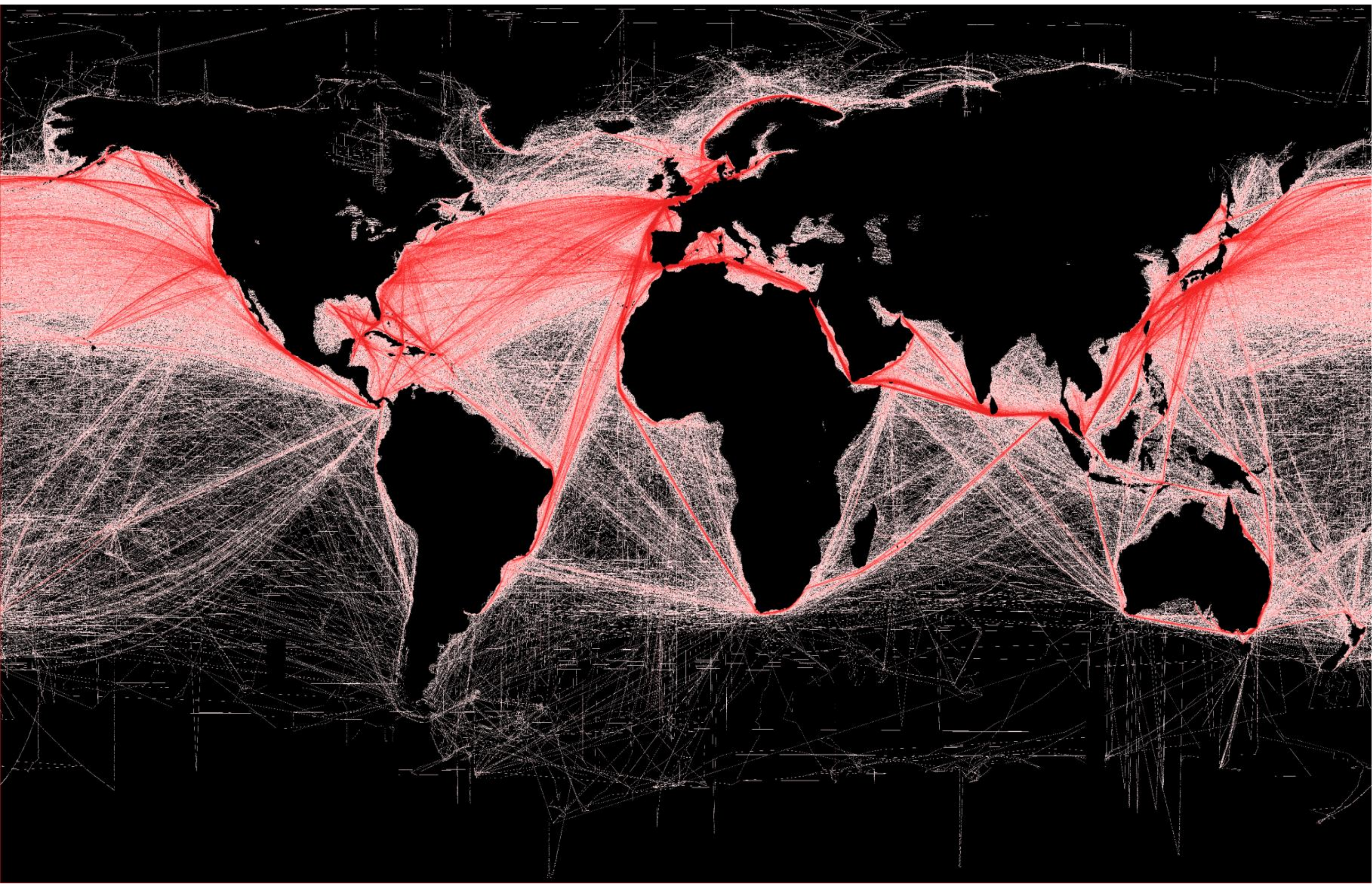
Standing Committee
for Economic and Commercial Cooperation
of the Organization of Islamic Cooperation (COMCEC)

DEVELOPING MULTIMODAL FREIGHT TRANSPORT (MFT) AMONG THE OIC MEMBER COUNTRIES

Status of the Implementation of MFT among the OIC Member Countries



COMCEC COORDINATION OFFICE
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1 INTRODUCTION

The implementation of the freight container has been one of the greatest success stories in world's economic history. The container technology has revolutionized the transport of goods and the global trade between countries much like the semiconductor has driven information and communication systems. This is because the deployment of freight containers in multimodal chains of transport makes sure that transport, handling and overall logistics costs are reduced, door-or-door transit times enhanced, less goods damaged and the security of shipments strengthened.

The Standing Committee for Economic and Commercial Cooperation (COMCEC) of the Organisation of Islamic Cooperation (OIC) clearly has identified the paramount importance of an efficient logistics and freight transport system for the economic development of OIC Member Countries. More specifically, the COMCEC has recognized the pivotal function of freight container transport for enabling or facilitating OIC Member Countries to increasingly enter into global supply chains and stimulate their external trade.

In this framework COMCEC Coordination Office has commissioned a study on multimodal freight transport (MFT). The first phase, which has been concluded in September 2013[1], aimed at presenting the basic concept of and the prerequisites for implementing successful MFT services. It has also identified key success factors and good practices of MFT services in North America and Europe and highlighted recent trends in seaborne container traffic, MFT logistics, and policy.

The key objective of the second stage of this study whose results are delivered with this report has been to examine and assess the current MFT practices in the OIC Member States and provide an outlook on the future developments. The investigation in particular has addressed the following issues:

- Evaluation of the current situation of seaborne container transport and MFT operations;
- Analysis of ongoing projects or future plans for the development of MFT services;
- Identification of implementation barriers for enabling an improved utilization of MFT services;
- Recommendations for enhancing MFT practices in OIC Member States.

Methodologically, the findings of this report overwhelmingly are based on proprietary knowledge of KombiConsult, the analysis of information gathered from railways providing rail freight and MFT services, a range of secondary sources such as research studies and the results of interviews with logistics experts. Additional material came from authorities in the OIC Member Countries.

In order to deliver valid results, the term MFT as subject of the study, must be clearly defined and distinguished from other forms of transport chains. For the purpose of the study, MFT will be used in the sense of "combined transport" or "intermodal transport" as applied, for example, in Europe, North and South America, Australia, or India. In this respect MFT means

[1] COMCEC: Global Trends and Policies in MFT. Ankara, September 2013.

the transport of goods in a chain of transport of at least two modes of transport where the goods themselves are not discharged and re-loaded at the transhipment point but remain in a loading unit of a length of minimum 20', which is used to be built according to international standards. A typical intermodal logistics chain is composed of a road haulage on the initial leg of the journey, followed by a rail transport before the loading unit is delivered to the consignee of the cargo on the final leg by another road transport. This report will use multimodal, combined and intermodal transport as synonyms.

2 OVERVIEW ON CURRENT MFT PRACTICES IN OIC MEMBER STATES

It goes without saying that the existence of a rail infrastructure is the fundamental prerequisite for operating MFT services by rail. According to a survey conducted for this study, 39 or nearly 70 per cent of the 57 existing OIC Member States provide for a rail network of at least one line, which is used for general rail freight services. All other countries have not yet established rail infrastructures at all or not for freight, or no reliable information could be collected (see Figure 2-1 and Figure 2-2).

According to the results of a comprehensive research MFT services by rail are currently supplied on a regular basis in 20 out of a total of 39 countries, which provide for a rail freight transport system. For several other countries no sufficient information could be gathered to assess whether a regular MFT service offering is at hand (see also Figure 2-1 and Figure 2-2).

The study's goal was to describe the state-of-affairs of MFT in all those OIC Member States, in which MFT services have already been implemented. This objective has been almost fully met although the conditions, on which data and information had to be gathered, often were extraordinarily demanding. Owing to this situation the scale and depth of information about rail freight and MFT services varies from country to country. Only five of the 20 countries, for which the study identified existing MFT services, namely Cameroon, Mali, Mozambique, Tajikistan and Uzbekistan, could not be covered as a lack of verifiable information did not enable to produce a serious report. However, some of them such as Uzbekistan are referred to in the framework of cross-border MFT services with other OIC Member States included in the present study.

In addition to the 15 countries already involved in multimodal supply chains this report also takes account of nine other OIC Member States, in which authorities, railways or logistics service providers have set up distinguished plans for implementing MFT services in the forthcoming years. This may apply to further countries. If so, usable information could not be gathered within the schedule of this study.

The report on the current situation and the envisaged evolution of the intermodal transport industry is composed of three chapters relating to the official three regional groups of the OIC Member States (see also appendix 1): Arab Group; Asian Group; African Group.

Figure 2-1: Overview on OIC Member States' inventory of rail freight and MFT services

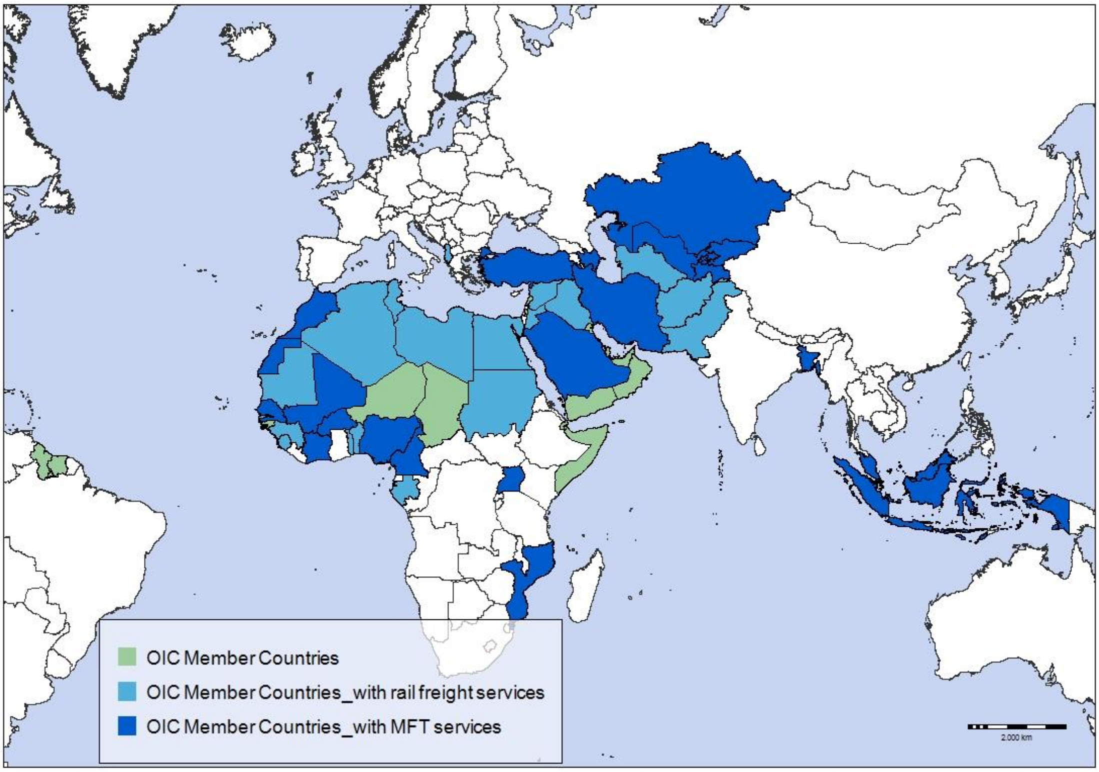
OIC Member State	Region	Existing rail freight services	Existing MFT services
Afghanistan	Asian	+	-
Albania	Asian	+	-
Algeria	Arab	+	?
Azerbaijan	Asian	+	+
Bahrain	Arab	-	-
Bangladesh	Asian	+	+
Benin	African	+	?
Brunei	Asian	-	-
Burkina Faso	African	+	+
Cameroon	African	+	+
Chad	African	-	-
Comoros	Arab	-	-
Djibouti	Arab	?	-
Egypt	Arab	+	-
Gabon	African	+	-
Gambia	African	+	-
Guinea	African	+	-
Guinea-Bissau	African	-	-
Guyana	Asian	-	-
Indonesia	Asian	+	+
Iran	Asian	+	+
Iraq	Arab	+	?
Ivory Coast	African	+	+
Jordan	Arab	+	-
Kazakhstan	Asian	+	+
Kyrgyzstan	Asian	+	+
Kuwait	Arab	-	-
Lebanon	Arab	-	-
Libya	Arab	+	?

OIC Member State	Region	Existing rail freight services	Existing MFT services
Maldives	Asian	-	-
Malaysia	Asian	+	+
Mali	African	+	+
Mauritania	Arab	+	-
Morocco	Arab	+	+
Mozambique	African	+	+
Niger	African	-	-
Nigeria	African	+	+
Oman	Arab	-	-
Pakistan	Asian	+	-
Palestine	Arab	-	-
Qatar	Arab	-	-
Saudi Arabia	Arab	+	+
Senegal	African	+	+
Sierra Leone	African	+	?
Somalia	Arab	-	-
Sudan	Arab	+	-
Surinam	Asian	-	-
Syria	Arab	+	?
Tajikistan	Asian	+	+
Togo	African	+	-
Tunisia	Arab	+	?
Turkey	Asian	+	+
Turkmenistan	Asian	+	-
Uganda	African	+	+
United Arab Emirates	Arab	-	-
Uzbekistan	Asian	+	+
Yemen	Arab	-	-

+ = existing
- = not existing
? = no reliable information

Source: KombiConsult analysis

Figure 2-2: Existing rail freight and MFT services in OIC Member States



Source: KombiConsult analysis

3 OIC Arab Group

Based on the selection criteria mentioned under chapter 2, seven OIC Member States of the Arab Group have been included in the analysis (see also Figure 3-1). Rail networks, which are used or have been used for rail freight transport, are existent in Djibouti, Egypt, Jordan, Morocco and Saudi Arabia. In the latter two regular intermodal rail/road services have been implemented as well. In Oman and the United Arab Emirates MFT services have not been set up yet.

