

Logistics and Transport Challenges in Mongolia

Erdenechimeg Eldev-Ochir*

Abstract

In a globalized economy, efficient logistics and low transport costs are a significant determinant of a country's competitiveness. Indeed, transport and logistics have a number of direct and indirect links with important economic and social development goals. Reducing the cost and improving the quality of logistics and transport systems creates an integrated and efficient transport network, which improves international market access and leads directly to increased trade. Increasing trade leads to better jobs, higher incomes and poverty reduction, specifically an increase in the per capita real income of a country. Indeed, transport and logistics have direct and indirect links with socioeconomic development.

Keywords: logistics, transport, Mongolian economy, trade, rail, air, and water transportation

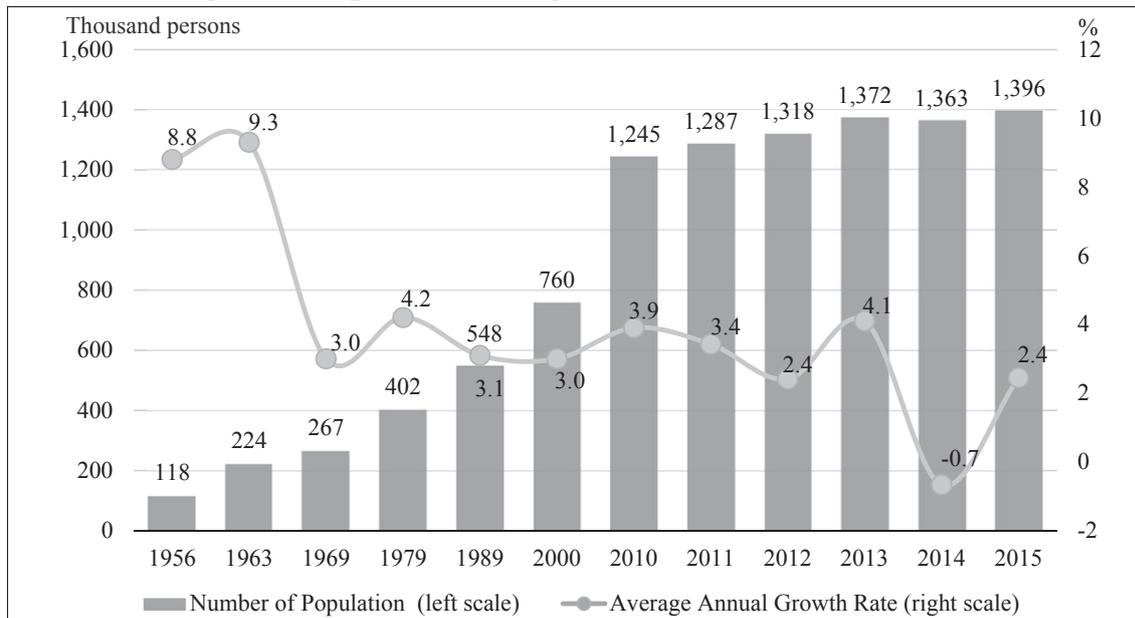
JEL classification codes: R40, A10

1. Overview of the Mongolian Economy

1.1. *Geography.* Mongolia is the 18th largest country in the world with an area of 1.564 million km². Mongolia is a landlocked country, located between the Russian Federation (RF) and the People's Republic of China (PRC). Being landlocked presents more challenges, associated with increased import prices, reduced export revenues and increased logistic costs. The high logistics costs of Mongolia also derive from poor transport infrastructure, underdeveloped transport and logistics services, and slow and costly procedures for dealing with both exported and imported goods.

1.2. *Population.* The total population was 3.06 million as of 2015, which increased by 10.8% over five years from 2.76 million in 2010. Mongolia has a population density of 1.8 people per km² and is very sparsely populated. But in contrast the population density (people per km²) in 2015 for Ulaanbaatar was 291.9, Orkhon Aimag 117.43, and Darkhan-Uul Aimag 29.99. Migration to Ulaanbaatar started in 1990 and rose steadily, greatly increasing between 2000 and 2010. In 2000, 32% of the total population resided within Ulaanbaatar, increased to 45.1% in 2010 and subsequently increased to 45.5% in 2015 (Figure 1).

In Mongolia, the cities of Ulaanbaatar, Erdenet and Darkhan are the main locations for business activities. Hence they play an important role in economic development. However, given the highly concentrated development in urban areas, these cities, especially Ulaanbaatar, have serious traffic problems and negative environmental impacts, such as noise, air, water, and land pollution. These negative factors reduce the economic competitiveness of a city and make its quality of life decline. City logistics is the process for optimizing the logistics and transport activities by private companies with the support of advanced information systems in urban areas, taking into consideration the traffic environment, congestion, safety, and energy savings within the framework of a market economy (Taniguchi et al., 2001).

Figure 1. Population Changes for Ulaanbaatar, 1956–2015

Source: Mongolian Statistical Yearbook, various issues

1.3. *Domestic Economy.* In 2015, GDP was 23.16 trillion togrogs at current prices and 15.84 trillion togrogs at constant prices in 2010. Mongolian economic growth or GDP at 2010 constant prices increased 2.3% in 2015, and compared to 2014 this was lower by 5.6%. The GDP growth rate was at its highest in 2011 at 17.51%, and subsequently decreased to 12.40%, 11.74%, 7.9%, and 2.3% in 2012, 2013, 2014, and 2015, respectively. The shares within GDP of (i) mining and quarrying, (ii) the wholesale and retail trade, and the repair of motor vehicles, (iii) agriculture, forestry, and fisheries, and (iv) transportation and storage were 17%, 17%, 13.6%, and 4.8%, respectively (National Statistical Office of Mongolia, 2015). Mongolia ranks 7th in global resources with around 1,170 known deposits and over 10,000 known instances of 80 different types of minerals have been identified, and the resources of coal, copper, gold, silver and uranium are known to be especially abundant (Mineral Resource Authority of Mongolia, 2014). From 2000, with the rapid price increase of key resources such as coal and oil, major mineral developers around the world turned their eyes to the potential of Mongolia's mineral resources, and began to enter the market. In addition, the government is trying to establish a manufacturing industry-based structure, expand the domestic market, and foster specialists to promote economic growth. However, the high expectations for the Oyu Tolgoi and Tavan Tolgoi development projects have been facing difficulties and delays, and there have been adverse impacts on mine development prospects. There is a need to devise efficient and effective measures to promote mineral resource development. The Mongolian government wishes to grow the economy using the abundant mineral resources, but there are many difficulties such as delays in development, insufficient transport infrastructure, obstacles to third country exports, and the limitations of implemented investments.

