucks, which make routine deliveries to stores during the day. The distribution is done either as milk-runs or as direct one-to-one deliveries, depending on the quantity to be delivered and the frequency of demand.

As seen in Figure 64, goods arrive at warehouses located in the central part of Ulaanbaatar, and then get distributed all over the city to stores and markets.

Figure 64: Transport and Distribution of Imported Goods



Source: Asian Development Bank.

Similarly, various other food products and perishables such as fruits, vegetables, and food grains, also follow various patterns of movement within the city depending on their source (origin), the location of processing or packaging plants, and the location of markets in Ulaanbaatar.

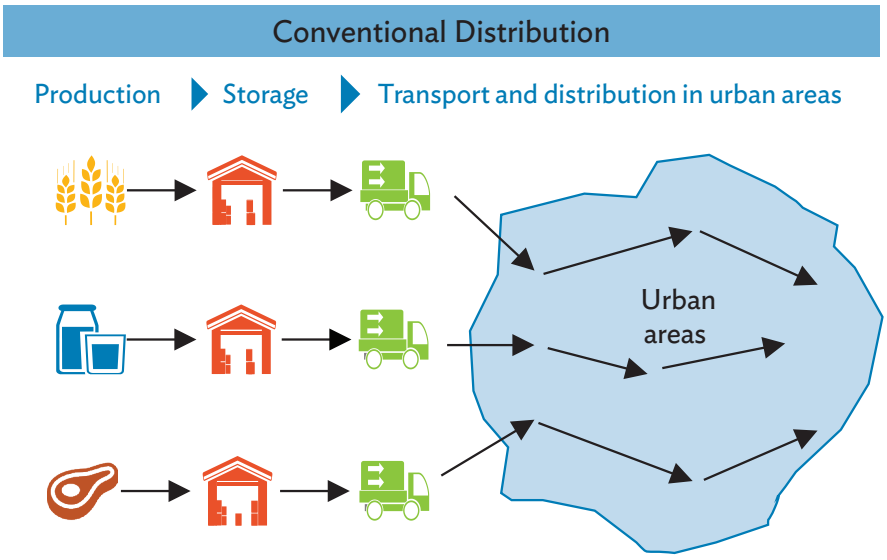
There are two major interventions that can help reduce the traffic congestion in Ulaanbaatar. The development of urban consolidation center (UCC) and the introduction of third-party logistics (3PL) service providers are discussed in the case studies.

Case Study: Urban Consolidation Center

The following case study by the Sustainable Urban Freight Systems elaborates the concept of UCC which can be effective in ensuring a well-coordinated transport and delivery system within urban areas while minimizing interference with the traffic on the roads. It also presents a practical and successful implementation example of this system for the distribution of non-mining products primarily consumed by the urban population of a city in Italy. The case presents similar characteristics to that of Ulaanbaatar, wherein the goods and products for the consumption by population arrive in the city from surrounding regions, but the transport within the city led to traffic congestion and delays.

Figure 65 represents the existing situation in Ulaanbaatar, where goods move throughout the city in an uncoordinated manner. Transport is done by different suppliers and/or manufacturers on their own using independent vehicle fleets. This leads to chaotic movement and frequent congestion in the city.

Figure 65: Conventional Movement throughout the City

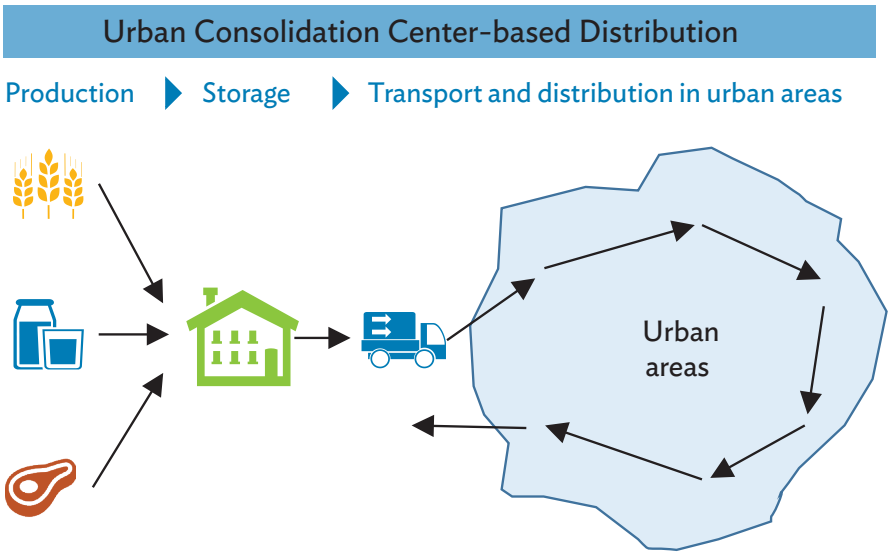


Source: Asian Development Bank.

Parma is a major hub for food product distribution and aggregation in Italy, and is also known as the capital of Italy's Food Valley. The city generates high daily traffic of food-based freight as well as passengers. The city administration has been traditionally implementing various techniques and projects to improve the flow of these goods and reduce congestion and improve the sustainability of urban transport. Some of the implementations include promotion of carpooling and use of electric vehicles. However, in 2004, the city administration in collaboration with private companies and trade associations, implemented the ECOLOGISTICS project dedicated to urban

freight transport in the city. The project aimed at finding sustainable solutions to deliver and/or distribute goods (food products) in the city, while ensuring minimum environmental impact, lower transport costs, and reduced congestion in urban areas.

Figure 66: Urban Consolidation Center-Based Distribution



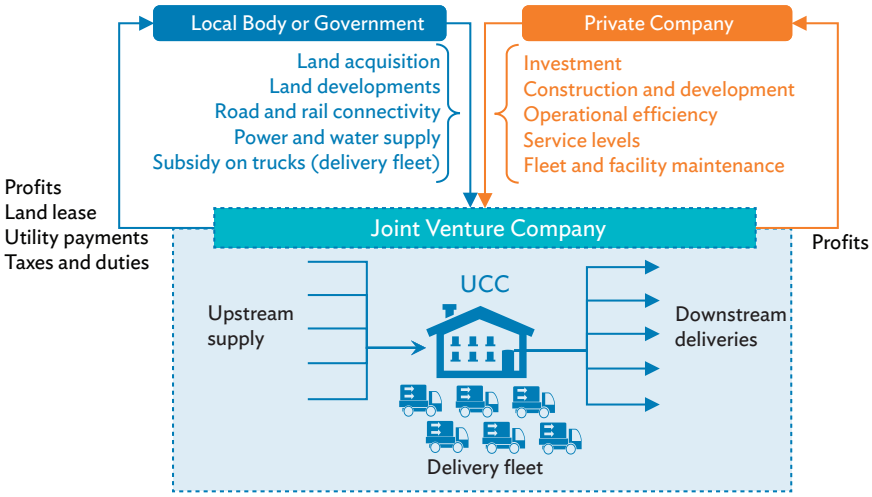
Source: Asian Development Bank.

The city used its existing infrastructure available with the Agro-industrial and Logistic Centre of Parma (known as CAL), which was originally conceived as a wholesale fruit and vegetable market. This facility had spare warehousing capacity which was used to set up the UCC for the ECOLOGISTICS project at Parma for food, agro, and textile products. Two main initiatives were launched as a part of this project:

(i) an urban consolidation service linked to the UCC for the Parma City, and
(ii) access restriction to urban centers for nonconforming vehicles to promote use of the ECOLOGISTICS fleet.