Figure 3-1: Rail infrastructure and MFT services in Arab Group Countries

Country	Rail network	Rail freight services	MFT services	UIC Member
Djibouti	X	?	-	-
Egypt	X	X	-	X
Jordan	X	X	-	X
Morocco	X	X	X	X
Oman	-	-	-	-
Saudi Arabia	X	X	X	X
United Arab Emirates (*)	X	-	-	X

(*) First rail line constructed, only test runs but no commercial freight traffic commenced by end of survey
Source: KombiConsult analysis

The OIC Member States of Oman, which does not provide for rail infrastructures to date, and the United Arab Emirates, in which a first rail line has only been inaugurated in autumn 2013 for test runs, are set to implement rail-based container transport services over the next years. These plans are one component of a large multi-national project by the members of the Cooperation Council for the Arab States of the Gulf (GCC), the United Arab Emirates, Bahrain, Saudi Arabia, Oman, Qatar and Kuwait. The six countries are dedicated to build a completely new state-of-the-art main line extending from Kuwait to Oman. In this framework, Saudi Arabia additionally is scheduled to enlarge its existing network by two long-distance lines, the Saudi Landbridge linking Riyadh and Jeddah and the North-South Line between Riyadh and the border to Jordan (see Figure 3-2). In the course of completing these major investments the railways of the GCC countries are set to developing competitive rail freight and intermodal services.

Figure 3-2: GCC's planned Rail Network

Source: Reuters

3.1 DJIBOUTI

3.1.1 Current state and evolution of container seaports

Although fairly small in terms of territory (23,000 km^2) Djibouti has one of the largest container ports in the region, which provides for a high growth potential as well. The port boasts itself to be located strategically at the crossroad of the three continents Africa, Asia and Europe and at the access point to the Red Sea and the Suez Canal (see Figure 3-3).

Figure 3-3: Geographical situation of Port of Djibouti

Source: Port of Djibouti, www.portdedjibouti.com

Apart from local volumes the container port today primarily serves landlocked Ethiopia and some other member countries of The Common Market for Eastern and Southern Africa (COMESA) in the area. The port, however, increasingly is rising to a regional transhipment centre thanks to the preferable location. Here containers are transferred from sea vessels to feeder ships that serve smaller ports, and vice versa.

The main container handling facility in the port of Djibouti is the Doraleh Container Terminal (DCT) operated by DP World. Inaugurated in 2009, the year of the worst global economic crisis, the terminal provides for some favourable characteristics:

- 18 meters draught allowing to serve the latest generation of Ultra-Large Container

Vessels with a capacity of 13,000 TEU and more;
- Six Super Post-Panamax ship-to-shore cranes with twin-lift capability.

The handling capacity of the facility is reported to amount to 1.2 million TEU. In a second phase it shall rise to about 3 million TEU.

After four years of operation the capacity of the Doraleh container terminal is utilized by about 60 per cent. The seaborne container throughput reached 728,541 TEU in the year 2012, corresponding to a growth of 5.8% compared to 2011. The break-down of the 2011 figures (2012 data were not available) clearly show that the terminal has developed to a transhipment hub. Nearly 56 per cent of the entire handling volume accounted for containers transferred between sea and feeder vessels whilst, in 2009, this market segment just had a share of 35 per cent (see Figure 3-4).

Figure 3-4: Container throughput of Doraleh Container Terminal

Market segment	Seaborne container throughput (TEU)			
	2009	**2010**	**2011**	**2012**
Import	168,000	165,000	157,200	-
Export	160,100	168,000	147,200	-
Transshipment	176,000	66,200	384,100	-
Total	**504,100**	**399,200**	**688,500**	**728,500**

Source: DP World, www.dpworld-doraleh.com

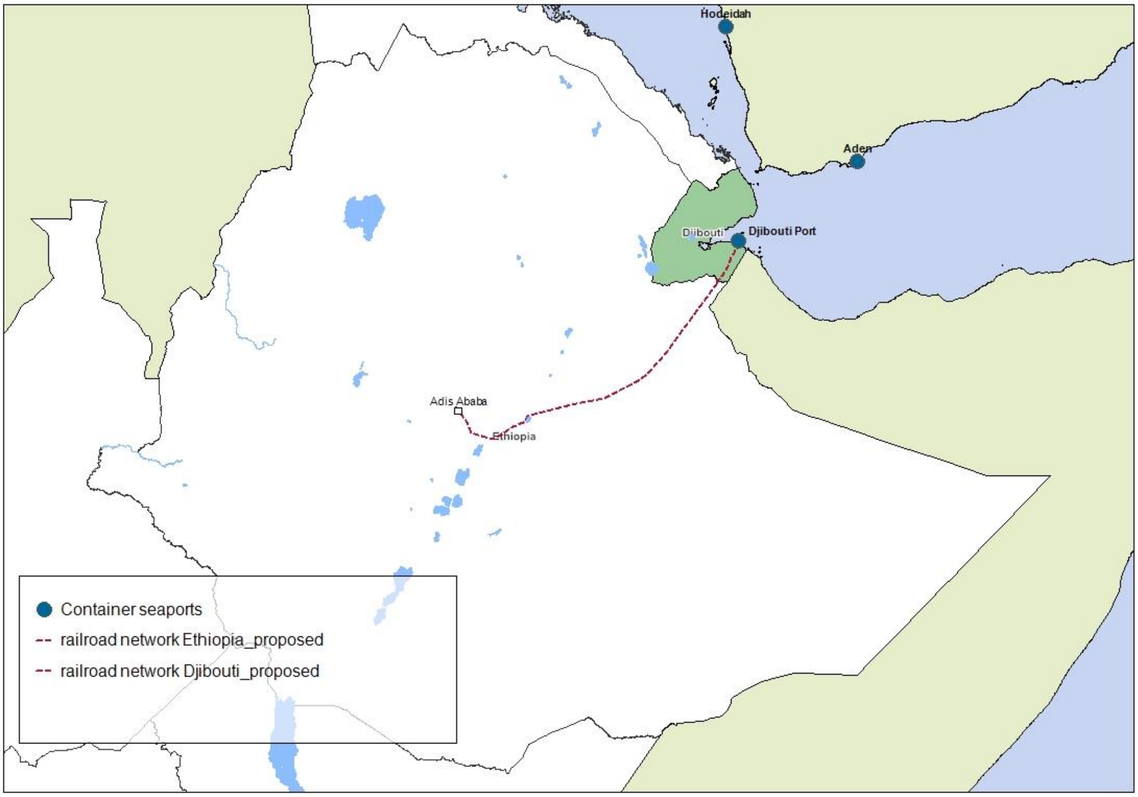
3.1.2 Current state and evolution of rail infrastructure and multimodal freight transport

There is a rail line running from the port of Djibouti to its main hinterland market, Addis Ababa, the capital of Ethiopia. According to available information, the line infrastructure is in a poor state. Yet it could not be entirely clarified whether it is currently used for freight transport. There are sources suggesting that bulk cargoes are moved by conventional rail freight services but it can be excluded that containers are carried on multimodal services.

The port of Djibouti and the operator of the container terminal are keen to upgrade the rail connection to the hinterland. By improving the service quality and reducing the transport costs they expect to catch additional container volumes for the port. The Djiboutian and Ethiopian governments now are set to rehabilitate the existing rail infrastructure and/or build a new standard gauge railway corridor between the port of Djibouti and Addis Ababa. The total rail distance is estimated at 650 km, thereof 110 km will be constructed as single track within Djibouti (see also Figure 3-5).

The ambitious project is part of the East-West African Railway Network, which shall contribute to the economic development of the hinterland of Ethiopia and cut the transit time between Djibouti and the capital of Ethiopia by half. Intermodal container traffic is expected to be the major client for the rail corridor.

Figure 3-5: Djibouti – Ethiopia rail project



Source: KombiConsult

3.2 EGYPT

3.2.1 Current state and evolution of container seaports

Egypt has three large container ports at the Mediterranean Sea, in Port Said, Alexandria, and Damietta (see also Figure 3-7). Their aggregate handling volume amounted to nearly 6.5 million TEU in 2011 thus slightly exceeding the result of the previous year (see Figure 3-6).

Figure 3-6: Container throughput of Egypt's main container ports

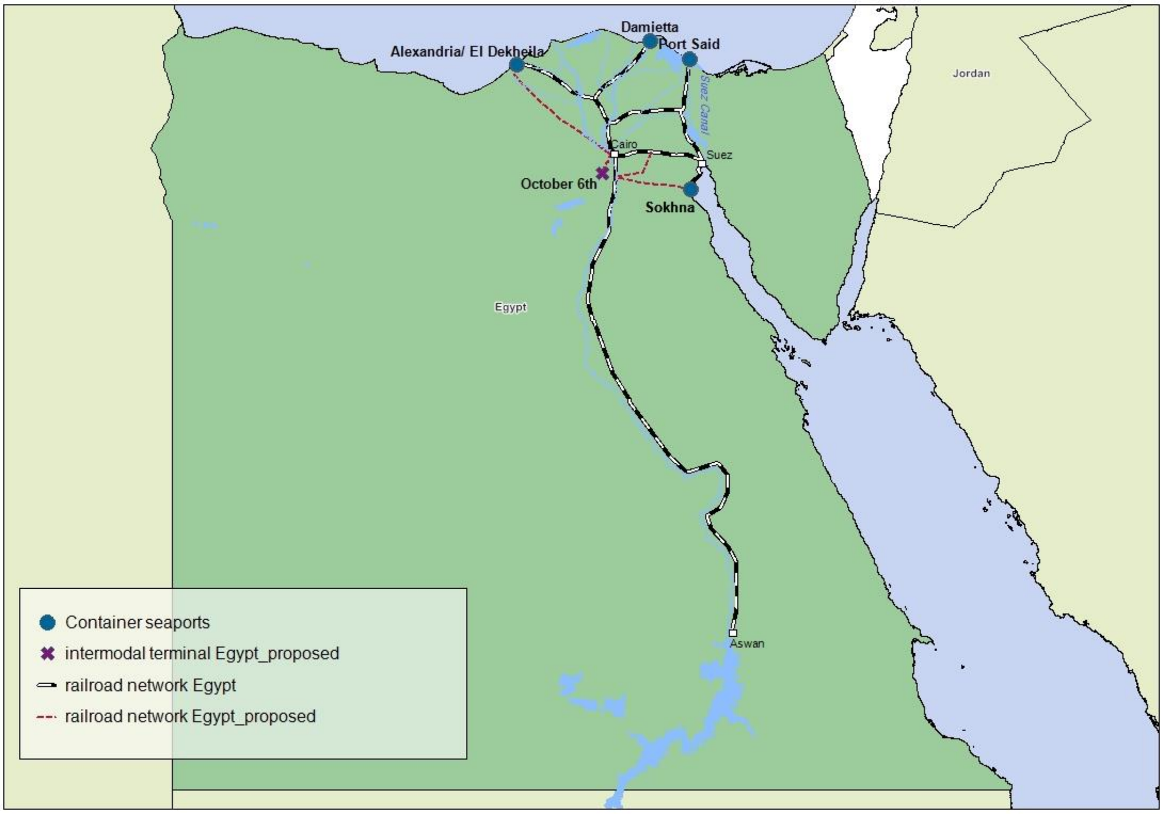
Port	Terminal	Seaborne container throughput (TEU)			
		2009	2010	2011	2012
Port Said	SCCT	2,700,000	2,900,000	3,200,000	2,900,000
	Port Said CT	738,000	905,000	982,000	934,000
Alexandria / El-Dekheila	ACCHC	800,000	832,500	775,000	812,500
	AICT	-	543,000	583,000	622,000
Damietta	DCHC	1,262,700	1,191,500	929,400	-

Source: Ports and terminal operators, KombiConsult analysis

Measured by throughput the port of **Port Said** clearly is Egypt's largest container handling facility. Together, the two terminal companies, the Suez Canal Container Terminal (SCCT) and the Port Said Container Terminal, accounted for more than 3.8 million TEU in 2012, about 5 per cent less than one year earlier.

Port Said has a distinctive role in the "division of labour" among Egypt's container ports. It primarily is a transhipment hub for the East Mediterranean countries. Located ideally at the northern access to the Suez Canal, the port overwhelmingly transfers containers between large sea vessels and smaller feeder ships. At the Port Said CT, the share of transhipments reached about two thirds of the total throughput. In 2012, the SCCT terminal also has experienced two successful navigational trials by vessels with a capacity of 15,500 TEU and is now prepared for receiving them. Both container terminals are connected to the national rail network. Yet, regular intermodal services have not been reported.

Figure 3-7: Egypt's main container seaports and rail lines



Source: KombiConsult

The port of **Alexandria** effectively has two locations, Alexandria itself and El-Dekheila, about 15 km west of Alexandria. Each of the two sites provides for two container terminals, which are operated by Alexandria Container & Cargo Handling Company (ACCHC) and, respectively, Alexandria International Container Terminals (AICT), a Hutchison Port Holdings (HPH) subsidiary. Their aggregate container throughput well exceeded 1.4 million TEU in the year 2012, almost 7 per cent more than in 2011.

The port of Alexandria is the main gateway for Egypt's seaborne trade. Its market share is estimated at about 60 per cent. This function is also reflected in the container business. About 95 per cent the total throughput handled by ACCHC relates to export and import containers and only some 5 per cent of all containers were transhipped. The ACCHC sites in Alexandria and El-Dekheila have a direct rail access. No information was available if intermodal services have been implemented.

The port of **Damietta** is only 10 km off the river Nile and about 70 km from Port Said. Like Port Said Damietta primarily is chasing after transhipment volumes serving countries in the Mediterranean basin. Damietta Containers and Cargo Handling Company (DCHC) that is operating the container terminal moved about 930,000 TEU of containers in the year 2011.

Compared to 2009 the terminal lost about 330,000 TEU or 26 per cent of its previous volume. The terminal is connected to the national railway network and inland waterways.