1.4. *External Trade.* In 2015 the surplus in Mongolia's foreign trade equaled US\$872.31 million, with exports at US\$4,669.47 million and imports at US\$3,797.16 million. In comparison with 2014 exports and imports they decreased by 19.1% and 27.5%, respectively; however, the foreign

trade balance increased from US\$539.23. Mineral resources provided over 80% of total exports, and this was 79% in 2015 (Table 1).

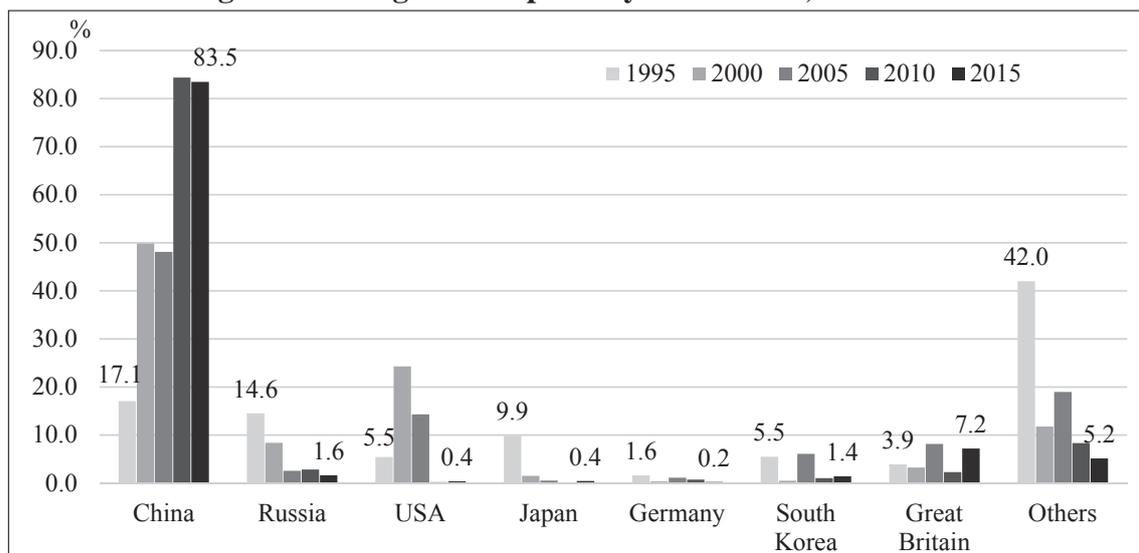
Table 1. External Trade Turnover, Exports, and Imports, 2010–2015 (US\$ million)

Main Indicators of Foreign Trade	2010	2011	2012	2013	2014	2015
Total turnover	6,108.6	11,415.9	11,123.0	10,626.9	11,011.0	8,466.6
Exports	2,908.5	4,817.5	4,384.7	4,269.1	5,774.3	4,669.5
Mineral products	2,354.5	4,299.4	3,909.3	3,495.5	4,791.5	3,678.4
Imports	3,200.1	6,598.4	6,738.4	6,357.8	5,236.7	3,797.2
Mineral products	754.9	1,274.4	1,581.2	1,738.6	1,463.9	936.4
Machinery, equipment, electric appliances, recorders, TV sets and spare parts	681.3	1,783.9	1,653.0	1,395.4	984.7	785.5
Auto, air and water transport vehicles and their spare parts	607.6	1,512.9	1,272.1	1,000.7	615.8	368.1
Balance	-291.6	-1,780.9	-2,353.7	-2,088.8	539.2	872.3

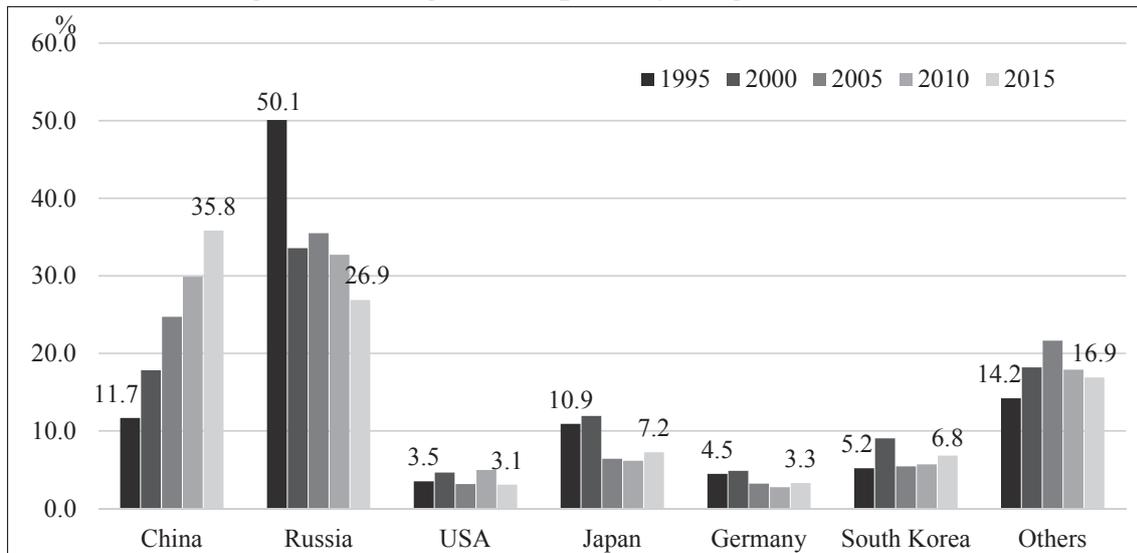
Source: National Statistical Office of Mongolia, 2015

The country's largest foreign trading partners are China (83.5% of total exports, 35.8% of total imports) and Russia (1.6% of total exports, 26.9% of total imports) (Figures 2 and 3). In contrast, trade with other countries accounts for only 14.9% of exports and 37.8% of imports. This can be explained by being a landlocked country with weak infrastructure connecting Mongolia to the world (especially Asia and the EU). The country's trade relations with its two neighbors is expected to remain robust and to grow rapidly.