The UCC was set up in a 5,000-square meter warehouse (of which 300 square meters were refrigerated) with ramps for loading and unloading trucks, and road-based linkage to the city center and major highways. The facility started off initially with 16 methane-powered trucks, which were used for deliveries in urban areas. Vehicles of other private players with similar technical configuration as the methane trucks were also allowed to enter the city center. Figure 66 shows the distribution system of UCC. The UCC also implemented an information technology system to manage orders, packaging, labeling, optimization of truck loads, route selection, and monitoring of fleet movement through Global Positioning System-based trackers. Figure 67 shows the governance and operational structure of the UCC.

Figure 67: Governance and Operational Structure of the Urban Consolidation Center



UCC = urban consolidation center.

Source: Asian Development Bank.

Although using this service was not mandatory, the model was well received by transporters and end-users. Customers from the hotel-restaurant-catering sector, especially appreciated the benefits of the model and were the largest users for this service. On the other hand, other transporters who were earlier making long-haul deliveries as well as last mile short-run deliveries to the city center, started using the ECOLOGISTICS services for in-city deliveries and focused their business on long-haul transport which improved their operational efficiency as well.

The case study emphasizes the importance of geographically locating the aggregation and distribution facility for products outside the city, while maintaining a centralized control system for making deliveries such that maximum deliveries take place with minimum number of trips and vehicles for these deliveries. The implementation of a coordinated approach complemented using a common fleet of delivery trucks provided in the city, with a system that delivered the desired results without impacting the urban traffic.

Case Study: Third-Party Logistics Service Providers

3PL service providers take over the noncore operations of enterprises and provide common infrastructure shared between customers. These facilities include transport, storage, aggregation, and distribution. These service providers also facilitate tracking and tracing of shipments for long-haul transport (Figure 68).

By consolidating the operations of freight transport, handling, storage, and distribution from multiple sources, 3PL service providers ensure higher efficiencies at lower overall costs. The use of 3PL service providers lets manufacturers and

Figure 68: Third-Party Logistics Service Providers

Source: Asian Development Bank.

traders focus on their core business activities. Such services are especially beneficial in a market scenario where a high level of movement is done by small vehicles for distribution. Introducing 3PL participants will help businesses and industries outsource their transport and logistics operations to specialized companies, thereby improving the overall efficiency of the supply chain.

In the conventional model where transport fleets and warehouses are separately owned by transporters, manufacturers, or traders, these benefits are lost since each individual operates below capacity, but incurs overhead costs of operation and maintenance operation regardless of the infrastructure use.

The movement of freight and passengers within the city leads to congestion and delays for both; thus, it is necessary to develop solutions which can facilitate the movement of both while keeping in mind the need and objective of both types of movements. Developing facilities which monitor and regulate freight movement within the city at a central level such as the UCCs and promoting 3PL service providers to complement these centers can have a significant impact in reducing the congestion in the city.

The following section looks at some of the issues regarding the storage and handling aspects of perishables and food products. The way that goods are handled, stored, and transported has a direct impact on the costs of food products and perishables that are directly consumed by the country's population. This needs to be addressed with utmost importance.

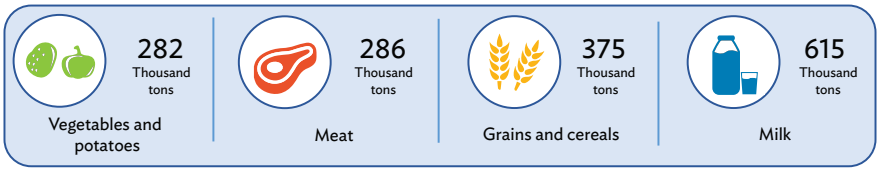
Storage and Handling of Perishables

Food is perhaps the most important constituent for human sustenance, and good quality food products are essential to the well-being of the people. The availability of good food to the people depends, to a very large extent, on the logistics and transport capabilities for these goods. Logistics play an important part in ensuring that perishable products, such as milk, meat, vegetables, and cereals reach consumers from their source in the right condition and at the right time. Whether these goods are moving or temporarily stored during transport, how they are kept is extremely important in ensuring the objective of delivering on time and in desired condition.

Logistics for domestic non-mining freight in Mongolia is dominated by transport and storage of agricultural products within the country's various *aimags*, and from the *aimags* to the country's main consumption center: its capital of Ulaanbaatar. The country's extreme winters strongly influence the production cycles of its agricultural produce, thereby making proper temperature-controlled storage and transport facilities essential to reduce wastage and ensure round-the-year availability of perishable commodities like vegetables, meat, and other animal products.

Mongolia produces a variety of agricultural products, such as milk and milk products, meat, grains and cereals, vegetables, and potatoes, and imports a significant volume of processed food products, such as beverages, pickles, edible oil, and meat products. Figure 69 shows Mongolia's average annual agricultural output between 2010 and 2015.

Figure 69: Mongolia's Average Annual Agricultural Output between 2010 and 2015



Source: Mongolian National Statistical Yearbook.

In 2015, the number of livestock in Mongolia reached 56 million heads. This marked a significant increase in livestock available for consumption and, consequently, availability of meat (by slaughter weight), which was the highest in the past 6 years. The total production of vegetables in the country was around 236,000 tons that mainly consisted of 164,000 tons of potatoes and 72,000 tons of other vegetables. Total production of cereals was around 195,000 tons, of which wheat constituted around 184,000 tons. Table 4 provides information on output of main agricultural products in Mongolia.

Table 4: Main Agricultural Products in Mongolia, 2010–2015 ('000 tons)

Output of Main Agricultural Products	2010	2011	2012	2013	2014	2015[a]
Meat (by slaughter weight)	201.2	208.0	263.4	299.3	291.7	448.3
Sheep wool	23.5	17.6	17.5	20.2	22.3	25.8
Cashmere	6.3	4.4	6.3	7.0	7.7	8.9
Milk	588.0	588.0	588.0	667.0	765.4	874.4
Cereals	355.1	446.1	432.8	350.2	470.0	194.6
Potato	345.5	435.9	245.9	191.6	161.5	163.8
Vegetables	328.5	395.2	99.0	101.9	104.9	72.3
Hide and skins (million pieces)	0.0	0.0	8.6	11.0	10.2	15.2
Eggs (million pieces)	56.6	56.6	56.6	63.2	72.2	100.6

[a] Provisional data.

Source: Mongolian Statistical Yearbook. 2015.

Cattle herders and farm workers in Mongolia. 1. A cattle herder in Mongolia (photo by Shutterstock.com); 2. farm workers during harvest; 3. workers preparing a cultivation farm in Mongolia (photo by Shutterstock.com); 4. a farmer selling his produce in local markets in Mongolia (photo by Shutterstock.com).

While some quantities of milk, meat, vegetable, and cereal production are consumed locally at the source, most of the production volume is transported to urban areas, especially to Ulaanbaatar, since a majority of the consumers are in the capital city. Likewise, the imported food products are also primarily consumed in Ulaanbaatar and other urban areas of Mongolia, such as Darkhan and Erdenet. Figure 70 presents the composition of a typical meal in urban and rural areas of Mongolia.

Figure 70: Composition of Meals for Urban and Rural Areas of Mongolia

Sources: National Statistical Yearbook; Mongolia and Asian Development Bank team analysis.