3.2.2 Current state of rail infrastructure and rail freight transport

The Egyptian rail network features the 1,435 mm standard gauge and comprises of about 6,700 km of lines, of which 71 per cent are single track. 28.4 per cent of the entire network provides for double track and 0.4 per cent even for 4-track ways. As the population and the economic activities are concentrated along the river Nile and in the Nile delta it is not surprising that these areas account for 57 per cent of Egypt's rail infrastructure.

Although the network is remarkably large rail's market share of Egypt's goods transport is insignificant. Freight trains just move about 5 per cent of the total domestic transport volume of nearly 500 million tonnes. The main commodities are phosphate, minerals and iron ore. Barges carry less than 1 per cent of the cargo over inland waterways whilst the road sector bears the brunt of freight traffic with a modal share of 94 per cent.

Apart from other factors the small market share of rail freight services is owing to the poor state of the infrastructure. Neglected since many years and failed to maintain and repair tracks, track beds, switches, signalling systems and other components the rail network hardly allows to supply road-competitive service levels.

In the framework of the 5th Strategy Plan 2008 – 2013, Egypt has started to invest and upgrade its rail infrastructure. It aims to enhancing the existing tracks, renew stations and rehabilitate rolling stock. Lately, however, several projects have been postponed. In this situation it is good news that, on October 9th, 2013, Egypt signed a loan agreement with the Kuwait Fund for Arab Economic Development in order to assist in the financing of the modernization of the rail section Banha – Zagazig – Ismaelia – Port Said (www.kuwait-fund.org). The project is particularly designed to increase the overall transport safety and increase the productivity of rail freight services.

3.2.3 Current state of multimodal freight transport

Although all major container ports at the Mediterranean coast are integrated into the national rail network, according to available reports, regular intermodal services have not been implemented yet. Despite that we assume that marine containers sporadically may be carried by rail from/to seaports but confirmation on this issue could not be obtained.

The huge market potential of container hinterland traffic – only the port of Alexandria processes an annual volume of about 800,000 TEU – literally calls for the employment of high-capacity modes of transport such as rail or barge. Against this background the weakness of rail on this growth market seems to be inexplicable at first sight. A deeper analysis of the situation, however, reveals the main deficits of the rail freight system and other handicaps:

- Poor infrastructure impeding the railway to achieve competitive service levels;
- Comparatively short transport distances between the seaports and the main origins

and destinations of marine containers, which make it difficult for the railway to offer competitive freight rates;
- A combination of short distances between the container ports and Cairo, the main origin/destination for container flows, and the sheer size of the Greater Cairo area make it difficult to determine the right consolidation centres for operating efficient intermodal trains (intermodal terminals) and benefit the use of direct trucks from/to ports;
- A lack of dedicated intermodal terminals in the centres of economic activities and population, which could provide efficient handling and container storage services;
- Fuel subsidies for road vehicles do not ensure fair terms of competition.

3.2.4 Development of multimodal freight transport

The Egyptian administration has taken various actions or plans to implement measures that could contribute to developing regular and competitive multimodal services by rail and, eventually, by inland waterways. Apart from the envisaged upgrading of the rail line to Port Said, which might also improve the quality of operations for intermodal transport by rail, the strategic move includes the following key components:

- The government has set up a Transport Master Plan for the period 2012 to 2027 (MINTS), which also includes projects for supporting the development of multimodal freight transport;
- A freight regulator has been established from which observers expect that the competitive situation between rail and road will become more balanced;
- The fuel subsidy policy shall be reviewed;
- The implementation of logistics centres that, depending on the market needs, are also supposed to include intermodal rail/road terminals. Among them the 6th of October logistics centre in Cairo may play a pivotal role for developing regular intermodal container hinterland services with the Egyptian ports. If situated strategically to industrial complexes and warehouses the 6th of October site would be a perfect location for consolidating export containers and distributing import containers in the region;

If these actions are due to becoming effective over the next years we believe that they will lay the foundations for implementing a viable and sustainable multimodal transport system.

We only suggest to adding a further component to the programme. A competitive intermodal transport offer relies both on efficient long-distance rail services and reliable regional collection and distribution trucking services by road. Those who are responsible for developing intermodal transport services are called on to contract a fleet of experienced road hauliers at an early stage of the project or carry out training programmes. Moreover the on-time pick-up or delivery of full containers and the quick return of empty containers to container depots also depend on the deployment of technically reliable trucks. The authorities in Egypt are asked to support any such action through financial aids or suitable regulatory measures.

3.3 JORDAN

3.3.1 Current state and evolution of container seaports

Jordan's only seaside container terminal is at the Red Sea port of Aqaba (see also Figure 3-9). The throughput of this Aqaba Container Terminal (ACT), operated by APM Terminals, soared in recent years. Against 2010 it rose by about 35 per cent to 817,400 TEU in 2012 and thus more than recovered from the drop of volumes in 2009 (see Figure 3-8). Since autumn 2013 the facility is prepared for further growth when an enlargement investment, almost doubling the annual capacity of the port to about 1.5 million TEU, was officially opened. As the port provides for berths with a draught of up to 20 m it can also serve the world's largest container vessels such as Maersk's new E-class ships with a loading capacity of 18,000 TEU. Based on the statistical data recorded by the port of Aqaba, the terminal primarily handles containers bound for or sourced in Jordan or transit containers from/to neighbouring countries such as Iraq.

Figure 3-8: Container throughput of seaport of Aqaba

Port	Seaborne container throughput (TEU)				
	2008	2009	2010	2011	2012
Aqaba	587,500	674,500	605,700	705,600	817,400

Source: Aqaba Container Terminal

3.3.2 Current state of rail infrastructure and rail freight transport

The existing rail network in Jordan comprises of two lines, both using the 1,050 mm track gauge. The rather ancient Hedjaz Railway extends from the border to Syria north-south to about the centre of Jordan. The freight traffic volume reportedly is very limited. The much more important line, for the time being, is the Aqaba Railway operated by Aqaba Railway Corporation (ARC), a state-owned enterprise. The alignment of this rail infrastructure is also north-south linking the country's phosphate mines in central and south Jordan with the port of Aqaba. In 2012, the transport volume of this line totalled to 2.1 million tonnes, a slight decrease of 3 per cent compared to 2011.

3.3.3 Current state of multimodal freight transport

Regular multimodal transport services currently are not supplied in Jordan. Although the port of Aqaba likely processes a large amount of export and import containers with origins or destinations in the capital of Amman, the existing Aqaba Railway line is not used for this market segment.

3.3.4 Development of rail infrastructure and rail freight transport

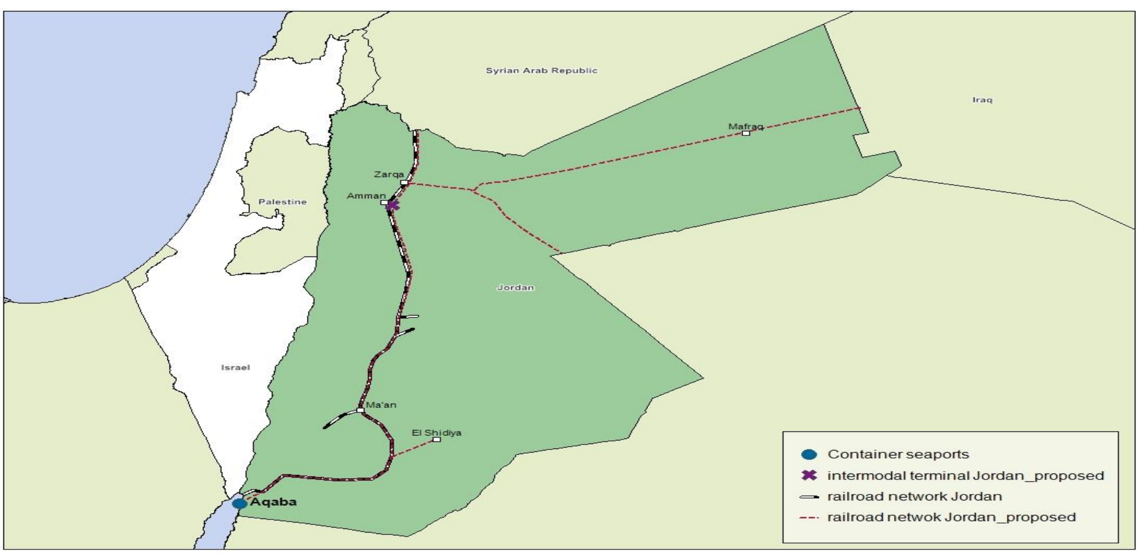
The government of Jordan has set up the "Jordan National Railway Project" presented in August 2011. The objective of this strategic programme with the time horizon 2040 is to develop a modern and efficient rail network in Jordan including links with the neighbouring countries of Iraq, Saudi Arabia and Syria, primarily dedicated to freight transport, and prepare the necessary regulatory and institutional framework.

The new national rail network is designed for a length of approximately 900 km of tracks that shall use the 1,435 standard gauge. The investment programme relates to three main rail sections:

- The Aqaba-Syria Link (North-South Line) is designed as the backbone of the new network. It shall connect the port of Aqaba with the Amman, Jordan's main industrial city of Zarqa and the largest phosphate mine, Shidiya Mine, and then continues to the border with Syria. The construction is expected to be finished by about 2018;
- The second project, the Zarqa-Iraq Link, is designed to establish an efficient connection to the Iraq rail network. It will branch off the main rail artery at Zarga;
- The Saudi Arabia Link is to branch off the Zarqa-Iraq Link and extend to the Jordan/Saudi Arabian border. There it will merge with the domestic North-South Corridor rail line planned by Saudi Arabia.

By completing these ambitious projects Jordan could become a turntable or landbridge for international goods transport between the Middle East, on the one side, and Turkey and Europe, on the other side (see alsoFigure 3-9). Apart from the geographical situation of this country this excellent position also is a result of the ESCWA international agreement to use the standard track gauge for new rail infrastructure investments in the entire region.

Figure 3-9: Jordan's national rail network



Source: KombiConsult

The second key component of the Jordan National Railway Project (JNRP) is the creation of a proper regulatory and institutional framework for the new national rail network. In this respect Jordan's government is set to implement an organizational structure, which - though basically designed to separate the responsibilities for infrastructure and operations – effectively represents a mix of both:

- A state-owned company, Jordan Railway Corporation (JRC), shall finance, build and manage the network. Based on the Jordan Railways Corporation Law the JRC has been already established;
- A private company shall be selected to render the operational services including the supply of rolling stock and, at the same time, operate and maintain the network.

If this scheme were realized as such we are concerned that conflicts of interest may arise between the JRC and the railway operating company about which infrastructure-related duties and particularly the financing of these measures shall be allocated to whom. Some European countries, for example, France or the UK, can supply ample evidence on how critical it is if the responsibilities for infrastructure and rail operations are either not clearly separated or united in a single organisation.
In 2012, Jordan has taken another important step in the quest for realizing a modern rail network. The country has become an associate member of the OTIF and of the "Convention concerning the International Organization for international Carriage by Rail (COTIF)". Jordan aims at obtaining the full membership after the completion of core components of the new rail network enabling to launch international freight services, for example, with Syria or Iraq.

3.3.5 Development of multimodal freight transport

BNP Paribas, a French bank assisting the Government of Jordan in the set-up of the JNRP, analysed the market potentials for a new rail network and projected traffic volumes. The bank clearly identified the multimodal transport of containers as the main market segment. If the new infrastructure had already been operational in 2008 BNP Paribas "back-casted" a containerized transport volume of 3.15 million tonnes. Based on a typical average ratio of 10 tonnes per TEU this tonnage would have corresponded to about 315,000 TEU, representing more than 50 per cent of Aqaba's seaborne container throughput in that year. For the time horizon 2030 BNP projected that the transport volume of containers will increase to 17 million tonnes, or about 1.7 million TEU.

The final JNRP has also defined the transport of marine containers in the hinterland of the port of Aqaba as the key target market in terms of expected volumes and revenues. The largest volumes are expected to be generated from full import containers and containers transiting Jordan on their way from and to Iraq and Syria. The JNRP has incorporated BNP's forecast for 2030 and also sets goals for the years 2020 and 2040. According to these projections, intermodal container hinterland services shall contribute 10 million tonnes or 35 per cent to the total rail freight volume in 2020 and even 26.6 million tonnes or 48 per cent in 2040 In terms of revenues the expectations towards intermodal services are even more optimistic. In 2040, this rail freight market segment shall generate more than 50 per cent of all revenues of the operating company (see Figure 3-10).

These are very ambitious objectives especially for the years 2020 and 2030 considering that the current volume is likely to be next to zero. Even if we assume that Aqaba's seaborne container throughput is going to grow as expected and provide the necessary market potential it will be a major financial, economic and operational challenge for any railway undertaking to supply the necessary scale of wagons, locomotives and personnel and increase the number and frequency of services within a few years at the required speed. This may also apply to the railway's logistics partners such as road hauliers that would need to invest into the required transport capacities. Against this background we would suggest considering a more modest path of growth.

This is also owing to the fact that intermodal terminals would have to be realized upfront at the key inland locations, among them Amman and Zarga, which would supply the necessary handling capacities and ensure efficient connections both to the rail and road network. If we assume that 50 per cent of the total 2030 forecasted container volume accounted for domestic transports (8.55 m tonnes), a ratio of 10 tonnes per TEU (855,000 TEU) and a ratio of 1.6 TEU per container, the Jordan Railway Corporation (JRC), if it were the nominated investor, would need to build intermodal terminals providing for an aggregate annual handling capacity for about 540,000 containers in Jordan. It cannot be assessed without an in-depth investigation if the financial resources and the necessary size of land at logistically attractive locations will be available.