Figure 2. Mongolia's Exports by Destination, 1995–2015



Source: General Customs Administration of Mongolia, 2016

Figure 3. Mongolia's Imports by Origin, 1995–2015

Source: General Customs Administration of Mongolia, 2016

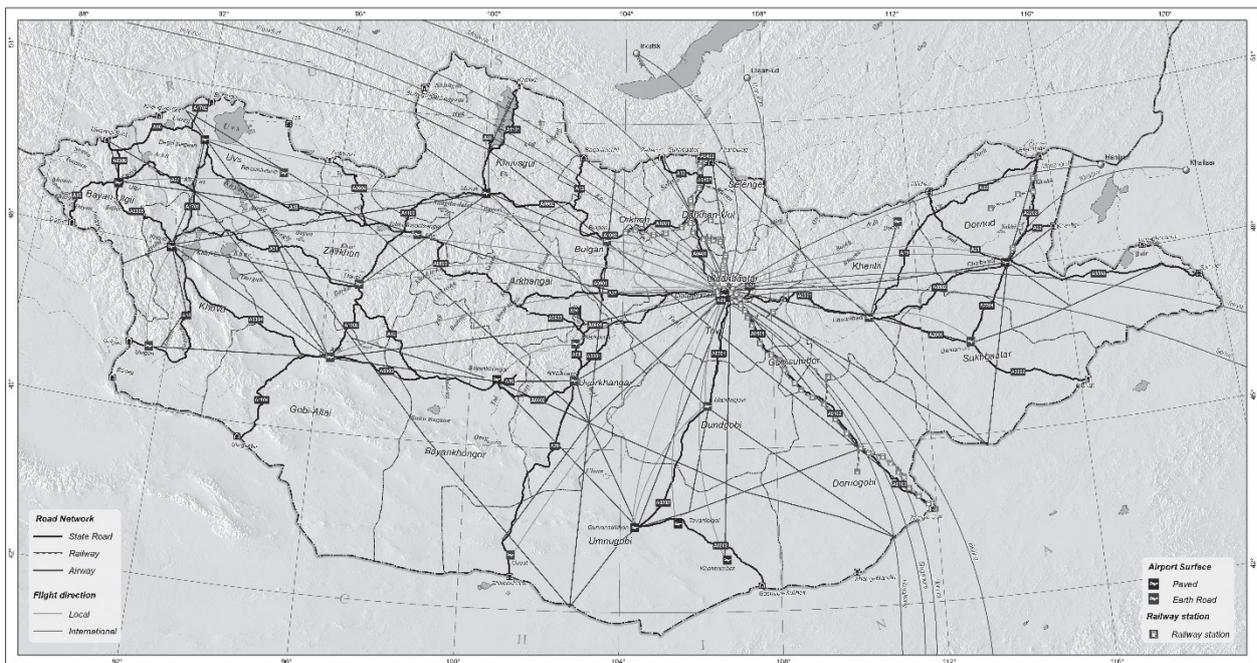
Mongolia's main imports are mineral products, machinery, and electric and electronic equipment. Its main exports are mineral products, such as copper concentrate, coal, crude oil, zinc concentrate, and gold. The Mongolian economy is too dependent on the mineral resources sector, which could entail huge risks. The establishment of controlled sustainable mineral extraction is necessary, especially for mineral commodity exports so as to manufacture value-added products meeting international standards at optimum market prices, as Mongolian mineral resources are non-renewable. Infrastructure and transportation, especially rail transportation, are important for both the domestic and international trade in mineral products. The government of Mongolia (2012–2016) wishes to establish a Minerals Exchange of Mongolia. The government considers that the establishment of a minerals exchange will create a reliable system for connecting suppliers and buyers, consisting of real market prices with more reliable access to information for the international market and investors, thereby increasing the competitiveness of Mongolian mineral products. It is essential to developing countries like Mongolia to widen their development base and meet growing socioeconomic needs. Industry extracts materials from the natural resource base and puts both products and pollution into the human environment. It has the power to enhance or degrade the environment. Therefore the government of Mongolia needs to prioritize particular industries for value-added products in terms of the importance of strengthening the Mongolian economy and positively impacting foreign and domestic investors.

2. Transport and Logistics in Mongolia

Mongolia ranked 119th with a 3.1 rating out of 144 countries in the Global Competitiveness Report 2014–2015 published by the World Economic Forum. This shows that Mongolian infrastructure is unsatisfactory. There are four sub-sectors of transportation operating in Mongolia. These are road, railway, air, and water transport. It is essential that transport and logistics in Mongolia should cope with increased demand for their services (Figure 4).

Mongolia's domestic economy is relatively small, consisting mainly of mining, livestock, and processing industries. Its main exports are mineral products and they account for approximately 80% of total exports. The basis of industrial development lies in the support and development of infrastructure, ecology, geology, and future planned development in accordance with state policies and sociopolitical factors. Increasing demand for transport and logistics involves supporting industrial development, including the agricultural sector's development, and both international and domestic trade development, including the development of free trade zones (FTZs) and special economic zones (SEZs). FTZs and SEZs have already been identified and stipulated by the government as focus points for investment: namely Zamyn-Uud, Altanbulag, and Tsagaannuur. Addressing increasing demand-side factors for industrial development involves attracting foreign investors to relocate to Mongolia, in the process increasing transit traffic through the country while engendering more economic activity, especially in regions away from Ulaanbaatar. Attracting foreign investors to the three FTZs requires that the necessary infrastructure in and around these areas be made available and that policies are formulated and adopted to provide sufficient economic incentives.