To ensure that the demand from the consumers is met, these goods require good quality handling and storage infrastructure during their transport. This is also essential to ensure that wastage and contamination of these products are minimized and health risks for the consumers are prevented.

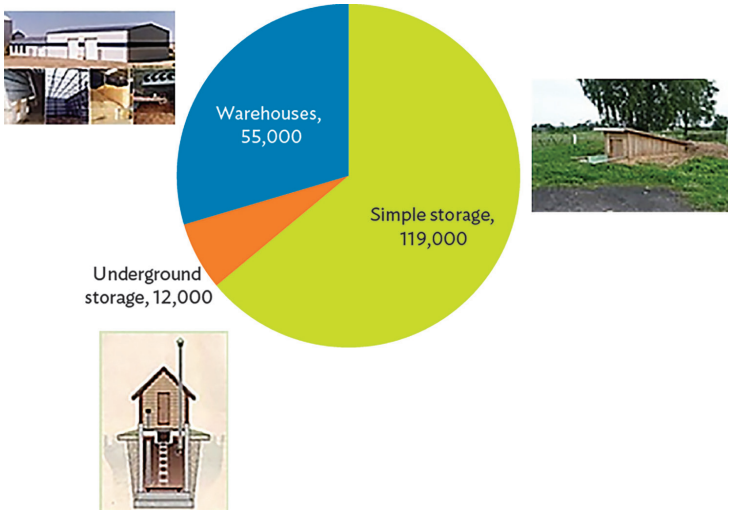
Storage and Warehousing Facilities for Vegetables and Potatoes

Logistics chains for vegetables and potatoes face challenges in terms of the facilities and capacity for storage and handling. Vegetables (along with potatoes) comprised around 35% of Mongolia's agricultural production that requires long-duration temperature-controlled storage. Vegetable and potato production in 2015 was 2,36,000 tons, while storage capacity was only 186,000 tons in 3,600 warehouses and storage areas of various types. Storage capacity could accommodate only 70% of annual vegetables and potato production in the country. The following graph depicts the breakup of the type of storage facilities available in Mongolia for storing vegetables and potatoes.

Figure 71 shows that nearly 70% of storage facilities for vegetables and potatoes comprise underground storage pits dug in basements of households of farmers and simple storage facilities, which are structures made of wood, stone, bricks, and concrete. These storage structures expose the agricultural produce to extreme weather during winters. Moreover, only 50% of total storage facilities for vegetables and potatoes were classified as good and another 35% were categorized as average by the government.[15]

The government plans to increase the production of vegetables and potatoes to make the country self-sufficient in these commodities. The requirement of quality temperature-controlled storage facilities will only rise.

Figure 71: Types of Storage Facilities with Capacity for Storage of Vegetables and Potatoes in Mongolia, 2015



Source: Ministry of Food and Agriculture, Government of Mongolia.

[15] Ministry of Food and Agriculture, Government of Mongolia.

Supply Chain for Meat and Meat Products

The country's meat supply chain comprises multiple actors, most of which are in the unorganized sector. Only a small percentage of livestock is sold directly by the herders to the processing companies in the organized sector through the agents of such processing companies. Majority of livestock passes through several steps (in the unorganized sector) that involve traders, small agents, herders' cooperatives, slaughterhouses, and wholesale markets. The presence of such actors increases the costs at each transaction without resulting in any significant value added.

Photographs on pp. 75 and 76 describe the meat supply chain for domestic consumption as well as exports of meat and meat products from Mongolia, and depicts the key actors involved at various stages. Some key steps in the meat supply chain are:

(i) The herders slaughter the animals themselves and take the carcasses to the wholesale markets in the various *soums* (districts) in Ulaanbaatar. However, most of the herders sell their livestock to middlemen such as brokers, meat traders, and small agents; some sell to herders' cooperatives in each *soum*.
(ii) Herders also sell livestock to brokers, agents, and small-scale meat traders who slaughter livestock purchased from herders and sell the carcasses in wholesale markets.
(iii) Many herders in *soums* are members of herders' cooperatives that further sell the live animals to slaughterhouses in Ulaanbaatar, as well as to wholesale centers in Emeelt and Nalaikh and to meat factories and processing plants in various *aimags* and Ulaanbaatar.
(iv) In addition to purchasing livestock from herders' cooperatives, most of the meat processing companies have their own agents located in various *soums* to procure livestock directly from herders. This channel forms the major supply chain link for supply of livestock to meat-processing plants.
(v) Animals purchased in various soums and *aimags* are transported by road to the various processing plants located in *aimags* or Ulaanbaatar, and are slaughtered there.
(vi) Mongolia's meat export market is catered to only by meat-processing companies in the organized sector, while the domestic consumption market for meat is supplied by wholesale markets, slaughtering centers, as well as meat processing factories. Some processing plants even manufacture final products like packaged meat and meat products ready for exports. However, utilization of storage capacity of these processing plants is very low.

Some Key Observations on the Meat Supply Chain

(i) The involvement of multiple entities and actors in the meat supply chain results in increased prices at each node of the chain with little or no value-added to the product or the overall process.
(ii) This supply chain involves transport of live animals, carcasses, cut meat, and meat products in trucks or private vehicles, most of which do not have any form of temperature-controlled storage facilities and usually do not meet the international standards.
(iii) The meat handled at processing plants and factories in the organized sector accounted for only 3.5% of total meat production in Mongolia during 2015.

One of the major reasons supply chain actors prefer the traditional methods is due to their comparative lower costs vis-à-vis the organized sector. Thus, while the organized system of procuring livestock, slaughtering, processing, and supply and/or storage of meat and meat products ensures higher quality of products, it has to compete with cheaper traditional methods.

In urban areas, an average Mongolian consumes about 80.4 kilograms (kg) of meat, 94 kg of milk, 72.4 kg of vegetables, and 142 kg of cereals a year.

While sufficient temperature-controlled storage facilities are available at processing plants and factories in the organized sector, the storage of carcasses, meat, and meat products by the unorganized sector comprises of facilities like underground storage in households, simple storage in structures made of wood, stone, and cement; and storage in third-party temperature-controlled facilities.

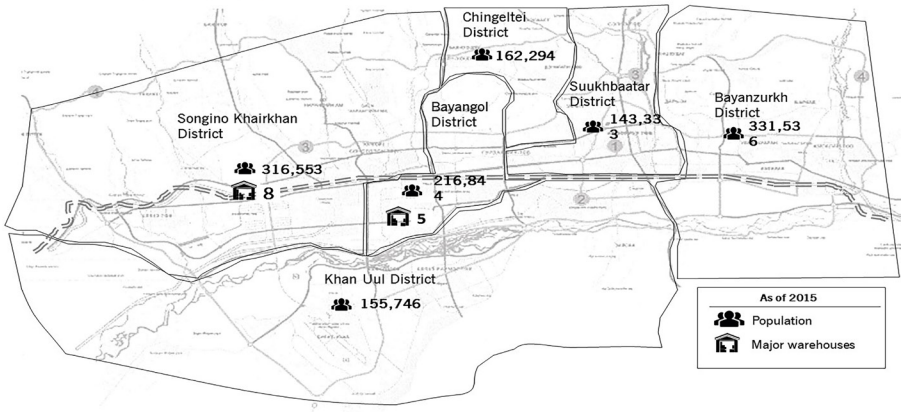
The need for a well-designed and appropriate storage is even more crucial since the harvesting of farms and slaughtering of animals for meat are done during a specific time of the year, but the farm produce and meat are consumed throughout the year. Thus, the products need to be stored for some time before they are consumed.