Figure 3-10: Projections of transport volumes and revenues for Jordan's new national rail network

Traffic flows	Transport volume (m tonnes)			Transport revenues (m USD)		
	2020	**2030**	**2040**	**2020**	**2030**	**2040**
Total	28.5	39.8	55.0	507	738	1037
Containers	10.0	17.1	26.6	215	360	540
% share of containers	**35%**	**43%**	**48%**	**42%**	**49%**	**52%**

Source: The Government of the Hashemite Kingdom of Jordan: Jordan National Railway Project, August 2011

3.4 MOROCCO

3.4.1 Current state and evolution of container seaports

Morocco can back on two large and a smaller container port. The biggest site by far is **Tanger Med I**. It comprises of two terminals with an aggregate capacity of 3 million TEU. The first facility TC1, operated by APM Terminals, was put into service in 2007, the second terminal TC2, licensed to Eurogate, commenced operations one year later. Ideally located at the intersection of various east-west and north-south trade lanes close to the Strait of Gibraltar Tanger Med I, from the very beginning, was designed as a hub. With a draught of up to 18 m all handling facilities also provide for the prerequisite that ultra-large vessels can call at the port. Transhipments effectively account for about 96 per cent of the total container throughput, which amounted to some 1.8 million TEU in 2012. This was a considerable set back not only against the year earlier but also compared to the previous path of growth (see Figure 3-11). In 2013, however, the port has recovered and even achieved an all-time high of over 2.5 million TEU.

Tanger Med I provides for an intermodal rail terminal, from which intermodal services have been operated with the dry port of Ain Sebaa near Casablanca since June 2009. Services shall be extended to other destinations in Morocco during 2014.

As the capacity of Tanger Med I is expected to be saturated soon a second container port, **Tanger Med 2**, is being built in the vicinity. Like Med I it will be home to two container terminals. The first, TC4, which will have a handling capacity for 2.5 million TEU and contracted to Marsa Maroc, is scheduled to start operations mid-2014.

Figure 3-11: Container throughput of Morocco's main container ports

Port	Seaborne container throughput (TEU)		
	2010	2011	2012
Agadir	140,600	127,500	124,800
Casablanca	769,100	812,200	839,700
Tanger Med I	2,058,400	2,093,500	1,826,400
% transshipments	*97%*	*96%*	*96%*

Source: Agence National des Ports

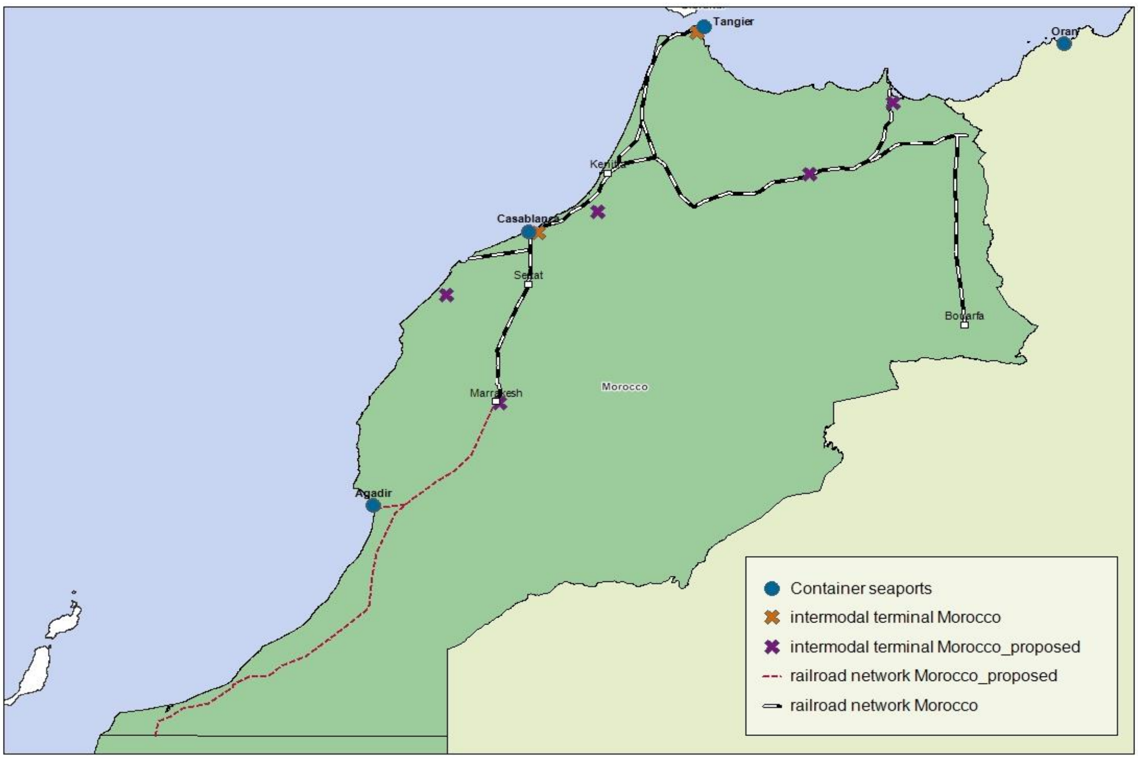
Whilst Tanger is dedicated to transhipments the port of **Casablanca** is Morocco's gateway for export and import flows. In recent years the container port has continuously improved the throughput and reached nearly 840,000 TEU in 2012. The intermodal rail/road terminal at the dry port of Ain Sebaa is located about 6 km off the port (see also Figure 3-12).

3.4.2 Current state of rail infrastructure and rail freight transport

The national railways Office National des Chemins de Fer (ONCF) manages a network of about 1,900 km built to 1,435 mm standard gauge. The network used for freight trains has a Y-shape. It runs from Marrakech in the centre of Morocco via Casablanca to the north where it splits up into two branches. One line leads to the port of Tanger, the other to the port of Nador at the Mediterranean Sea including a link to Algeria (see Figure 3-12).

The ONCF can look back on a record of continuous growth of freight traffic. Between 2008 and 2012 it increased by 35 per cent from 27.5 to 36.9 million tonnes. The main commodity is phosphate, which accounted for 75 per cent of the entire tonnage.

Figure 3-12: Rail network, terminals and container ports in Morocco



Source: KombiConsult

3.4.3 Current state of multimodal freight transport

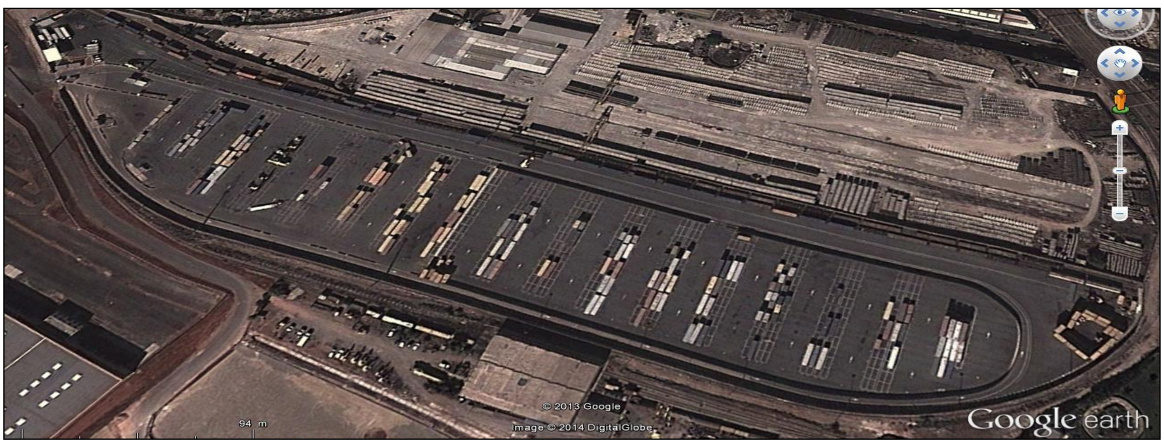
ONCF is the only intermodal operator in Morocco. Currently it offers multimodal services for the transport of marine containers between the major seaports and railheads in the hinterland. According to available information ONCF serves the following trade lanes:

- Port of Casablanca - Dry Port Ain Sebaa (2012: 5,100 containers);
- Dry Port/Casablanca – Marrakech;
- Dry Port/Casablanca - Kénitra;
- Dry Port/Casablanca - Port of Tanger.

As concerns rail operations ONCF tends to deploy dedicated intermodal block trains. The typical train length is up to 550 m for intermodal trains calling at the Casablanca terminal and 450 m for services from/to the port of Tanger. This would result in a maximum transport capacity of the trains between about 55 TEU and 70 TEU.

The two main intermodal terminals are the dry port of Ain Sebaa and Tanger. Ain Sebaa has two handling tracks of a length of 600 m. The declared annual handling capacity of the site is 150,000 TEU, corresponding to 90,000 – 100,000 containers (see Figure 3-13). The port of Tanger reports that the current layout of the intermodal terminal provides for three handling tracks of 800 m length and could enable to handle up to 1,100 TEU per day. It is envisaged to build another three tracks and re-organize the layout to allow implementing rail-mounted gantry cranes that should replace the reach stacker handling.

Figure 3-13: Casablanca intermodal terminal Ain Sebaa



Source: Google Earth

Based on the available documentation it seems as if the ONCF mainly provides for 40' container flatcars, which can accommodate either a 40' container or two 20' containers, though depending on the gross weight of the units (see Figure 3-14).

Figure 3-14: Container wagons deployed by ONCF

Source: ONCF

3.4.4 Development of multimodal freight transport

The Government of Morocco seeks to strengthen the logistic industry in the country. One of the priorities of the strategic programme for the period 2010 to 2015, which is related to the overall "Stratégie nationale de développement de la compétitivité logistique", is the development of "plateformes conteneurs", which can be translated as intermodal terminals. It is not surprising that the largest market potentials are indicated for the port regions of Casablanca and Tanger. A need to set up new platforms or extend existing sites has also been recognized for the inland locations of Marrakech and Fes and for Oujda-Nador in north Morocco.

3.5 OMAN

3.5.1 Current state and evolution of container seaports

The port of Salalah, one of the largest container ports in the Middle East, is at the command of Oman. In 2012, the port registered a record throughput of 3.6 million TEU and thus recovered strongly from the drop of volume in the previous year. Salalah just south of the city of Oman belongs to the quite large group of transhipment ports in the entire region. The percentage share of containers not coming from or going to the hinterland amounted to about 98%. The nominal handling capacity of the port is 4.5 million TEU.

The ports of Sohar and Sultan Qaboos are located at the Gulf of Oman. They are primarily handling export and import containers and are significantly smaller than Salalah in terms of throughput (see Figure 3-15).

Figure 3-15: Container throughput of Oman's main container ports

Port	Seaborne container throughput (TEU)		
	2010	2011	2012
Salalah	3,482,400	3,200,700	3,620,000
Soltan Qaboos	306,500	-	-
Sohar	101,300	108,500	199,000

Source: Port Authority of Oman, Terminal Operators

As the Omani Government expects that the need for transhipping containers will continue to intensifying it plans to build another container terminal in Duqm with an annual handling capacity for 3.5 million TEU. Though mainly dedicated to transhipment cargo the port also will be linked to the envisaged national and the GCC rail network for ensuring hinterland container services. The management of the port of Duqm is a joint venture between the Consortium Anwerp Port (CAP) and the Omani Government.

3.5.2 Current state of rail infrastructure, rail freight and multimodal transport

Since there is no rail network in Oman yet neither conventional rail freight nor multimodal transport services are implemented, for the time being.

3.5.3 Development of rail infrastructure and multimodal freight transport

As a GCC member Oman has designed a comprehensive plan for developing a national rail network and the links with the other GCC countries. The total programme encompasses the construction of more than 2,200 km of new tracks and is scheduled to be realized in three phases (see Figures 3-16 and 3-17).

Figure 3-16: Container throughput of Oman's main container ports

Phase	Segment	Rail section	Length (km)
1	Port of Sohar - UAE border via Al Ain	Sohar - Al Ain	136
		Al Buraimi Spur	27
	Port of Sohar - UAE border	Sohar - Khatmat Milaha	58
	Port of Sohar - Muscat	Port of Sohar - Al Misfah	242
		Spur to Sohar Railway Yard	8
		Al Misfah - Muscat Central Station	20
	Muscat - Port of Duqm	Al Misfah - Duqm	486
		Sinaw - Ibra	84
2	Port of Duqm - Salalah	Duqm - Salalah	-
3	Port of Salalah - Yemen	Salalah - Thamrait - Al Mazyounah	-

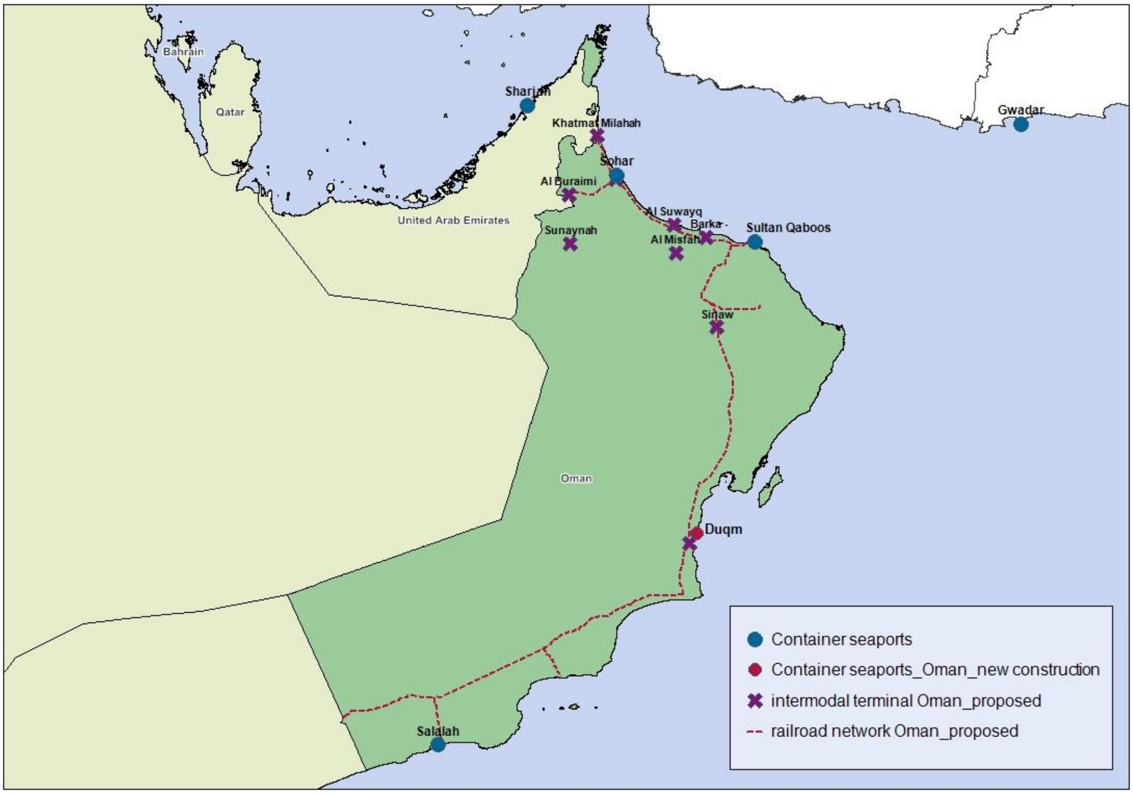
Source: Salim Al Amri, Ministry of Transport and Communications: Oman National Railway Project

According to the design study, Oman's national rail infrastructure is to provide for the following key characteristics:

- Double-tracked rail line using 1,435 mm standard gauge;
- Speed of freight trains: 80 – 120 km/h;
- Axle load: 32.4 tons;
- Clearance (loading gauge): AAR plate H;
- No level crossings with road.