Figure 4. Mongolian Road Network



Data source: Ministry of Roads and Transportation, 2015

Source: Asian Infrastructure Research Institute

2.1. Automotive Transport. The road network in Mongolia is 49,250 km in length, of which 12,722 km are state/national roads and 36,528 km are local/provincial roads (including 553 km of mining roads) (Figure 5). The Mongolian road network is classified into the following categories: international roads, state roads, local roads, special purpose roads (including mining roads, etc.), and private roads. International roads consist of three Asian Highways (the AH3, AH4, and AH32). The feasibility study for the AH3 (from Altanbulag to Zamyn-Uud) construction work is underway. According to the current plan in the pre-feasibility study, the AH3 will be a six-lane highway (Zagdradnaa, 2016). State roads are intended to connect Ulaanbaatar with the aimag

centers, important towns, and border crossing points designated by government resolutions. The state roads have 33 routes. Local roads are intended to connect aimag centers with other aimag centers and villages. Mining roads are built by private-party and/or consortium agreement, with the condition of transferring the ownership of roads to the state after the expiration of the mine's life.

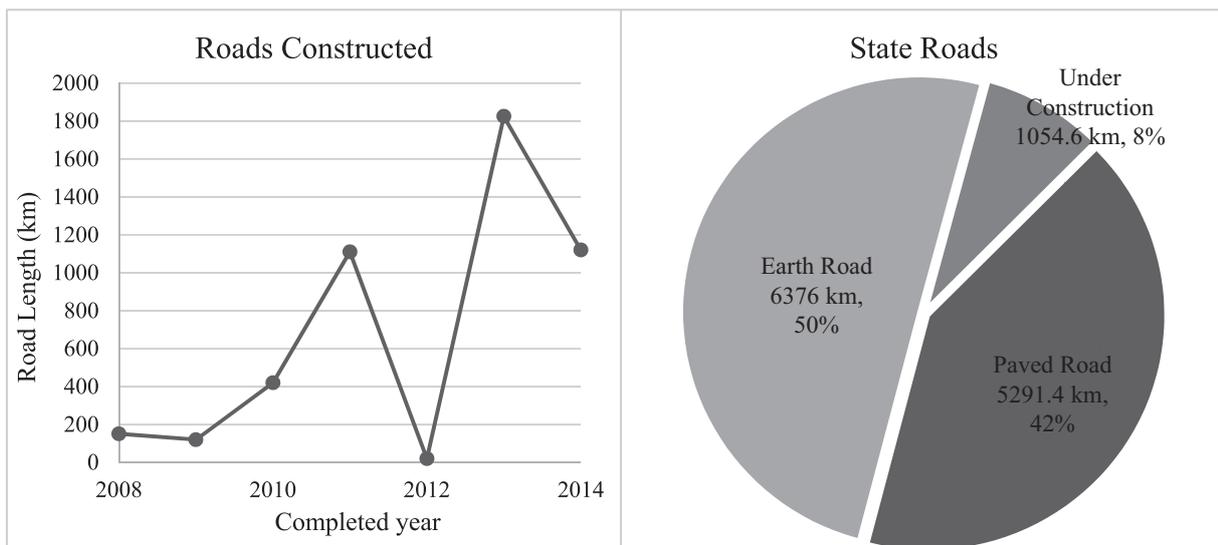
Figure 5. National Road Network



Source: Ministry of Roads and Transportation, 2015

2,656 km of paved roads were built in 2013 and 2014, and as a result Ulaanbaatar is now connected by paved road to the centers of six aimags (Moron, Bayankhongor, Dalanzadgad, Mandalgovi, Sainshand, and Baruun-Urt) (Ministry of Roads and Transportation, 2015). As of today, out of 21 aimags, 17 aimags are connected with Ulaanbaatar by paved road. The total investment amount was 1.4 billion togrogs. The length of paved road increased from 2,950 km to 5,300 km (20% of the state gravel/earth roads were upgraded to paved roads).

Figure 6. Road Conditions in Mongolia



Source: Ministry of Roads and Transportation

Mongolian state road construction has made some social contributions, such as improving

mobility and transportation safety, enabling economic development, and combating poverty. However, road maintenance is essential. Unfortunately, road maintenance in Mongolia is often neglected or improperly performed resulting in rapid deterioration of roads and eventual failure from both climatic and vehicle use impacts. There are 26 companies (20 are state-owned) that operate in road maintenance and repairs (Zagdradnaa, 2016). The National Road Fund was established as the backbone of the road and transportation sector. For 2015, 18 billion togrogs from the central government budget was allocated to road maintenance work (Zagdradnaa, 2016). Limited funds force a setting of priorities on the necessity and severity of the required maintenance, and repairs which are insufficiently undertaken are other minor necessities, such as installing new road signs and lighting. Approximately 200 km out of every 1,000 km of road require maintenance and repairs and that would require 60 billion togrogs.

Although new paved roads increase from year to year, roadside facilities are underdeveloped. *Michi-no-Eki* [Roadside Stations] could be adopted in Mongolia to facilitate the more effective management of national roads and to provide services for road users and to promote the sustainable socioeconomic development of local areas. The Norms and Standards for Roadside Facilities were approved in 2012. These norms and standards will need to be revised in order to have roadside facilities to international standards and to promote local socioeconomic development including local tourism, and trade, etc.

2.2. Rail Transport. There are a small number of stakeholders in the Mongolian railway sector. The current national operator of Mongolian railway transport is "Ulaanbaatar Railway" (UBTZ), which has a joint venture status between the Mongolian and Russian governments, where the countries' shares are equal, at 50/50. The second largest stakeholder is the state-owned "Mongolian Railway" (MTZ) joint stock company. The MTZ was established in 2008. Bold Tomor Yeroo Gol LLC (a private mining company) has 93 km of railway connecting Yeroo on the UBTZ mainline with Khandgait near the Bayangol deposit in Selenge Aimag. The Bold Tomor Yeroo Gol company was established in 2007 and exports iron ore mined at the Bayangol deposit. The total length of railway lines in Mongolia is 1,908 km. Mongolia has 182 locomotives and 6,577 wagons (Figure 7).