Due to the lack of adequate and well-designed storage facilities in Mongolia and specifically in Ulaanbaatar, which is a major consumption center, meat and other perishables are stored in substandard conditions, which may lead to health issues for consumers. Figure 72 shows the district-wide population and available major warehouses in Ulaanbaatar.

Mongolia also exports meat to other countries, but the lack of storage facilities for meat consignments at BCPs has adversely impacted the exports. Meat exporters have to deal with losses due to deterioration and wastage during waiting time at BCPs since there are no facilities for storage of meat and perishables.

Example of transport and meat storage in Ulaanbaatar. Transport and storage of meat brought to a local market in Ulaanbaatar.

Figure 72: Population and Warehouses in Ulaanbaatar, 2015



Source: National Statistical Yearbook. 2015.

Thus, it is important to develop good quality infrastructure to store and transport perishables such as meat, vegetables, milk, and cereals. The following are some examples of how perishables are transported, handled, and stored elsewhere in the world.

Temperature-Controlled Storage and Transport Infrastructure

Perishables must be stored and transported in facilities which have temperature-control systems installed to ensure that the contents stored are not exposed to contamination or infections that may lead to health hazards for the people at large. It requires efforts for the development of storage infrastructure such as food-grade warehouses with temperature-control systems as well as vehicles appropriately designed for transportation of livestock, meat, milk, cereals, and vegetables.

Temperature-controlled storages for perishables. 1. Warehouse for storage of vegetables and fruits; 2. temporary storage of meat in a well-designed slaughter-house; 3. deep freeze storage for processed meat (photos by Shutterstock.com).

Transportation trucks designed for livestock and perishables. 1. Trucks designed for transport of livestock such as cows, horses, and pigs; 2. temperature-controlled truck for transport of processed and semi-processed meat (photos by Shutterstock.com).

Besides proper storage, use of appropriate vehicles for transportation are also equally important. Vehicles specifically designed for transportation of livestock or perishables should be used to prevent injuries to livestock or deterioration of perishables.

Prevention of injuries to livestock and reduction of deterioration and wastage of perishables can help reduce costs incurred by farmers, and herders, and ensure that good quality products are available to consumers at reasonable prices. The following case study is presented as an illustration of a successful large-scale supply chain management of milk, which is a highly consumed perishable food product in India as well as Mongolia.

Case Study: Amul's Milk Supply Chain

India is the world's largest producer of milk and milk products and Amul is one of India's food product brands, which produces and markets milk and milk products in India as well as overseas.[16] Amul is run as a cooperative body by the Gujarat Co-operative Milk Marketing Federation Limited, which is jointly owned by more than 3.6 million milk producers (farmers and herders) from the State of Gujarat in India. Amul follows a three-tier system for its milk supply chain.

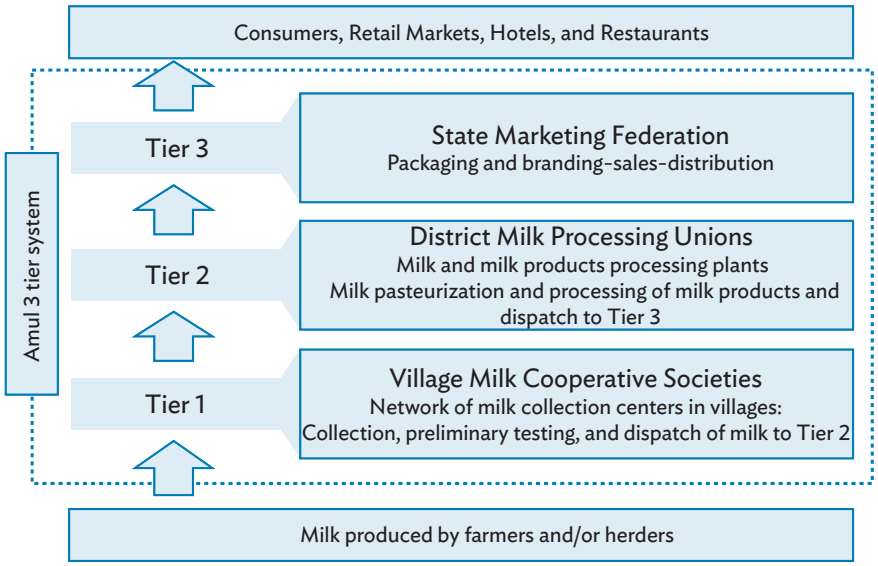
Amul has established a network of milk-collection centers at the first level which are equipped with automated milk-collection, testing, and chilled storage facilities. This ensures that the quality of milk is maintained at the source. Milk collection centers open twice every day all year to receive milk from farmers and herders. Farmers and herders bring their milk to these centers and, after receipt and preliminary testing for quality, herders are paid for the milk brought by them. Milk is stored in chillers

[16] Food and Agriculture Organization. Gateway to Dairy Production and Products. http://www.fao.org/agriculture/dairy-gateway/milk-production/en/#.WWIICISGPIU accessed on August 2017.

temporarily, and then dispatched to the District Milk Processing Union plants in temperature-controlled trucks.

These temperature-controlled trucks bring milk from nearby villages to the district milk-processing plants twice daily for further processing. Milk is received from these trucks in automated receiver bays, and is sent to the testing facility within the plant. Once laboratory results for testing are received, the batch of milk is accepted for processing and sent for pasteurization and storage in temperature-controlled silos for further processing or packaging as the need may be. Figure 73 shows the three-tier supply chain system that Amul follows.

Figure 73: Amul's Three-Tier Supply Chain



Source: Asian Development Bank.

The district marketing federation is responsible for management of orders and ensuring timely deliveries to the end customers. Throughout the entire supply chain starting from villages to end customers, Amul uses state-of-the-art collection, storage and transport facilities, which ensure that the raw materials or products are maintained at high standards of quality.

Considering the importance of food as a source of livelihood as well as for the sustenance of the population, and comparing it with existing facilities and practices for its storage and handling in Mongolia, it is imperative to ensure that better systems and facilities are put in place to ensure minimal wastage and reduction of possibility of contamination. Developing well-designed temperature-controlled storage facilities at the source, point of consumption, and at BCPs for exports will help ensure that

perishables such as meat, milk, fruits, and vegetables retain their quality and freshness as well as prevent the outbreak of diseases among the population.

Chapters 2, 3, 4, and 5 looked at the issues with physical infrastructure and processes for international trade and domestic freight movement in Mongolia. Chapter 6 discusses the issues with transit freight in Mongolia and the possible interventions to address these issues.