When realized these characteristics are particularly favourable for the implementation of efficient intermodal services. Apart from the speed the envisaged maximum axle load and the clearance are prerequisites for effectively operating double-stack container trains, which deliver an extremely high productivity. The traffic forecasts of the Omani Government actually take intermodal services into account even if the priority in the freight sector, for obvious reasons, may be put on the transport of petrochemical products and other bulk cargoes. To support the implementation of multimodal transport the master plan also includes the construction of nine intermodal yards along the national rail network. The survey could not fully assess whether each facility will really incorporate rail/road transhipment facilities. The sites in Sohar and Duqm, however, are clearly designed as dedicated intermodal terminals for serving the container ports. The intermodal yard in Khatmat Malahah at the border with the UAE shall take care of customs clearance procedures, security checks and other administrative processes.

Figure 3-17: GCC rail network in Oman



Source: KombiConsult

3.6 SAUDI ARABIA

3.6.1 Current state and evolution of container seaports

In 2012, the two key container ports of Saudi Arabia, Jeddah and Dammam, handled an aggregate volume of 6.35 million TEU. Including the considerably smaller port of Jubail the three ports altogether had a seaborne container handling volume of 6.6 million TEU (see Figure 3-18). This was an increase of about 16 per cent compared to the previous year. All ports in Saudi Arabia are managed by private operators while the Ports Authority has a supervisory role.

The largest site, the port of **Jeddah**, achieved a more than proportionate growth rate of almost 18 per cent and reached a new record throughput of more than 4.7 million TEU. This is mainly due to the transhipment role of this Red Sea port. Forecasts see this port to grow its volume further over the next five years resulting from the implementation of the national transport strategy and the extension of services by container shipping lines. The port has three container terminals with an aggregate handling capacity of 7 million TEU: Southern Container Terminal, Northern Container Terminal, Red Sea Gateway Terminal.

Figure 3-18: Container throughput of Saudi Arabia's main container ports

Port	Seaborne container throughput (TEU)		
	2010	2011	2012
Jeddah	3,830,900	4,018,800	4,738,000
Dammam	1,333,100	1,492,300	1,619,700
Jubail	123,800	166,200	244,700

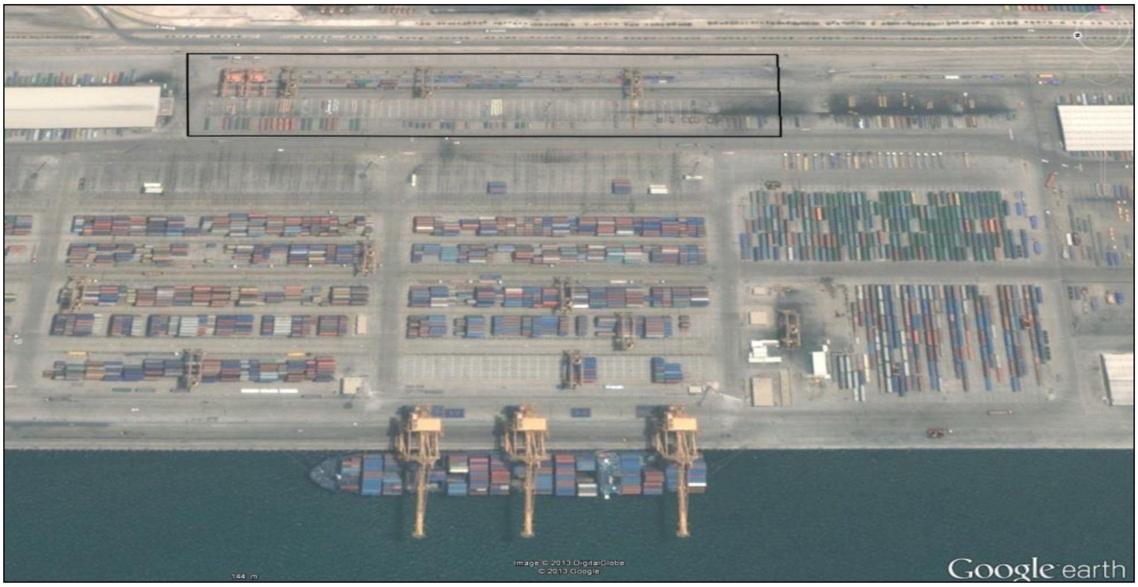
Source: Saudi Arabia Ports Authority

The port of **Dammam,** which has a single container terminal, witnessed a slower growth than Jeddah. Compared to 2011 the throughput rose by 8.5% in the year 2012. But with an increase of the volume to more than 1.6 million TEU the container terminal already has exceeded its indicated handling capacity of 1.5 million TEU. Dammam currently is the only port in Saudi Arabia that is connected to the national rail network and can back on a near-dock intermodal terminal. (see Figure 3-19).

The port of **Jubail** is located 80 km north of Dammam. The port has a single container terminal that processed 245,000 TEU in 2012, thus doubled the throughput within two years. Main hinterland transports are to the capital city of Riyadh.

Another large container port is under construction in the King Abdullah Economic City at the Red Sea. The first phase of the new King Abdullah Port, located about 100 km north of Jeddah, is due to be put into operation during 2014. The annual handling capacity amounts to 2.7 million TEU.

Figure 3-19: Port of Dammam with near-dock intermodal rail/road terminal



Source: Google Earth

3.6.2 Current state of rail infrastructure and rail freight transport

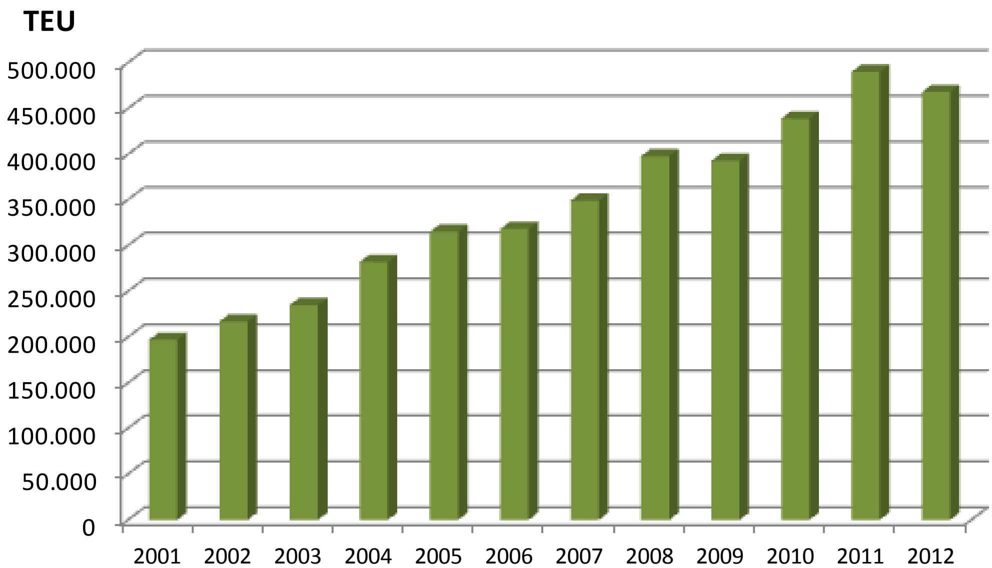
The Saudi Railways Organization (SRO) operates a total rail network of approximately 1.380 km, of which 556 km of tracks between Dammam and Riyadh via Al-Ahsa, Abqaiq, Al-Kharj, Haradh and Al-Tawdhihiyah are dedicated to freight services. A 449 km rail line is used by passenger trains, and 373 km of tracks are branch lines mainly connecting industrial and agricultural sites with the main line.In 2010, SRO carried more than 4 million tonnes of freight over its freight line. The transport performance totalled to about 1.7 billion tonne-kilometres.

3.6.3 Current state of multimodal freight transport

According to available sources, multimodal freight transport in Saudi Arabia currently is limited to a single service between the port of Dammam and the capital of Riyadh performed over the freight line. It concerns a dedicated intermodal service, and the trains shuttle between the Dammam near-dock intermodal terminal and the inland terminal in Riyadh (see also Figure 3-21). The study could not produce any evidence if another intermodal service is supplied on the trade lane Dammam-Hardh.

The intermodal transport volume of SRO amounted to 468,000 TEU in 2012. This means a slight drop of 22,000 TEU or 4.5 per cent compared to the record year 2011 when the shuttle trains shipped 490,000 TEU. Within one decade, from 2001 to 2011, SRO achieved a spectacular growth of its intermodal traffic of 149 per cent (see Figure 3-20). According to SRO, the railway has captured a market share of about 80 per cent for the trade lane Dammam-Riyadh.

Figure 3-20: SRO's intermodal transport volume, 2001-2012 (TEU)



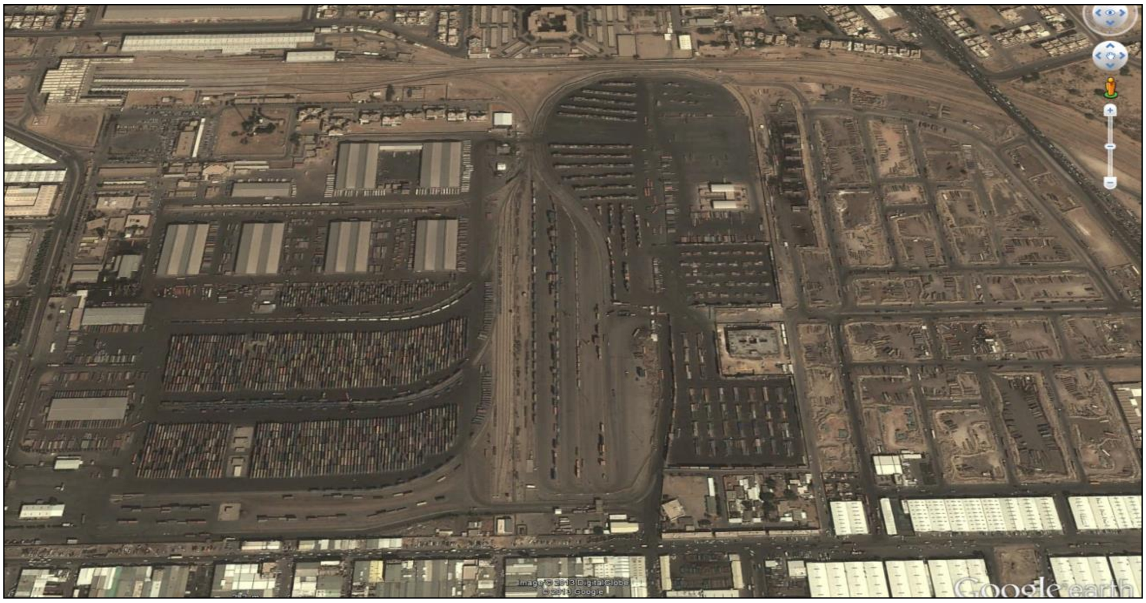
Source: Saudi Railways Organization

SRO serves the trade lane Dammam-Riyadh with five regular train pairs per day. The scheduled transport time ranges between 4.5 to 5 hours. This corresponds to an excellent average travel speed of 110 to 120 km/h. According to SRO and Bergqvist (2013), in many cases, the intermodal service is operated by double-stack container trains. The indicated average capacity of the trains is 110 containers. As 40' containers reportedly account for the huge majority of all shipments the typical transport capacity of intermodal trains can be estimated to be about 200 TEU.

Two dedicated intermodal terminals are in operation in Saudi Arabia. The Dammam near-dock facility is reported to provide for three handling tracks of each 340 m length and three rail mounted gantry cranes. This information is suspected to be either not topical or not comprehensive as such a terminal layout would not provide for the capacity to handle five daily train pairs with an daily average handling volume of about 1,800 TEU or about 1,000 containers, assuming 250 working days. The layout of the intermodal yard at Riyadh dry port could also not be clarified. Apart from the supply of logistics services in respect of container transports the dry port has a key benefit. It provides customs clearance services thus basically enabling a fast processing particularly of import containers.

In 2013, SRO employed a fleet of more than 1,600 dedicated intermodal wagons including 838 double-stack cars and 784 container flatcars.

Figure 3-21: Riyadh dry port and intermodal terminal



Source: Google Earth

3.6.4 Development of rail infrastructure and multimodal freight transport

Saudi Arabia has set up a programme of four railway network enlargement projects. Each rail section will be built to the 1,435 mm standard gauge. One project, the high-speed line between Jeddah and Medina/Mekka, is completely dedicated to passenger traffic whereas the other investments primarily target at goods transport (see also Figure 3-22).