Figure 7: Current Railway Sector: General Information

 <ul style="list-style-type: none"> Total railway lines: 1,908 km 	 <p>2014:</p> <ul style="list-style-type: none"> Freight transportation: 21.0 million tonnes Passenger transportation: 3.7 million passengers
 <ul style="list-style-type: none"> Wagons: 6,577 Locomotives: 182 	 <p>Human resources</p> <ul style="list-style-type: none"> UBTZ: 15,002 MTZ: 1,568
 <p>2014:</p> <ul style="list-style-type: none"> Income: 310.1 billion togrogs Profit: 2.4 billion togrogs 	 <p>Stations</p> <ul style="list-style-type: none"> UBTZ: 80 Bold Tomor Yeroo Gol: 5

Source: Ministry of Roads and Transportation, 2015

2.2.1. UBTZ: The railway sector receives 310.1 billion togrogs in income with an annual profit of 2.4 billion togrogs. Freight transport amounted to 21 million tonnes, with 3.7 million passengers

in 2013. Of the total income of freight transportation, 38% comes from iron ore, 19% cargo transport, and coal 11% (Ministry of Roads and Transportation, 2015). Although the net weight of coal transportation is 36% (as compared to iron ore: 26%; construction materials: 10%; oil: 8%; and cargo: 5%), coal transportation makes a financial loss (Ministry of Roads and Transportation, 2015). Coal transportation is for domestic sales, particularly for the energy sector. Therefore, it has a reduced tariff, and compared to other products it is cheaper. The tariffs for coal and fares for passenger transportation are set low by the government. Mongolia exports coking coal and uses non-coking coal for domestic use. There is a restriction on coal transportation through Zamyn-Uud–Erlan from the Chinese side because of environmental issues and congestion. The UBTZ makes a profit from its transport of iron ore and copper.

The passenger service operates at a substantial financial loss. They lost railway passengers due to the new highway from Ulaanbaatar to Zamyn-Uud. Passenger trains have set speeds of 90 km/hour and 80 km/hour, with an average speed of 42 km/hour (this speed includes the time for stops, and UBTZ trains are some of the slowest). Moreover, the UBTZ railway improvements of signals and communications on the mainline (Sukhbaatar–Sainshand–Zamyn-Uud line) are still underway. The most important factor for improving freight and passenger transportation is to improve signaling and communications.

The mainline's capacity is 25 million tonnes of freight transportation. The UBTZ development strategy plan (development/expansion plan for Mongolian railways) up to 2020 was developed. According to this development plan, they were expecting to reach 34 million tonnes of freight transportation by 2016, and 100 million tonnes by 2020. The planned volume of transportation will be highly dependent on the development of UBTZ. The UBTZ development plan (UBTZ partnership agreement in strategic development and modernization) to 2020 comprises four parts:

- 1) 770 km of the north rail line (Erdenet–Artssuuri) will be constructed. The north line will create a high volume of traffic in coal transportation from Elista, Russia. Therefore, the north line will be essential for the increase in transit traffic.
- 2) The mainline (Sukhbaatar–Zamyn-Uud) will become double-tracked and electrified (1,100 km, including the Bogdkhan railway).
- 3) 239 km of the east rail line (Choibalsan–Ereentsav) will be constructed.
- 4) The west line is still under study

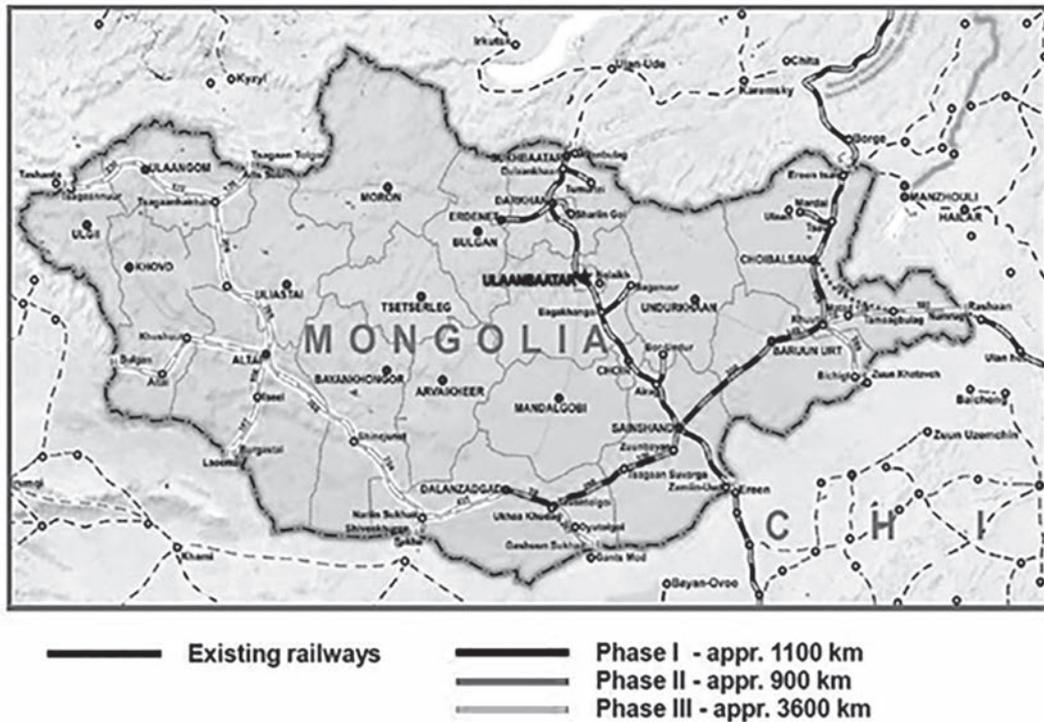
2.2.2. *MTZ*: The main objective of the railway sector is to implement new railway projects. According to the State Policy on Railway Transportation of Mongolia (Parliament Resolution No. 32, 24 June 2010), 5,600 km of railway is planned to be constructed (Figure 8). MTZ has been granted the concession rights to develop, construct, finance and operate approximately 1,800 km of railway as per phases 1 and 2 of the State Railway Policy.

- Tavan Tolgoi/Ukhaa Khudag to Gashuunsukhait (“South Line”) (~ 267 km);
- Tavan Tolgoi to Khoot (~ 918 km);
- Khoot to Choibalsan (~ 155 km);
- Choibalsan to Ereentsav (~ 238 km);
- Khoot to Bichigt (~ 200 km) or to Nomrog (~ 380 km);

- Nariinsukhait to Shiveekhuren (~31 km).