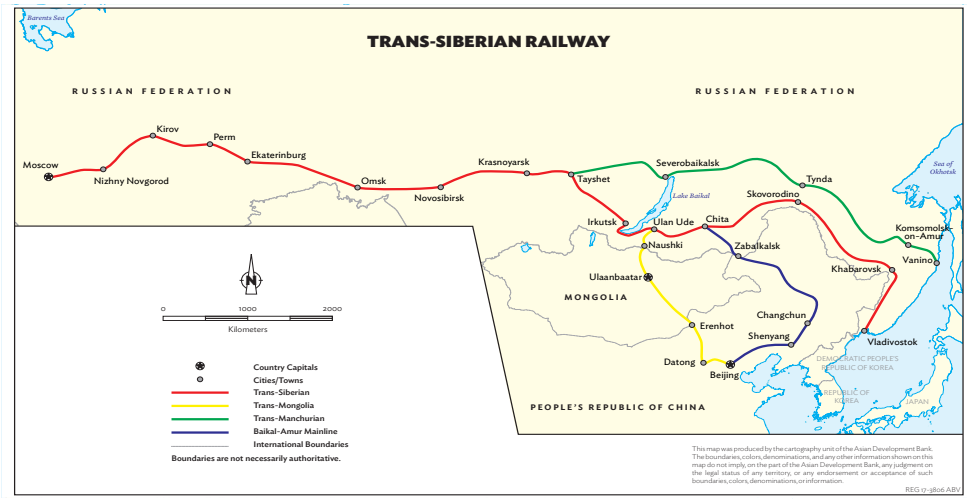
6 Transit Trade Through Mongolia

Existing Transit Trade through Mongolia

Being landlocked between the Russian Federation and the PRC, Mongolia acts as a land bridge between the two countries, and provides passage to goods moving between the two countries. Conventionally, goods passing through Mongolia between the Russian Federation and the PRC are transported by railways over the Trans-Mongolian branch of the Trans-Siberian Railway Network (Figure 74).

In 2014, 89% of the total goods traffic volume transported by railway between the Russian Federation and the PRC was through the Zabaikalsk–Manzhouli border crossing point, 7% through Mongolia, and 4% through Kazakhstan.

Figure 74: Trans-Siberian Railway Network



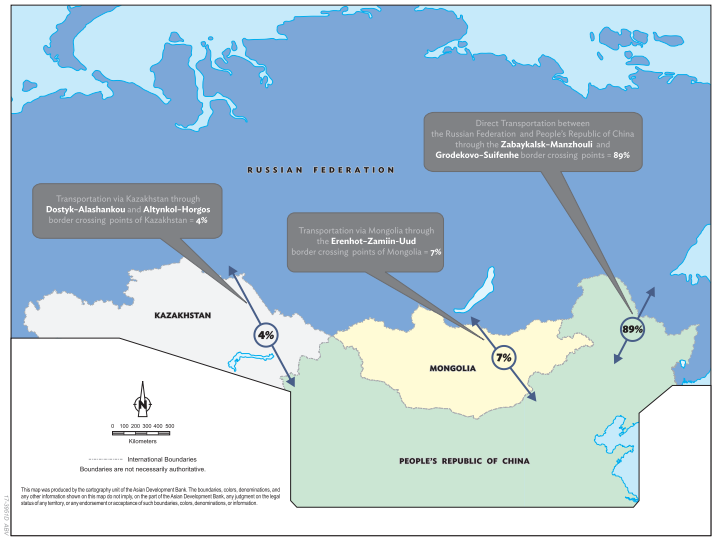
Source: Asian Development Bank.

Another branch of the Trans-Siberian Railway Network which directly enters the PRC at the Zabaikalsk–Manzhouli BCP is the dominant route used for movement of goods between the two countries. The border crossing between the Russian Federation and the PRC at Zabaikalsk–Manzhouli also allows movement of goods by road. Goods also move between the Russian Federation and the PRC through Kazakhstan to some extent.

Until recently, road-based transit movement between the Russian Federation and the PRC did not exist. However, in 2016, a pilot run for transit movement through Mongolia between the Russian Federation and the PRC was conducted.

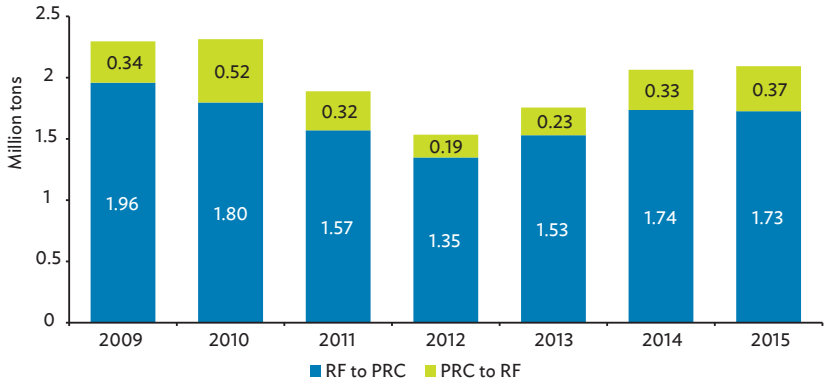
For rail freight, the current dominant route for trade between the Russian Federation and the PRC is through the Manzhouli–Zabaykalsk BCP catering to 89% of the total rail-based trade between the two countries in 2014 (Figure 75). The availability of planned infrastructure and significant freight handling capacity, coupled with round-the-clock border crossing operation, has favored the Manzhouli–Zabaykalsk BCP. For transit movements through Mongolia, the Zamyn Uud BCP on the Mongolia–PRC border and the Suukhbaatar BCP on the Mongolia–Russian Federation border are the major gateways for all rail-based freight movement. Figure 76 shows the transit traffic between the Russian Federation and the PRC passing through Mongolia by railways between 2009 and 2015.

Figure 75: Rail-Based Trade Movement Volume between the Russian Federation and the People's Republic of China, 2014



Sources: Ulaanbaatar Tumur Zam and Asian Development Bank analysis.

Figure 76: Transit Traffic between the Russian Federation and the People's Republic of China through Mongolia



PRC = People's Republic of China, RF = Russian Federation.

Source: Ministry of Road and Transport Development, Government of Mongolia.

The transit freight movement by railways moving through Mongolia averages close to 2 million tons per annum. This movement takes place through the Trans-Mongolian line, which passes through the capital city of Ulaanbaatar. Since this is the only railway line connecting the PRC and the Russian Federation borders, the movement of transit freight as well as passengers takes place through this line. As a result, the city suffers from traffic congestion and pollution due to movement of trains carrying freight. On 17 October 2012, the city mayor of Ulaanbaatar and the minister of the Ministry of Road and Transportation signed a Memorandum of Cooperation which included the following points:

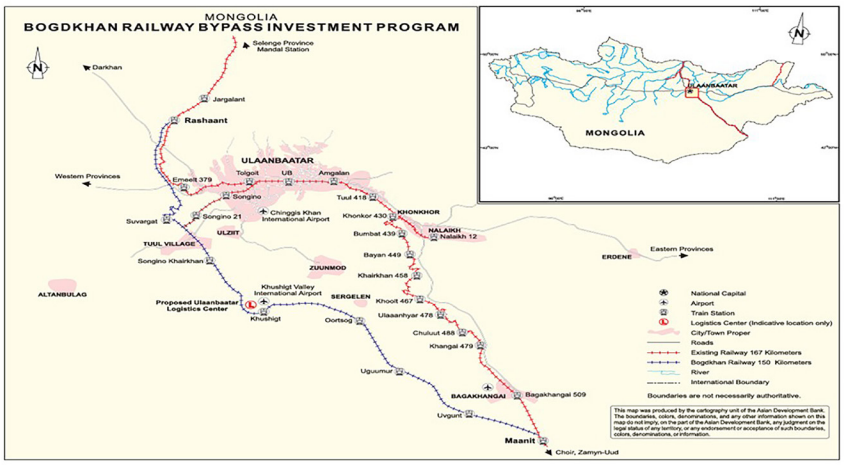
(i) Construct the basic structure of the Bogdkhan Railway (bypass line) to increase the speed of the railway, shorten the time taken by trains running through Mongolia, and secure better living and working conditions.