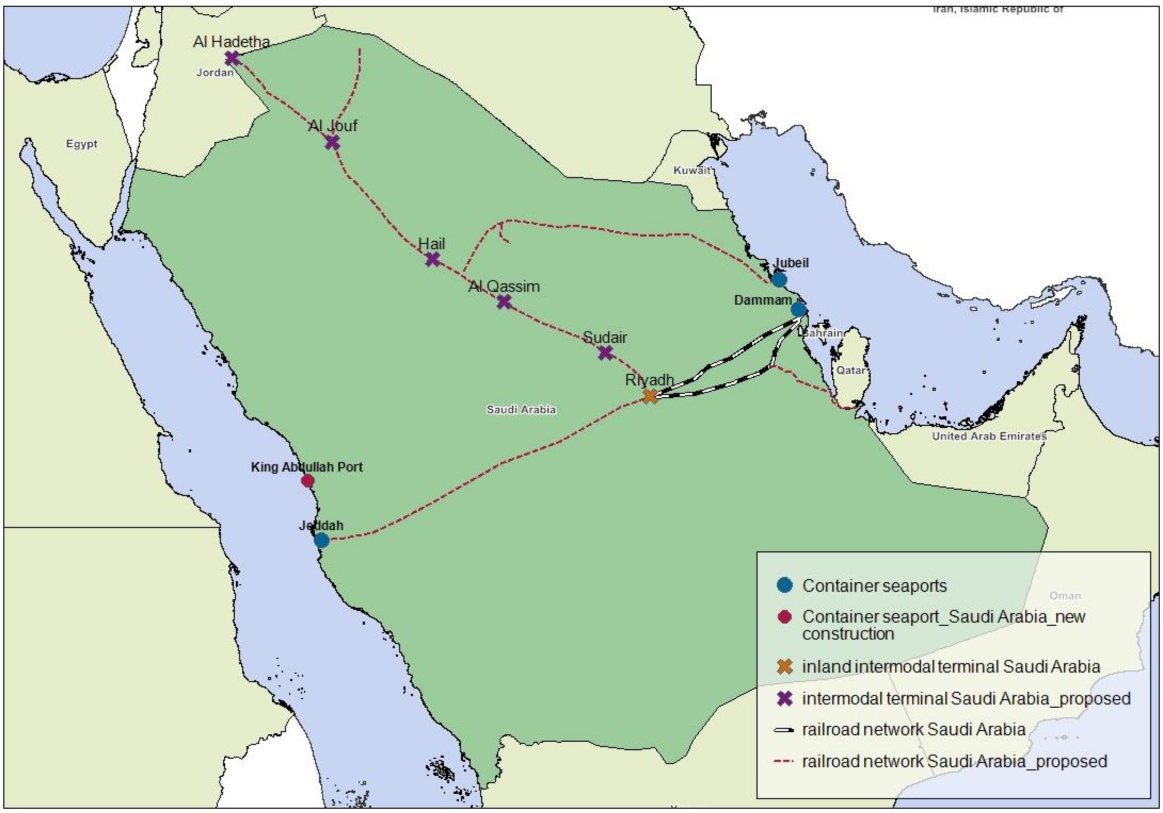
The **Saudi Landbridge** project is designed to establish a through-rail corridor across the country between Jeddah at the Red Sea and the ports of Dammam and Jubail at the Arabian Gulf. The landbridge shall primarily be used for operating intermodal trains moving containers. It involves three main measures:

- Construction of a new line between Riyadh and Jeddah (950 km) as the continuation of the existing freight line;
- Construction of a connecting line between Dammam and Jubail (115 km);
- Upgrading of existing Dammam-Riyadh section.

Like the landbridge the **North-South Line** is mainly targeting at freight transport services, yet more for bulk than containerized commodities. The new line will link Al-Haditha near the border to Jordan in the northwest of Saudi Arabia with Riyadh. It will also provide for extensions to Hazm Al Jalamid for the transport of phosphates, to Al-Zubayrah for the haulage of bauxite, and to Ras-Al Zour where a new Gulf port shall be built to ship these commodities overseas. The project includes the construction of a total of about 2,750 km of tracks. Saudi Railways Company (SAR) has been nominated by the Government to manage and operate the new infrastructure and supply the relevant utilities. Among others, it is planned to build nine intermodal yards along the lines. When Jordan will have realized its new line between Zarga and the border to Saudi Arabia, the gap between both countries can be closed and a full north-south corridor will be established.

Finally, Saudi Arabia is a key partner of the **GCC Gulf Rail Project** (see also section 3.1). The new main line will extend from Kuwait to Oman over a distance of likely more than 2,100 km. Saudi Arabia's share of the project is estimated at 663 km.

Figure 3-22: Saudi Arabia rail network: existing lines and enlargement projects



Source: KombiConsult

The enlargement of the national rail network has considerable positive implications for the implementation of **intermodal transport services**. This is owing to the fact that the new rail sections, for one part like the Jeddah-Riyadh link, are specifically targeted at this rail freight sector anyway and, for another part, they will be releasing new market opportunities for intermodal services.

According to SRO, the landbridge rail line should enable to double the volume of container traffic from the then 350,000 to 700.000 containers by the year 2015. Even if the time horizon for the traffic projection likely will have to be postponed as the line works are due to be terminated later the prognosis clearly indicates the prospects for multimodal transport on this corridor.

In addition to that, we do expect that further opportunities especially for container hinterland transport by rail may arise on the following trade lanes and from the following freight markets in the medium and long-term:

- Inter-port container transports between the seaports along the GCC main line as regards both full containers and the balancing of empty container movements;
- Container hinterland traffic on the GCC main line from/to Iraq;
- Container hinterland traffic between the Arabian Gulf ports and Jordan via the Dammam-Riyadh-Al-Haditha rail line;
- Transport of continental cargoes in intermodal loading units between Saudi Arabia and the UAE, on the one side, and Jordan, Syria, and Turkey, on the other side, via the Dammam/Jeddah-Riyadh-Al-Haditha rail lines;
- Transport of marine containers between the industrial cores of the King Abdullah Economic City and the King Abdullah Port and the port of Jeddah.

In order to identify detailed potentials for intermodal services an in-depth market investigation would be required.

3.7 UNITED ARAB EMIRATES

3.7.1 Current state and evolution of container seaports

The most important container seaports in the United Arab Emirates (UAE) are Jebel Ali, Khor Fakkan und Khalifa. By far the biggest port in the UAE and also among the Top 10 world container ports is **Jebel Ali**. In 2012 the container terminals of this Dubai-located port moved nearly 13.3 million TEU between vessels and shore. Herewith its nominal handling capacity of 14 million TEU was almost fully employed. The more important is that another facility providing for a capacity of 4 million TEU is going to be operative in 2014. The terminal will have an access to the envisaged GCC rail network.

The Emirate of Sharjah's port of **Khor Fakkan** is located strategically at the Strait of Hormuz. In 2012, the port recorded a plus of 24 per cent against 2011 and reached an all-time high of almost 4 million TEU of containers (see Figure 3-23).

Khalifa is a new port in Abu Dhabi, which went into operation in December 2012. It has replaced Mina Zayed and also taken over the majority of volumes. In the start-up phase Khalifa has a capacity for about 2 million TEU, which shall be extended to 15 million by 2030. The exiting container terminal is supposed to have handled some 1.1 million TEU in 2013. The port will be linked to the national railway network by 2016 and provide intermodal container hinterland services.

Figure 3-23: Container throughput of main container ports in the UAE

Port	Seaborne container throughput (TEU)		
	2010	2011	2012
Jebel Ali	-	13,000,000	13,270,000
Khor Fakkan	-	3,230,000	3,996,000
Khalifa/Mina Zayed	516,000	768,000	-

Source: World Cargo News 9/2013; Port Operators

3.7.2 Current state of rail infrastructure, rail freight and multimodal transport

Until lately the UAE has not had provided for a piece of rail infrastructure. This has changed in 2013 when an initial 266 km rail section was opened for trials. The first train ran on September 22nd, 2013 (see Figure 3-24). The tests are scheduled for a period of three months. Commercial operations initially carrying granulated sulphur shall be commenced in early 2014 under the responsibility of Etihad Rail. This railway company was established in June 2009 to control the development and the construction of the new rail network and once established operate the UAE's national freight and passenger services.

Against the above background it is obvious that neither wagonload nor intermodal services are currently implemented in the UAE.

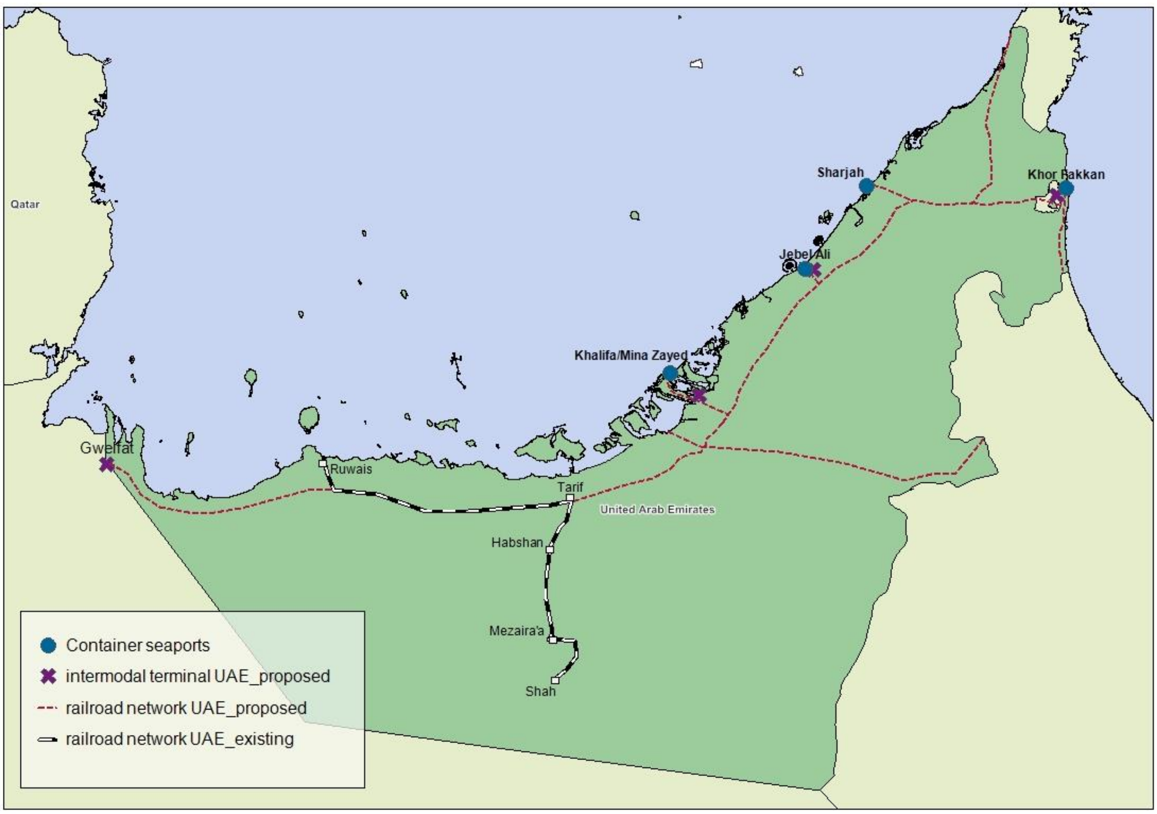
Figure 3-24: Etihad Rail trial freight train

Source: Railway Gazette, 28 Sep 2013

3.7.3 Development of rail infrastructure and multimodal freight transport

Like Oman and Saudi-Arabia the UAE has been planning its national rail network in context of the GCC Gulf Rail project. The envisaged 1200 km of lines will extend from Saudi Arabia at Al Ghweifat border point to Abu Dhabi, Dubai, Sharja, Fujairah, and Kalba at the border with Oman and also include links with major locations in the hinterland such as Madinat Zayd and Al Ain at the border with Oman (see also Figure 3-25). The entire project will be enforced in three phases and is expected to be completed by 2018.

Figure 3-25: UAE's envisaged rail network and intermodal terminals



Source: KombiConsult

Phase 1 of the investment programme, the line connecting the sulphur sites of Shah and Habshan with the port of Ruwais, has been virtually terminated with the beginning of test runs in September 2013. Phase 2 consists of a 628 km rail section, which is to connecting Mussafah, Khalifa and Jebel Ali Ports and also provide connections to the neighbouring countries of Saudi Arabia at Al Ghweifat and Oman at Al Ain. The final phase 3 will see the construction of a rail line between the Port of Dubai and the north Fujairah, the port of Khor Fakkan and Rast.

The majority of railroad lines will be double-tracked and will be linked to all major industries within the UAE. The track will be standard gauge with a maximum axle load of 32.5 tonnes, which is a crucial characteristic to enable double-stack container trains.

Etihad Rail seeks to operate double-stack container trains with a maximum length of 1,200 m and reportedly is set to deploy articulated well-cars for taking up - most likely - four 40' containers each. Trains shall carry up to 260 TEU.

Intermodal terminals will be built adjacent to the container terminals at Jebel Ali, Khalifa and Khor Fakkan. In addition, an intermodal terminal will be located in the hinterland at the border city of Al Ain. Intermodal terminals will be operated by Etihad Rail as well as by joint ventures with private stakeholders.

Except for one the survey could not identify publicly available sources reporting on the forecasted development of intermodal traffic on the UAE rail network. The only source refers to a MoU signed between Etihad Rail and DP World, the operator of the container port of Jebel Ali. According to this information, DP World expects that the rail terminal at Jebel Ali will achieve an annual handling volume of up to 5 million TEU by 2030 [Railway Gazette, 8 May 2012].

3.8 Summary on OIC Arab Group

Some of the largest container ports in the world outside China and the Far East are in the seven OIC Arab Group countries analysed for this study. The ports of Jeddah, Khor Fakkan, Port Said and Salalah handled between 3.5 and nearly 5 million TEU of containers in 2012. The largest in this group, Dubai's Jebel Ali seaport accounting for a throughput of more than 13 million TEU in 2012, even is under the world's top 10 container ports (see Figures 3-26 and 3-27).