However, new railway development projects are at a standstill due to current economic conditions and a lack of investment. The mining industry is a key economic industry in Mongolia. The expected export volume of minerals and mining products from the three major mining deposits of Tavan Tolgoi, Oyu Tolgoi and Nariinsukhait is 100 million tonnes by 2020.

Figure 8. State Policy on Railway Transportation



Source: Ministry of Roads and Transportation, 2015

Construction of part of the 267 km Ukhaa Khudag–Gashuunsukhait line had already started, but is at a standstill due to funding issues. The new railway line plan is as follows:

- Phase 1: US\$5.2 billion invested, expected duration 2013–2016;
- Phase 2: Planned by Nippon Koei.

According to this development plan, they were expecting to reach 34 million tonnes in freight transportation by 2015. The Nariinsukhait–Shiveekhuren line is 45 km, of which 20 km was decided upon as standard narrow-gauge track. The implication will be the possibility to transport 28 million tonnes of coal through this border point. The 230-km Khoot–Bichigt line was designed by Nippon Koei and it has the potential to transport 10 to 15 million tonnes of coal. Currently they are planning a narrow-gauge track.

2.2.3. Bogdkhan new railway: The feasibility study and design of the Bogdkhan new railway will be conducted by the ADB. However, the financing is still open for other investors to co-partner with the ADB through international bidding. On the other hand, the new logistics center

at Khushgiin Khundii will be developed with or without the new railway. That means that the new logistics center at Khushgiin Khundii will have a railway line whenever the Bogdkhan new railway is developed. Transit traffic will bypass Ulaanbaatar. The freight traffic will be sorted at the logistics center and can be redistributed to Ulaanbaatar. However, all freight and transit traffic will pass through it. The current Maanit to Ulaanbaatar line has a lot of curves (a critical point). There are a lot of complications with these curvatures, such as speed and volume capacity. The new line will be much straighter which means more speed and more volume, thus more efficiency. It will be efficient once the new airport train connects to Ulaanbaatar. The new airport will open in 2017.

The Transit Mongolia Program has been being implemented since 2008. A trilateral conference on transit railway transportation passing through Mongolia, Russia and China was held in December 2013 and the three countries concluded a joint statement.

2.3. Air Transport. The Mongolian Civil Aviation Authority (MCAA) is managing the operations of Mongolian civil aviation organizations in accordance with the Law on Civil Aviation. There are three main aviation companies, including passenger transportation companies with regular operations such as “MIAT”, “Aero Mongolia” and “Hunnu Air” and eight smaller aviation companies. MIAT is the national courier. As MIAT is the national courier, the MCAA supports it; the MCAA gives first choice to MIAT when new routes are plotted and approved by the Ministry of Roads and Transportation. Hunnu Air is a 100% private company.

Mongolian civil aviation organizations are studying how to increase the number of passengers transported via developing new domestic flight routes. Mongolian civil aviation international air transport is increasing the number of flight destinations. Currently Mongolian civil aviation organizations are in a constant relationship regarding flight clearance issues with the same organizations in Russia, Germany, China, the ROK, Japan, and Turkey, and their representative agents are operating in Berlin and Frankfurt in Germany, Moscow in Russia, Beijing, Hohhot, and Hong Kong in China, Seoul in the ROK, Tokyo in Japan, and Istanbul in Turkey, providing ticketing, reservation, luggage, and passenger services. Over the last few years, Mongolian civil aviation organizations have been researching the development of possible new international routes, in particular to increase the number of routes to Mongolia’s two neighboring countries, including destinations in northern Russia (Novosibirsk, Krasnoyarsk, and Khabarovsk) and in China (Manzhouli, and Harbin, etc.). Hunnu Air has striven to create routes (Frankfurt, some Russian cities such as Khabarovsk, and Manzhouli).

There are no transit flights for either passengers or cargo yet. A new transit hall at the Chinggis Khaan Airport (or Buyant-Ukhaa Airport) has opened recently and it is expected to have some transit traffic there. Previously there were feasibility studies on transit traffic, but they didn’t have the appropriate facilities for transit traffic. The new airport will have transit halls when it starts operations in June 2017. Compared to other countries, demand must be lower in Ulaanbaatar. Therefore it is more likely that other countries would choose connecting routes such as EU–Ulaanbaatar–Seoul to combine the demand in one route. There are some Russian cities that wish to fly over Mongolia to China or to Frankfurt and other European cities. There are more opportunities for new routes with Russian cities (for example from Irkutsk).

Carried cargo in 2014 was 3.4 thousand tonnes, which decreased from 4.1 thousand tonnes in 2013. MIAT has the right to transport goods, and they are a member of the International Air Transport Association (IATA). MIAT has the right to transport dangerous items, explosives, combustibles, chemicals, toxic substances and hazardous materials. Currently, the facilities for handling air cargo are insufficient. The new airport will have larger cargo terminals. Construction of the new airport will finish in June 2017, and after the new airport is complete the MCAA plans to move a major part of Chinggis Khan Airport to the new airport. If an FTZ is developed around the airport, it could increase air passenger traffic, and local people could work within the FTZ as well. It is essential to ensure an appropriate business environment and more flexible taxation and fees. The new draft law on an FTZ was submitted to parliament, but it has not yet been approved. The Ulaanbaatar city government will be responsible for the construction and development of the shuttle and highways. According to the plan, the highway will be ready by the time the new airport is in operation. There will be no employee residences near the airport as the nearby areas are designated as an FTZ. That might cause some problems. As transit air cargo has been increasing year on year, Mongolia's other dream project should be MICA (Mongolian International Cargo Airport).

2.4. *Water Transport.* Mongolia has 580 km of waterways. Lake Hovsgol (135 km), the Selenge River (270 km), and the Orkhon River (175 km) offer navigable routes but carry little traffic. Most rivers and lakes freeze over in winter and are only navigable from May to September. As such, waterway transport makes virtually no contribution to Mongolia's overall transport industry.