(ii) Relocate the railway depots for locomotives, passengers, and freight trains from within the Ulaanbaatar city area.

(iii) Relocate the logistics terminals present in the city center, and develop comprehensive logistics centers for the complex freight transportation.

(iv) The Bogdkhan bypass railway line is an important project which will serve two purposes for Mongolia. First, it will help decongest the existing railway line by diverting the transit passenger and freight traffic away from Ulaanbaatar. Further, it will provide a faster and more efficient route for facilitating more transit traffic between Russian Federation and PRC. An indicative alignment for the Bogdkhan bypass line is shown in Figure 77.

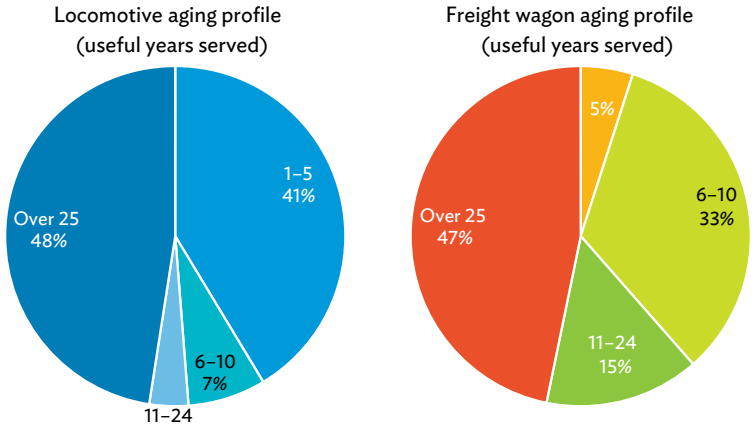
Figure 77: Indicative Alignment of the Bogdkhan Bypass Line



Source: Asian Development Bank.

There are two major challenges for the transit movement of goods by rail between the Russian Federation and the PRC through Mongolia. The first is the difference of the railway gauge between Mongolia and the PRC, which requires additional loading and unloading of goods between different trains at the Mongolia–PRC BCP. The second challenge is the lack of available locomotives and wagons in Mongolia to operate trains carrying transit cargo. A major part of Mongolia's fleet of existing locomotives and wagons is expected to be out of service soon since most locomotives are approaching the end of their economic life.

Figure 78: Aging Profile of Mongolia's Railway Rolling Stock



Source: Ulaanbaatar Tumur Zam and Asian Development Bank analysis.

About 48% of the locomotive fleet and 47% of the wagon fleet are already over 25 years old and will soon be unusable for operations. This will effectively reduce the operational capacity of railways in Mongolia by half, thereby impacting the movement of transit goods through Mongolia (Figure 78).

It is estimated that, to transport an additional 10 million tons of annual cargo, Mongolia would need 2,100 new wagons in addition to the replacement of around 3,000 old wagons, i.e., 5,100 new wagons. Therefore, it is imperative to augment the locomotive and wagon fleet in Mongolia to cater to the existing and the future traffic of goods as well as passengers moving by railways.

The Bogdkhan bypass railway line, which has been contemplated for some time by the Government of Mongolia, would provide a major boost to the transit traffic through Mongolia. It would also release line capacity along the Ulaanbaatar section, which is currently used for domestic, transit, export, and import rail freight.

Trilateral Economic Corridor

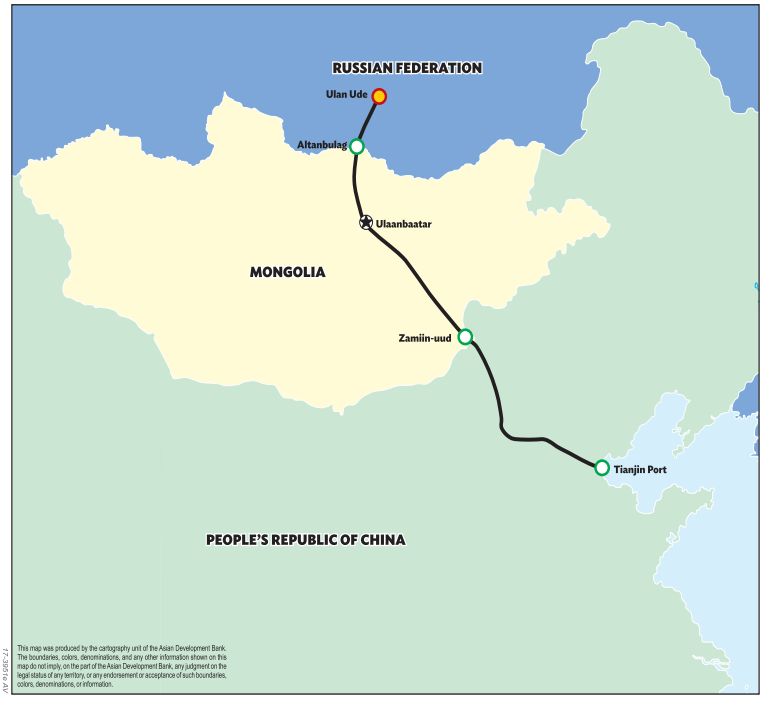
The Russian Federation, Mongolia, and the PRC entered into a trilateral Economic Partnership Agreement on 23 June 2016 in Tashkent, Uzbekistan during the 11th meeting of the Shanghai Cooperation Organization. The agreement includes a list of

32 projects in various areas, such as transport infrastructure development, industrial development, cooperation on border processes, cultural exchange, agriculture, and tourism. A major part of this agreement focuses on cooperation to improve roads and other transport infrastructure, regular consultation with third-party transport agencies including railway companies, and promoting trade in the region.

The transit movement of goods through Mongolia has been governed by the SMGS Convention of 1951 for rail-based transit transport over the years. The Trilateral Partnership Agreement is expected to further facilitate the movement of transit goods by railway through Mongolia as the three countries increase their cooperation on border processes and customs procedures.

Due to the absence of a uniform code for movement of goods by road across the three countries, transit movement of goods by road through Mongolia did not exist. However, following the agreement for developing an economic corridor through the Trilateral Partnership Agreement, the governments of the Russian Federation, Mongolia, and the PRC conducted a pilot run between 13 August 2016 and 25 August 2016 for road transit through Mongolia. For this pilot run, trucks left the Tianjin Port from the PRC and entered Mongolia at the Erenhot and Zamyn Uud BCP. From here, the trucks reached Ulaanbaatar and then proceeded onward to Altanbulag BCP on the northern border of Mongolia. After crossing the Altanbulag BCP, the trucks traveled to Ulan Ude where the pilot run terminated. Figure 79 shows a schematic map of this pilot run.

Figure 79: Route for the Pilot Run by Road for Transit through Mongolia



Source: Asian Development Bank.

The pilot run was conducted to test the actual transport time from start to end, and to understand any practical difficulties that may be encountered during the transportation. During the pilot run, the MCGA achieved an average processing time of 15 minutes per truck at BCPs.

Similar to the SMGS Convention of 1951, governing the rail-based transit movement through Mongolia which is uniformly accepted in all three countries, a convention for road-based transit needs to be adopted to fully leverage the proposed economic corridor between the three countries. The Transports Internationaux Routiers (TIR) Carnets Convention of 1975 for road-based transit transport can be an effective tool to promote road-based trade between the PRC and the Russian Federation through Mongolia. The TRI Carnets Convention is recognized by the three countries, and is in different stages of implementation.