According to available information, just three ports of our sample, Dammam, Tanger Med I and Casablanca, currently are integrated into regular intermodal container hinterland services (see also Figure 3-27). Dammam even reports an extraordinarily high transport volume of about 450,000 TEU per year, which is completely moved on a service between the port and the Saudi Arabian capital city of Riyadh. This is likely to be one of the world's largest single trade lanes of intermodal rail/road transport, if not the biggest.

Intermodal services in Morocco, for the time being, are focused on the exchange of containers between the main ports of Casablanca and Tanger and their respective catchment areas. The current transport volume has not been disclosed. Based on ONCF's, the national railway, indications of the scope of services and the train parameters we estimate that the annual volume will be well below 50,000 TEU.

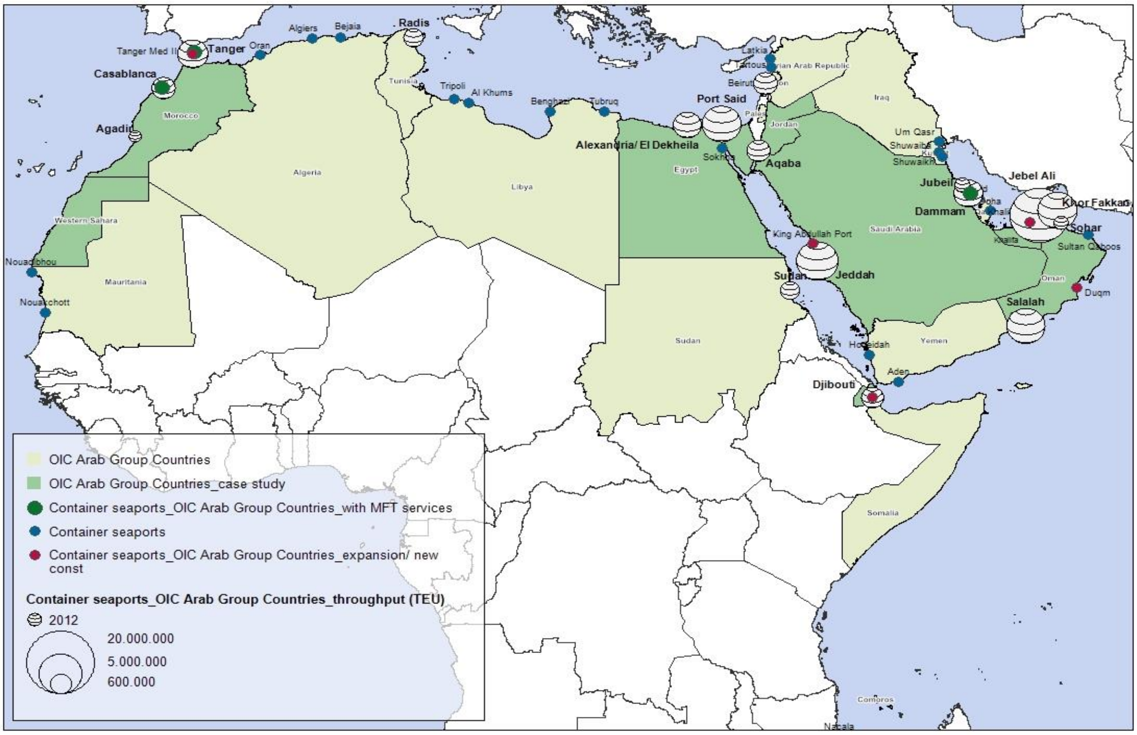
Figure 3-26: Container throughput of Arab Group's main container ports

Port	Country	Seaborne container throughput (TEU)		
		2010	2011	2012
Jebel Ali	UAE	-	13,000,000	13,270,000
Jeddah	Saudi Arabia	3,830,900	4,018,800	4,738,000
Khor Fakkan	UAE	-	3,230,000	3,996,000
Port Said	Egypt	3,805,000	4,182,000	3,834,000
Salalah	Oman	3,482,400	3,200,700	3,620,000
Tanger Med I	Morocco	2,058,400	2,093,500	1,826,400
Dammam	Saudi Arabia	1,333,100	1,492,300	1,619,700
Alexandria	Egypt	1,375,500	1,358,000	1,434,500
Damietta	Egypt	1,191,500	929,400	-
Casablanca	Morocco	769,100	812,200	839,700
Aqaba	Jordan	605,700	705,600	817,400
Doraleh	Djibouti	399,200	688,500	728,500

Source: KombiConsult

In the other five countries of the Arab Group intermodal services by rail have not been supplied until now. This fact is obvious for Oman and the United Arab Emirates (UAE), which do not operate a rail network yet, although a first rail line in the UAE is due to be inaugurated for conventional rail freight services early in 2014. In Jordan, the only operational rail link is dedicated to the transport of phosphate by conventional wagonload services. Egypt, on the other hand, provides for a rather large rail network extending for about 6,700 km. Yet it is used to carry only some 25 million tonnes of freight per year, corresponding to a market share of about 5 per cent. It appears as if regular intermodal services currently are not operated by the Egyptian railway. Other sources, however, indicate that a certain number of containers are conveyed by rail between the ports of Alexandria and Port Said. The port of Djibouti provides for a rail access. However, it is reported that the infrastructure is in such a poor state that, for the time being, the port is not being served by conventional freight or intermodal trains.

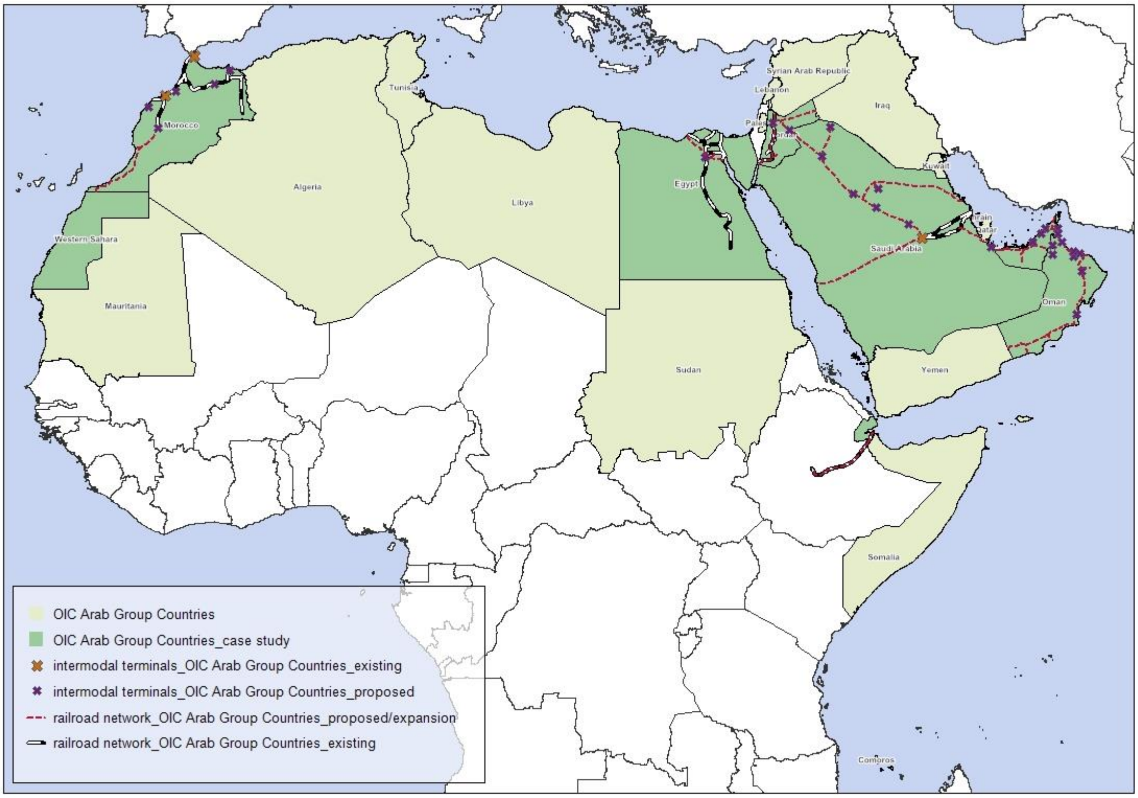
Figure 3-27: Arab Group countries: main container ports



Source: KombiConsult

While, except for Saudi Arabia, the existing level of intermodal activities in the Arab Group countries covered by this study is very limited the prospects for intermodal transport are very good. In every country, governments, railways, port operators or logistics service providers are set to establish or extend container hinterland transport services by rail. The authorities and the private sector seem to have recognized the pivotal function of multimodal transport for promoting external trade, decongest seaports and road infrastructure and raise the attractiveness of the country as a whole or of certain regions for domestic and foreign investments into manufacturing industries or distribution centres.

Figure 3-28: Arab Group countries: rail and intermodal network



Source: KombiConsult

Against this background the countries have already taken actions or are scheduled to promote intermodal services amongst other by the following measures:

- Construction of new rail lines or complete networks;
- Implementation of state-of-the-art rail technology including high axle loads and clearings that allow for operating double-stack container trains;
- Upgrading and modernization of rail and intermodal terminal infrastructure;
- Construction of rail access to container ports;
- Creation or improvement of cross-border rail links, which once finished would enable to implement international MFT services in the Middle East or North Africa;
- Set-up of new intermodal terminals and inland container depots;
- Procurement of efficient intermodal wagons.

4 OIC ASIA GROUP

The present study covers 10 members of the OIC Asia Group. Each country has at least one rail line, which is used for rail freight services, but most of them provide for quite extensive networks. Regular multimodal rail/road transport services, too, have been implemented in every country except for Afghanistan where, for the time being, the rail transport of containers seems to be limited to the movement of military goods, and Turkmenistan (see Figure 4-1).

Figure 4-1: Rail infrastructure and MFT services in Asia Group Countries

Country	Rail network	Rail freight services	MFT services	UIC Member
Afghanistan	X	X	-	X
Azerbaijan	X	X	X	X
Bangladesh	X	X	X	X
Indonesia	X	X	X	X
Iran	X	X	X	X
Kazakhstan	X	X	X	X
Kyrgyzstan	X	X	X	-
Malaysia	X	X	X	X
Turkey	X	X	X	X
Turkmenistan	X	X	-	X

Source: KombiConsult analysis

4.1 AFGHANISTAN

As a landlocked country Afghanistan has no immediate access to seaports. The geographically closest ports for processing external trade flows with overseas countries are located in Iran and Pakistan if goods should not be carried over very long distances via the neighbouring Central Asian countries to ports in China, Russia or the Baltic States. For each option the conditions to employ rail freight services are equally poor. Owing to a very limited rail infrastructure in Afghanistan merchandise have to be exported and imported almost entirely by road, not to mention the domestic supply.

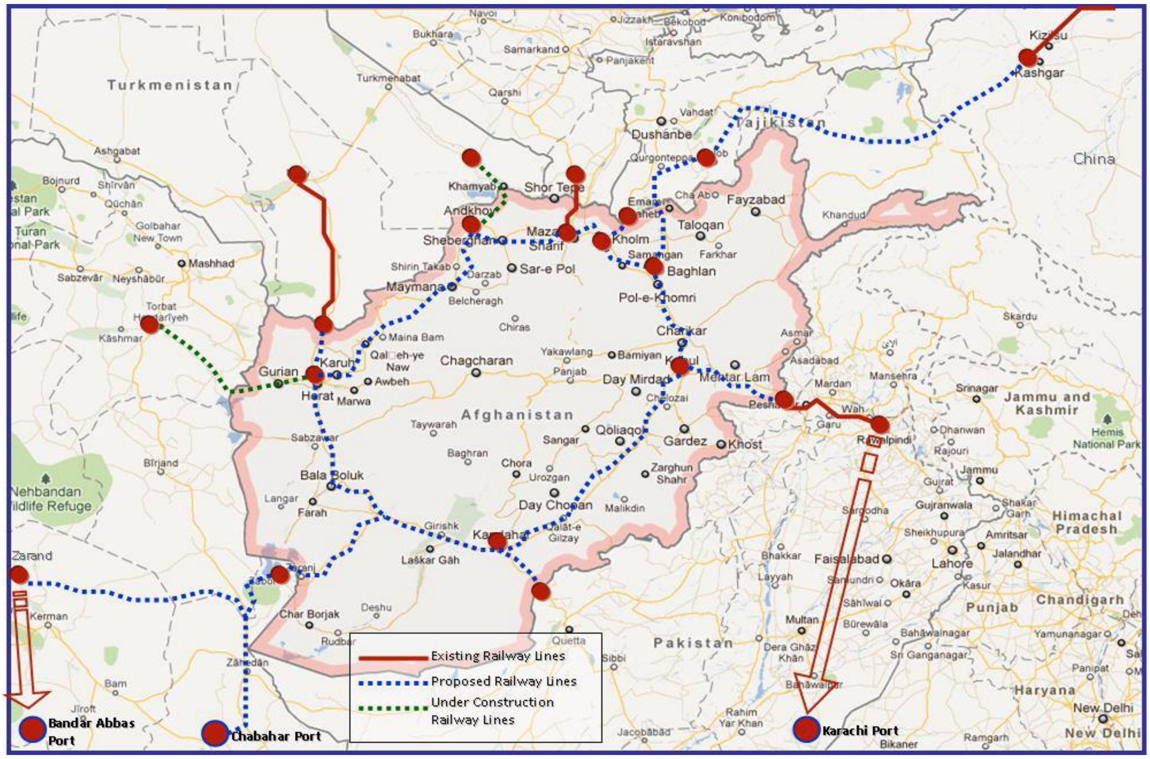
This report on Afghanistan, first, describes the current situation in the rail sector and its implications for multimodal freight transport. Then it displays the plans for enlarging the rail network in this country and the opportunities for implementing intermodal services.

4.1.1 Current state of rail infrastructure and rail freight transport

Afghanistan's rail network currently composes of two short border-crossing lines of track (see Figure 4-2). The first line stretching for about 10 km connects Turghundi at the northern Afghan-Turkmen border with Serhetabat in Turkmenistan. The other rail line was only completed in autumn 2011 and actually is an extension of the Uzbek rail network. The single track unelectrified line runs about 75 km from Temez via the Uzbek-Afghan border station to Mazar-e Sharif in North Afghanistan. Operation of the line has been licensed to a subsidiary of the Uzbek state railway UTY for a start-up phase of three years and shall be taken over by Afghanistan's own railway authority once established.