2.5. *Logistics.* Logistics are not very well developed in Mongolia. There are no regulations or legal frameworks for logistics services. Mongolia does not have any logistics hub including freight terminals, truck decks, cross-dock operations, and distribution centers, etc. Imported goods from Russia and China are carried by trucks from Zamyn-Uud and Altanbulag, but there are no logistics and roadside services. Table 2 shows a comparison of transportation costs (TEU twenty-foot equivalent units) for landlocked countries.

Table 2. Comparisons of Transportation Cost per TEU (Twenty-Foot Equivalent Unit) of Landlocked Countries

Variables	Almaty, Kazakhstan	Tashkent, Uzbekistan	Dushanbe, Tajikistan	Bishkek, Kyrgyzstan	Ulaanbaatar, Mongolia Export	Ulaanbaatar, Mongolia Import
Distance to the Closest Seaport, km	3,380	2,720	2,040	3,100	1,700	1,700
Cost /TEU/ km, US\$	0.37	0.35	0.59	0.34	0.61	0.87

Source: Mongolian Logistics Association, 2015

This comparison shows that the Mongolian unit cost per TEU (for the distance from Ulaanbaatar to Tianjin Port, China) is high. Both China and Mongolia impose high tariffs. The UBTZ has a joint venture status between the Mongolian and Russian governments, where the countries' shares are equal, at 50/50. Therefore, Mongolia cannot control transport tariffs freely.

The World Bank has been conducting a Logistics Performance Index (LPI) Survey every two years since 2007. According to the LPI survey reports, Mongolia ranks approximately 138–140 out of 156 countries (Table 3).

Table 3. LPI Rank Comparisons

Country	LPI	Customs	Infrastructure	International Transshipment	Logistics Quality and Competence	Tracking and Tracing	Timeliness
1. Singapore	4.09	4.02	4.22	3.86	4.12	4.15	4.23
26. China	3.49	3.16	3.54	3.31	3.49	3.55	3.91
95. Russia	2.61	2.15	2.38	2.72	2.51	2.60	3.23
68. Botswana	2.32	2.09	2.09	1.91	2.29	2.59	2.99
138. Mongolia	2.25	1.98	2.22	2.13	1.88	2.29	2.99

Source: The World Bank, 2014

In order to improve the LPI for Mongolia, it is necessary to improve the following issues which are appropriate for the Mongolian case:

- 1) Management of the transportation routes and logistics corridors to seaports, and improvement of the transit transport agreements with Mongolia's two neighbors;
- 2) Border management and improvement of collaborative cooperation with the neighboring countries' border offices; and
- 3) Transportation and logistics quality of domestic transportation, timeliness and technology for transportation, and transportation costs.

Domestic freight transportation is highly underdeveloped, and Mongolia needs a freight transportation control and monitoring office. Logistics for agriculture, construction, petroleum, and the mineral resource industry should be introduced in Mongolia.

According to E. Dorjzovd, General Director of Landbridge LLC and President of the Freight Forwarders' Association of Mongolia, the Freight Forwarders' Association consists of 200 members, of which 100 companies are active. Among the 100 companies, 50 freight forwarders have regular business and the other 50 freight forwarders' business is irregular (on and off). 65–70% of the total volume of transport, freight forwarding, and logistics services are handled by 6 or 7 companies. There are very few foreign freight forwarders.

Transporting products depends on economic conditions. Mining booms encourage imports of mining equipment and technologies. When the government started to issue housing loans at a low interest rate (8%), imports of construction products and materials increased. Currently, there are no mining booms and housing loans with low interest rates, and imports of consumer goods predominate. However, the transport volume of consumer goods is not high. Used car imports from Japan take the largest share of consumer goods. Approximately 500–600 containers of used cars per year are imported from Japan. For new car imports, the main imported vehicles are from Ford from the United States, Mercedes from Germany, and Toyota from Japan. They use containers for automobile shipments. It might be possible to use double-decker carriers for

many cars to and from Vladivostok, but this type of shipment is very expensive. Transporters and freight forwarders do not initiate business and they follow the existing business because they depend on economic conditions and business. This means that transporters and freight forwarders are moving goods to any business.

Mongolians consume 240,000 tonnes of meat annually. Without refrigeration meat loses 15% of its weight. This means 36 million kg of meat is lost annually during transportation. Supposing that 1 kg of meat is 5,000 togrogs, then a loss of 180 billion togrogs can be estimated. This is one of the reasons that Mongolian meat prices are high compared to meat prices in the ROK. It is also the case with vegetables. Comprehensive studies were conducted on agriculture, construction, petroleum, and the mineral resource industry. They concluded that logistics for agriculture, construction, petroleum, and the mineral resource industry should be introduced in Mongolia. They also require the CAS (Cells Alive System) refrigerating system, which keeps food products fresh on the cellular level for a very long time. Other systems are unreliable. The CAS system is suitable for Mongolian conditions. This system will be useful in both exporting and importing food products. There are temperature controls with an insulation system, and thus it will give protection from the extreme continental climate.

The priority will be to improve logistics in Tianjin (10 hectares in area), Zamyn-Uud, and Ulaanbaatar (Bogdkhan Railway). These logistics centers will need to be integrated. Regarding Bogdkhan logistics center, when the government builds a facility they will need someone to operate it, but often they sell it at a cheaper price than the cost of its construction. Therefore they need the railway tracks first, and then they should discuss logistics.

3. Relationship with Neighboring Countries

Mongolia is a landlocked country between China to the south and Russia to the north. The only way to connect to third country markets is by crossing either the Chinese or Russian border. This results in transportation costs dependent on those neighbors.