Table 5: Accession of the Transports Internationaux Routiers Carnets Convention

Country	Accession or Ratification	Date of Accession or Ratification
Russian Federation	Acceded	8 June 1982
Mongolia	Acceded	1 October 2002
People's Republic of China	Acceded	5 July 2016

Source: United Nations Economic Commission for Europe. https://www.unece.org/trans/conventn/legalinst_42_bcf_tir_1975.html.

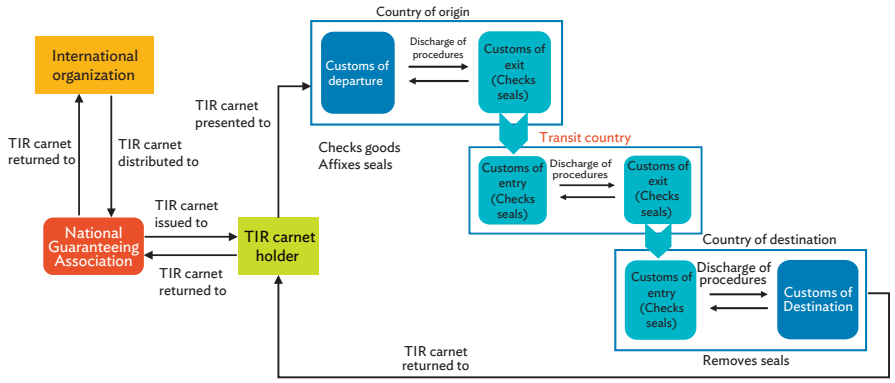
Case Study: Transports Internationaux Routiers Convention in Operation

The TIR system has been extensively implemented in many countries, and has helped simplify the road-based transit movement by reducing the cost of securing guarantees. Mongolia too can benefit from the TIR Carnets Convention by acting as a transit corridor between the PRC and the Russian Federation. This case study elaborates the comparative advantage of TIR carnets system over other road transport conventions by being the simplest and cheapest among other similar systems. This case study from the TIR Handbook of the United Nations Economic Commission for Europe elaborates the comparative advantage of TIR carnets system over other road transport conventions by being the simplest and cheapest among other similar systems.

The primary objective of the TIR Carnets Convention is the simplification of border customs procedures and elimination of redundant activities that do not add value at road-based BCPs. The success of the system relies on active participation of countries, and provision of a conducive environment for the system to function.

The TIR system has an Executive Board that ensures that support and timely resolution for all issues arising from operations and provides consultation on matters of dispute if they arise. The TIR Carnets Convention not only covers transit by road, but multimodal transport as well, as long as one part is by road. Table 6 provides the benefits and risks and/or disadvantages in the implementation of a TIR system for road-based transit movement.

Figure 80: Transports Internationaux Routiers Carnets in Operation



Source: Asian Development Bank.

Table 6: Benefits and Disadvantages of the Transports Internationaux Routiers Carnets System

Guarantee System	Benefits and/or Advantages	Risks and/or Disadvantages
Transports Internationaux Routiers	• Internationally accepted, tried and tested system, and operational in 70 countries worldwide • Cheaper than all prevalent systems • Higher level of cargo security • Faster customs processing at border • Fewer instances of default or nonpayment of duties, thus fewer claims • Transparent and provides access to statistical data	Requirement of secure containment or sealed load compartments limit usage to containerized or bulk liquid cargo and not for dry bulk commodities

Source: International Road Transport Union. 2016. *Transit Costs in East and Southern Africa*. August.

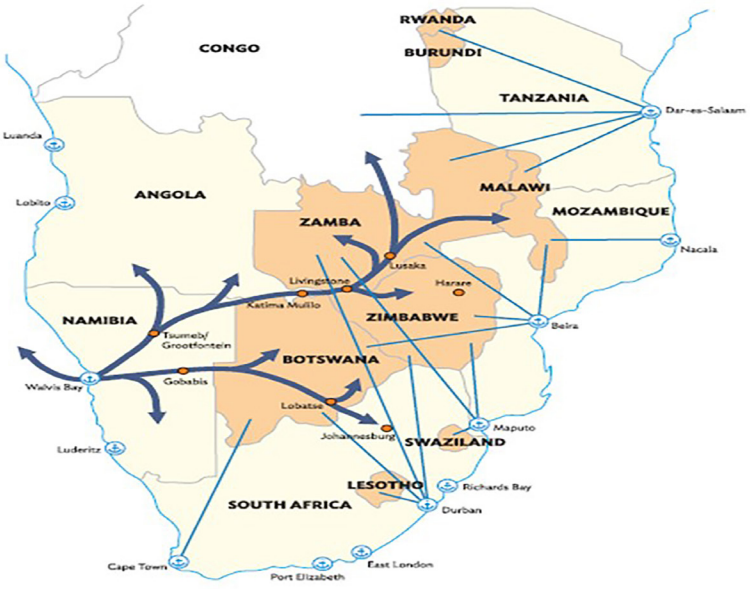
Case Study: Advantages through Transit Trade Facilitation: Walvis Bay Corridor Group

Landlocked countries are at a geographical disadvantage due to the lack of direct access to maritime trade routes. They have to rely on their neighboring countries for much of their trade requirements. As a result, typically, trade volumes are low and trade costs are high for landlocked countries. However, being landlocked also presents an opportunity to facilitate the movement of goods between neighboring countries by acting as a land bridge. Countries can harness this peculiar situation to their advantage by developing dedicated economic and freight-friendly corridors within their borders. Simplification of border crossing procedures and provision of better border infrastructure are the key measures that can improve the flow of transit freight through a landlocked country. As transit freight through the country improves,

the movement of export and import trade for the landlocked country also improves, and the costs associated with transport and logistics reduce as systemic efficiency improves.

The Walvis Bay Corridor Group is a trade and transport facilitation networked cluster in south-central Africa. The group comprises freight forwarder associations, road carriers associations, port authorities, local municipal governments, departments of customs, trade, and transport of various countries such as Botswana, Malawi, Namibia, Zambia, and Zimbabwe. This group has helped bring stability to trade and transport in the region besides also providing benefits such as employment generation along the corridor routes. The participation of public and private institutions has enabled it to become a one-stop support and resource center for all transport and trade-related services in the region. This has greatly improved the reliability and convenience of cargo shipments in the region (Figure 81).

Figure 81: Walvis Bay Corridor Group



Source: United Nations Conference on Trade and Development (UNCTAD). 2003. Strategies for Landlocked and Transit Developing Countries to Plan and Implement Sustainable Trade and Transport Facilitation Initiatives. UNCTAD/SDTE/TLB/2003/2.

Case Study: India–Nepal Cross-Border Trade, Treaty of Transit, and Institutional Arrangements

Source: Asian Development Bank secondary research.

Nepal is a landlocked country on the northeastern border of India, along the Himalayan mountain ranges. Much like Mongolia's dependence on the PRC for its external trade, Nepal also relies on India for its trade with other countries. Nepal uses India's ports of Haldia and Kolkata on the east coast of India for its imports and exports to other countries.

To facilitate the transit movement of goods through India, Nepal and India signed a Treaty of Transit on 11 September 1960. The key provisions of the treaty are:

(i) freedom of movement to traffic-in-transit across the territories of both countries on mutually agreed routes without discrimination;

(ii) traffic-in-transit is exempt from customs or other transit duties during the course of transport through the other country's territory;

(iii) facilitation of traffic-in-transit through the provision of identified points of entry and/or exit and elementary infrastructure, such as storage sheds and/or yards;

(iv) definition of a mutually agreed procedure of inspections and checks to prevent delays in transport; and

(v) treatment to sea vessels with Nepal's flag at the Indian ports.

The provisions of the treaty allow seamless and uninterrupted movement of transit goods through India, which originate in Nepal or are destined for Nepal. It also establishes clear procedures for regulatory authorities from both countries to monitor and manage the movement of such goods, thereby reducing uncertainty of shipments and increasing timeliness of deliveries. This also helps shipping companies and freight forwarders structure their charges competitively having complete knowledge of the procedural requirements. Besides the trade with other countries, Nepal also has a significant trade volume with India as its trade partner. The bilateral trade between Nepal and India accounts for 60% of Nepal's exports and 57% of its imports for which Nepal and India have mutually agreed to recognize 27 nodes along their border for trade of goods between the two countries. The ministries of commerce of both the countries meet at regular intervals to revalidate the provisions of the treaty, and discuss any modifications that may be needed in its provisions to facilitate the trade and movement of goods.

Dialogue between and among neighboring countries is crucial to facilitate the movement of transit cargo in a landlocked country like Mongolia. Trade agreements and treaties are a significant part of trade facilitation for uninterrupted movement of transit goods, as presented in the case studies of ADB. Chapter 7 presents the recommendations for an efficient freight movement in Mongolia.

7 Summing Up

Mongolia's logistics sector has a very crucial role to play in the national economy as well as in the day-to-day lives of the people of Mongolia. Mongolia's mineral wealth is a major driver of the economy. Competitiveness of Mongolia's mineral exports in the international market depends on the logistics sector of the country. Efficient transport and logistics across borders will facilitate trade growth.

Despite the importance of trade, the potential of transport and logistics sector in the country has not been completely exploited. The Trans-Mongolian Railway line is the main arterial line which carries freight and passengers across the country, but is only able to serve a limited part of the country. As a result, the dependence on roads has increased and a significant part of the mineral commodities exported from the country rely on roads due to lack of railway connectivity.

The costs for transport and logistics are high in Mongolia. According to primary consultations with stakeholders, it is estimated that transport and logistics costs contribute to about 30% of prices of goods, which is significantly higher compared to other countries. While there are challenges arising due to the dependence on the two neighboring countries, the Russian Federation and the PRC, a suboptimal logistics ecosystem within Mongolia is a contributor to the costs. This publication covers issues with Mongolia's logistics, and has provided specific resolution mechanisms and recommendations that address them.

Recommendations for International Freight Movement

To unlock the potential of the logistics sector, the development of infrastructure has to be supported by improvement in border-related processes.

Create an integrated multimodal logistics facility.

Mongolia's imports are characterized by significant container-based freight. The existing scenario of multiple freight terminals served by the Ulaanbaatar railway station has created an inefficient system which has led to redundancy of assets, higher handling costs, and longer turnaround times. This system can be optimized by bringing together various freight terminal operators and freight forwarders in a common facility, which allows sharing of high-value assets among them, ensuring better asset utilization and lower operating costs for each operator and ultimately benefitting the end consumer. This can be addressed by

replacing the existing system with an integrated multimodal logistics facility. PPP opportunities can be developed in such facilities to synergize business opportunities in the city and address the issues that impact containerized imports in Mongolia. One example is the model of the integrated multimodal freight terminal at Dadri, India.

Provide rail connectivity between the mines and border crossing points.

Likewise, Mongolia's exports, which are dominated by minerals such as coal, iron ore, copper, and crude oil, face challenges from poor mine to border connectivity in most cases. Only three BCPs have rail connectivity and the road connectivity at the remaining BCPs is also inadequate. The infrastructure is also considerably inadequate at BCPs across Mongolia. Providing rail connectivity between the mines and BCPs will help save the cost of transport by lowering the fuel consumption. Thus, it is recommended that BCPs and mines should be linked with railway wherever feasible and the border infrastructure should be upgraded. The case of the Northern Railway Corridor can act as a model which can be replicated across other mines and BCPs, where the mining company also develops the railway link in conjunction with the Government of Mongolia. This is one alternative for delivery and/or operations of major projects in tight fiscal times, while still recognizing that planning and other public sector responsibilities still need other improvements.

Construct an automated bogie exchange facility at the border crossing point.

Another key issue which impacts the movement of goods across borders is the variation in the railway gauge of Mongolia and the PRC. This necessitates the transfer of freight between railway wagons of different gauges at the BCP. This additional handling of freight entails additional time and cost during transport. Currently, such a transfer takes place manually by unloading the freight from one wagon and then reloading the freight onto another wagon. This manual operation can be automated by a bogie exchange facility at the BCP between Mongolia and the PRC. Such a facility can help improve the throughput at BCPs significantly.

Implement a national electronic single window.

The idea of a national single window has been an effective solution to the conventional silo-like and compartmentalized functioning of various government agencies, ministries, customs authorities, other government authorities, and stakeholders in trade and transport.

To harmonize the border processes, it is essential that the MCGA, GASI, and the Mongolia Immigration and Border Security share and exchange information among them and operate in a coordinated manner to reduce repetitive steps at border crossing. The implementation of a national electronic single window can achieve these objectives.

Develop and adopt regulatory mechanisms.

Dialogue among neighboring countries is important to facilitate the movement of cargo into and out of Mongolia. To facilitate the movement of transit goods through Mongolia, the Trilateral Economic Corridor, being promoted jointly by Mongolia, the Russian Federation, and the PRC, needs to be augmented by creation of rail and road infrastructure along with implementation of the requisite regulatory mechanisms. While the SMGS Convention for rail-based transit movement already exists, the adoption of the TIR carnets for road-based transit movement can greatly boost the movement of transit freight across Mongolia.

Recommendations for Domestic Freight Movement

Build urban consolidation centers.

Being home to 46% of Mongolia's total population, Ulaanbaatar city has been facing constraints in the transport, storage, and distribution of goods produced and consumed domestically. Poor storage facilities and inefficient distribution mechanisms are the two major hindrances for the logistics related to domestic goods. Movement, storage, and distribution of domestic goods can be streamlined and efficiently managed by implementing UCC which help plan, organize, and optimize the movement of domestic goods within Ulaanbaatar as well as in nearby regions.

Promote third-party logistics service providers.

3PL service providers take over noncore operations of enterprises and provide common infrastructure that is shared between customers. These facilities include transport, storage, aggregation, and distribution. 3PL service providers also facilitate tracking and tracing of shipments for long-haul transport, and can complement UCCs and have a significant impact in reducing costs and congestion in the city.

Improve and develop the agricultural supply chain.

Logistics for domestic non-mining freight in Mongolia is dominated by transport and storage of agricultural products within the country's various *aimags* to Ulaanbaatar. The country's extreme winters strongly influence the production cycles of its agricultural produce, thereby making proper temperature-controlled storage and transport facilities essential to reduce wastage and ensure round-the-year availability of perishable commodities.

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Breaking Barriers
Leveraging Mongolia's Transport and Logistics Sector

This study provides insights into the logistics sector in Mongolia and its relationship to international trade, domestic trade, and freight movement throughout the country. It also looks at case studies and examples of logistics and transport solutions from other countries that are relevant to Mongolia. Recommendations may be used by policy makers, nongovernment organizations, and industry associations to delve deeper into some key areas of the trade and logistics sector in Mongolia, and take steps to make improvements.

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