The Chinese president Xi Jinping's state visit on 8 May 2014 resulted in agreements over important issues of roads, transportation and infrastructure, and the signing of a Memorandum of Understanding. The agreements enable and increase the amount of authorized use of Chinese seaports which are open to foreign trade for Mongolia. These seaports are the north Chinese and northeastern Chinese regional open-trade seaports of Dalian, Jinzhou, Yingkou, Qinhuangdao, Huanghua, Huangdao and Tianjin. The previous 1991 agreement only authorized the use of Tianjin Xingang international port. The principal agreements included no less than a 40% tariff discount, customs and VAT exemptions for Mongolian international transit cargo through Chinese territory, and running the transportation of one-third of Asia-to-Europe transit cargo through Mongolian territory. This enables the opportunity to transport Tavan Tolgoi coal through China to third country markets instead of transporting it all to China. The agreement has a tariff discount that may lower the tariff more than domestic tariffs. The Memorandum of Understanding between the Ministry of Roads and Transportation of Mongolia and the Railway Authority of the People's Republic of China on the renewal of the 1955 "Mongolia and China Border Railway Agreement"

includes the development of four new border crossings (Shiveekhuren–Sekhee, Gashuunsukhait–Gantsmod, Bichigt Zuun–Khatavch, and Sumber–Ashaan).

The state visit of Russian president Vladimir Putin in September 2014 resulted in the signing of 15 documents, including on: increasing the capacity of the main railway line of Ulaanbaatar Railway (UBTZ) to an annual capacity of 100 Mt, and this is proposed by electrifying the UBTZ line, extending the Salkhit–Erdenet line to the border to the northwest, opening a new railway crossing connecting to Kyzyl in Tuva, Russia, which would enable Russian mineral commodity access to China through Mongolia; the construction of the “Bogdkhan” railway line to increase rail transportation, and; a joint venture for establishing a new vertical corridor through Mongolia’s western regions. The bilateral meeting also resulted in a shared ownership of the Russian invested Rajin port in the DPRK. For Mongolia this provides for the first time the opportunity to possess a seaport. The Russian government is favorable to the rail transportation of Mongolian mineral commodities, but the issue is as to whether the Russian railway line capacity is sufficient for Mongolian mineral commodities. At present there is only a line in the eastern region which can transport mineral commodities through Russia to third country markets, but this line is too long to be feasible.

4. Conclusion

Mongolia is too dependent on its vast mineral resources, which are mostly non-renewable resources. This prompts us to seek proper use and appropriate measures such as environmental protection and to advance value-added products on world markets with optimum prices as a priority. The development of these transportation and logistics systems would solve a lot of Mongolian socioeconomic issues. An integrated and connected transportation system that extends to all corners of Mongolia, and international open border ports will be the foundation for the development of mineral resources, transportation, logistics, agriculture and other industries.

Construction of new roads is important. However if there is no maintenance, then the new roads and existing roads will deteriorate. The main problems of road maintenance are related to roads carrying overloaded trucks and to extreme climate conditions. The current state roads have two lanes and belong to the Road Class III, which has a weight limit of 10 tonnes per axle. Since we know there are many overloaded trucks, we need to construct roads to a higher standard and with better technology. Again, although new paved roads are increasing from year to year, there are no roadside services. *Michi-no-Eki* [Roadside Stations] could be adopted in Mongolia to facilitate the more effective management of national roads and to provide services for road users and to promote the sustainable socioeconomic development of local areas. Certain roadside stations, which are located at important junctions for long-distance travel, should be integrated with logistics hubs. Therefore, comprehensive roadside development studies including transport demand analysis are needed. Moreover, freight transports do not have any registration, which creates informal transportation services. It may be possible to introduce RFID technology for transportation and logistics. There are insufficient (almost no) transportation specialists who can undertake transport modeling and future planning. It is important to enhance the human resource capacity for transportation and logistics specialists.

The following are short summaries of issues in railway transportation: (i) a need for investment for renovation and improvement of assets. Over 50% of the locomotives and wagons of UBTZ have been in use for more than 25 years; (ii) main line (TMGR) improvement (double track or new developments, such as electric) is essential; (iii) Mongolia needs to make a legal decision on ownership of newly developed railways. It may be possible to make a new railway the property of the state. On such a railway, any Mongolian operator will be able to carry freight and passengers; (iv) unified automatic signals, controlling and monitoring systems are needed; and (v) train stations need to meet international standards and to improve passenger transportation services.

Mongolian civil aviation organizations are researching the development of possible new international routes, particularly increasing the number of routes to the two neighboring countries. If an FTZ is developed around the new airport, it could increase air passenger traffic, including transit traffic, and also local people could work within the FTZ. Therefore, the government should support and ensure the optimization of the legal and trade environment in the FTZ.

Improving logistics in Tianjin (10 hectares of area), Zamyn-Uud, and Ulaanbaatar (Bogdkhan Railway) should be a top priority in logistics development. Moreover, logistics hubs and roadside stations should be integrated in order to support the sustainable growth and infrastructure development of local areas.

* Executive Director, Asian Infrastructure Research Institute (AIRI), Mongolia

References

- Dorjzovd, E. (2015), General Director of Landbridge LLC and President of the Freight Forwarders' Association of Mongolia, interviewed by the author on 18 September 2015
- General Customs Administration of Mongolia (2016): Mongolian Customs: Statistical Information System, retrieved on 24 May 2016 from: <http://www.customs.gov.mn/statistics/>
- Mineral Resource Authority of Mongolia (2014): Mineral Resources Database, Ulaanbaatar
- Ministry of Roads and Transportation (2015): *Yearly Statistical Bulletin*, Ulaanbaatar
- Mongolian Logistics Association (2015): *Issues in Mongolian Transportation and Logistics*, Ulaanbaatar
- National Statistical Office of Mongolia (2015): *Mongolian Statistical Yearbook 2015*, Ulaanbaatar
- Schwab, K. (2016): The Global Competitiveness Report 2014–2015, World Economic Forum, Geneva, retrieved on 8 May 2016 from: http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2014-15.pdf
- Taniguchi, Thompson, Yamada, and Van Duin (2001): *City Logistics: Network Modelling and Intelligent Transport Systems*, Pergamon, Amsterdam
- Ulaanbaatar Railway (2015): *Ulaanbaatar Railway Annual Report 2014*, Ulaanbaatar Railway, Ulaanbaatar

World Bank (2014): LPI Global Ranking 2014, retrieved on 15 June 2016 from the World Bank IBRD IDA: <http://lpi.worldbank.org/international/global/2014>

Zagradnaa, R. (2016). Director of Auto Road and Transport Policy Implementation Department, Ministry of Roads and Transportation (personal communications)