The new piece of rail infrastructure allows to implement the first commercial rail freight services in Afghanistan and link the country with its major trade partners especially Uzbekistan. It is also expected to accelerate the import of goods to Afghanistan and reduce overall transport costs by decongesting the current bottleneck of Hairatan. This border station is said to be the hub for about 50 per cent of Afghan imports and has become increasingly congested by trucks. It was reported that effectively conventional freight trains shipping bulk goods such as grain, flour, oil, fuel or construction materials have been operated over the new line since its inauguration. The capacity of the line, however, cannot yet be fully exploited as the railway company UTY only provides for limited operational resources.

Figure 4-2: Afghanistan: existing and planned rail lines



Source: UNECE, Project Concept Note 2012

4.1.2 Current state of multimodal freight transport

Prior to the completion of the rail line Termez - Mazar-e Sharif multimodal services were not supplied in Afghanistan. Import containers travelling by rail had to be discharged from trains at an Uzbek inland container terminal and conveyed to Afghanistan by trucks thus contributing to congest the border station. The same applied to export containers though processes were reverse.

Now that the new infrastructure is in operation intermodal services by rail could basically be provided until Mazar-e Sharif. The clearance of the line even allows to operating double-stack container trains, which would enable very competitive costs compared to road. Yet, there is no evidence that civil transports of containers have taken this opportunity for the time being. It is only reported that containers deployed for the supply of military forces in Afghanistan have been carried via Uzbekistan to and from Mazar-e Sharif.

4.1.3 Development of rail infrastructure and multimodal freight transport

There is quite a long list of plans or ongoing projects to enlarge the Afghan rail network and connect it with the neighbouring countries. The clear focus of all investments is on freight transport. The following key rail infrastructure programmes have been identified (see also Figure 4-2):

- Afghanistan - Turkmenistan: The two countries have set up a project, which includes the construction of a rail section extending from Mazar-e Sharif to Andkhoy and Aqina in Northwest Afghanistan, where it shall be connected with a new line running to Atamyrat-Imamnazar in Turkmenistan. The construction of the tracks was launched in June 2013.
- Afghanistan - Tajikistan: Tajikistan joined the above initially bilateral project at a later stage. It relates to the building of a rail section from Mazar-e Sharif east to Sher Khan Bandar at the Afghan-Tajik border. According to recent reports the final alignment of this rail project has not been approved by both countries.
- Afghanistan – Iran: A further project foresees the extension of the rail section Mazar-e Sharif - Andkhoy to Herat in West Afghanistan. Here the line would be connected to the link between Herat and Khaf in Iran. This line is under construction since about eight years and is supposed to become operational in 2014.
- Afghanistan – Pakistan: It is more than three years that both countries signed a Memorandum of Understanding to invest in two new railway lines linking Kandahar in South Afghanistan with Quetta (Pakistan) and Jalalabad in East Afghanistan with Peshawar (Pakistan). It is said that the work on the first project may commence soon.
- Mazar-i-Sharif - Kabul - Torkham (North-South corridor): The Chinese MCC group has proposed to build this domestic rail line, which, however, might be connected to the Pakistan network in Torkham. The line would mainly be required to access a copper mine in Aynak, for which MCC has been granted a mining concession.

Like the latter project, the construction of almost any new rail line in Afghanistan is dedicated to rail freight traffic and, in particular, to the transport of bulk cargoes. The rail projects are considered critical for exploiting the huge mineral resources of the country such as copper or iron ore, and ship the cargoes to seaports or destination countries efficiently, or facilitate the import of raw materials, for example, oil and gas from neighbouring countries.

Based on available sources the supply of intermodal services appear to not playing a role in the decision processes for the planned investments into the Afghan rail network. This might turn out as short-sighted perspectives for two reasons. First, especially the rail connection with Iran, whose inauguration is likely to be imminent, will provide Afghanistan access not only to the container seaports at the Persian Gulf but also enable land bridge transports with Turkey and Europe. If it comes to the shipping of general cargo such as packed or palletized goods the employment of containers or other suitable intermodal load units would deliver a cost-efficient and safe logistics solution.

The second reason for the potential evolution of intermodal services on the Afghan rail network is related to track gauges. Afghanistan has decided to use the standard gauge of 1,435 mm for the domestic rail network. The same gauge is used in Iran, which facilitates the transport of cargo between both countries and also enables a cost-effective movement of containers from/to Iranian ports.

All other neighbouring countries, however, have different kinds of gauge. Pakistan uses 1,676 mm while the networks of the central Asian countries of Tajikistan, Turkmenistan and Uzbekistan are built to 1,520 mm gauge. Since all new cross-border rail sections with these countries shall conform to their corresponding track gauge Afghanistan is required to build interchange or break-of-gauge stations where the domestic and the international lines will meet. At other borders it has been proved that the transfer of containers between trains is the technology, which seems to entail the least cost for bridging the break of gauge. Others technologies such as the change of axles or the transhipment of cargo are more costly or take much more time. Against this background it is suggested to investigate the comparative economics of the transport of bulk goods such as minerals with conventional wagons and in freight containers.

Only recently, Afghanistan has taken another important step to progress its railway system. In December 2013, the UIC officially confirmed the membership of the Afghanistan Railway Authority.

4.2 AZERBAIJAN

4.2.1 Current state and evolution of container seaports

Azerbaijan, in the strict sense, is a landlocked country without any access to the oceans of this world. Since the country, however, is located at the west coast of the Caspian Sea it provides for sea ports. The most important is the port of **Baku**. As a multipurpose port it handles dry cargo, liquid bulks as well as containers. The annual container handling capacity is indicated with 10,000 TEU. The major counterparts in the container trade are the ports of Aktau, Amirabad, Anzali and Turkmenbashi.

It is planned to move the existing port of Baku to Alyat, about 65 km south of Baku. It is situated at the crossroads of the east-west and the north-south corridors. The container terminal will be built in three phases. The first phase will create an annual handling capacity for about 40,000 TEU. It shall be enlarged to 150,000 TEU and 1 million TEU in stages 2 and 3, respectively.

4.2.2 Current state of rail infrastructure

The Azerbaijan Railways "Azərbaycan Dəmir Yolları" Qapalı Səhmdar Cəmiyyəti" is a state-owned undertaking under the surveillance of the Ministry for Transport. It operates a national railway network using the 1,520 mm track gauge of about 2120 km, of which 805 km are double-tracked and 1,295 km are electrified. The two main border crossing lines are with Armenia and Georgia. Parts of the network reportedly are not maintained properly restricting the maximum velocity for freight trains velocity to about 35 km/h on some sections. The Azerbaijan Railways, however, has already started to invest heavily in the infrastructure. They are set to rehabilitate or upgrade the existing network, build missing links with neighbouring countries and ensure a state-of-the-art railway technology.

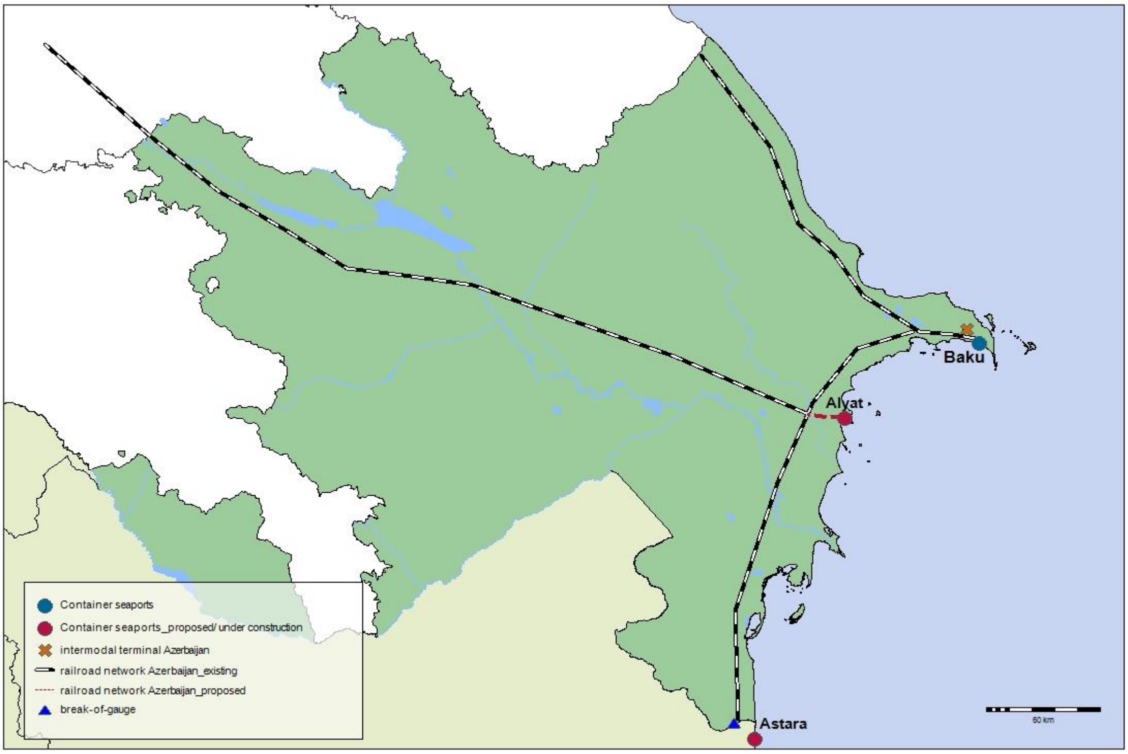
4.2.3 Current state of multimodal freight transport

The Azerbaijan Railways are the only providers of intermodal transport in Azerbaijan. Currently, they operate a single dedicated service. The international container block train shuttles between Baku and the Black Sea port of Poti in Georgia twice a week (see also Figure 4-3). At the port of Baku connections to central Asian countries are offered by short-sea or ferry services over the Caspian Sea particularly with the port of Aktau in Kazakhstan. Azerbaijan current intermodal facilities are:

The border stations for the Baku-Poti service running on the TRACECA corridor are Beyuk Kasik in Azerbaijan and Gardabani in Georgia. The scheduled time for processing the trains is three hours on each side. They include the change of locomotives, customs clearance, border controls and technical inspection. According to reports, the time-schedules often are not met leading to delays of up to eight hours. ADB CAREC action plans are on-going aiming at reducing the delays and strengthen the regional cooperation.

State-owned Baku International Sea Trade Port currently provides for the only specialized intermodal terminal in Azerbaijan. The facility whose annual capacity is estimated at 15,000 TEU, employs a gantry crane and a reachstacker and can handle 20’ and 40’ containers.

Figure 4-3: Rail network and main intermodal trade lane in Azerbaijan



Source: KombiConsult

4.2.4 Development of rail infrastructure and multimodal freight transport

The Kars–Tbilisi–Baku railway section, a regional railway project and part of the TRACEC corridor, is currently under construction and will connect Azerbaijan with Turkey through Georgia. In this framework, existing lines will also be rehabilitated and modernized. Once completed rail freight traffic and especially continental intermodal services carrying containers are expected to increase in both directions.

The Ministry of Transport in conjunction with Azerbaijan Railways has a great interest in developing intermodal terminals and ensuring an advanced intermodal network within Azerbaijan especially along the TRACEC international transport corridor. Therefore additional terminals may be established once the necessary market potential will have been identified. Most of the rolling stock of the Azerbaijan Railways is supposed to be in poor conditions. This also applies to container railcars. The railway undertaking now seeks to procure new locomotives and rehabilitate the current wagon fleet. In addition, when the demand for intermodal services is due to increase as a result of the extension and upgrading of the international rail network Azerbaijan Railways intend to invest in new container wagons as well.

4.3 BANGLADESH

4.3.1 Current state and evolution of container seaports

The port of Chittagong clearly is the leading main container port in Bangladesh handling about 98 per cent of the containerized maritime trade of the country. Since many years the port is on a steady path of growth reflecting the integration of Bangladesh into global supply chains. In 2012, Chittagong's container throughput exceeded the 1.4 million TEU mark. That's a plus of 21 per cent compared to 2009 (see Figure 4-4).

Subject to the administrative control of the Ministry of Shipping of Bangladesh the port of Chittagong is operated by the Port Authority. It has a single terminal with a handling capacity of about 1.7 million TEU. The Port Authority recently has implemented actions to increase the efficiency and reliability of its services. As a result the port has been successful in reducing the berthing time of container vessels from an average of 11 to 2.4 days. Too, container dwell time has declined from 26 to 18 days. Apart from road haulage the port can also back on intermodal transport services by rail. The handling tracks have a length of 550 m.

The second largest container port in Bangladesh, the port of Mongla, is significantly smaller than Chittagong. It has a regional importance and accounted for a container throughput of 30,000 TEU in 2011.

Figure 4-4: Container throughput of Chittagong Container Terminal

Port	Seaborne container throughput (TEU)			
	2009	2010	2011	2012
Chittagong	1,161,500	1,329,000	1,392,100	1,405,500

Source: Containerisation International

The Government of Bangladesh aims to match the increasing demand for container traffic and therefore has elaborated plans for enlarging the country's handling capacity for sea-to-shore volumes. One component is the building of two additional container terminals in Chittagong boosting the capacity from 1.7 to about 3 million TEU. The second component is the construction of a new deepwater port on Sonadia Island south of Chittagong, which would also help to offset the main deficit of the port of Chittagong that is the small draught of maximum 9.2 m. This move must also be considered against the background of an anticipated increasing competition from Myanmar's new deepwater port in Sittwe, which might lead to a shift of container volumes away from Chittagong.

4.3.2 Current state of rail infrastructure and rail freight transport

The Bangladesh Railway (BR) operates a national network of 2,855 km lines of track. It is not only divided into a west and an east zone separated by the Jamuna River, but the two zones also feature different track gauges (see Figure 4-5).

Figure 4-5: Rail network in Bangladesh

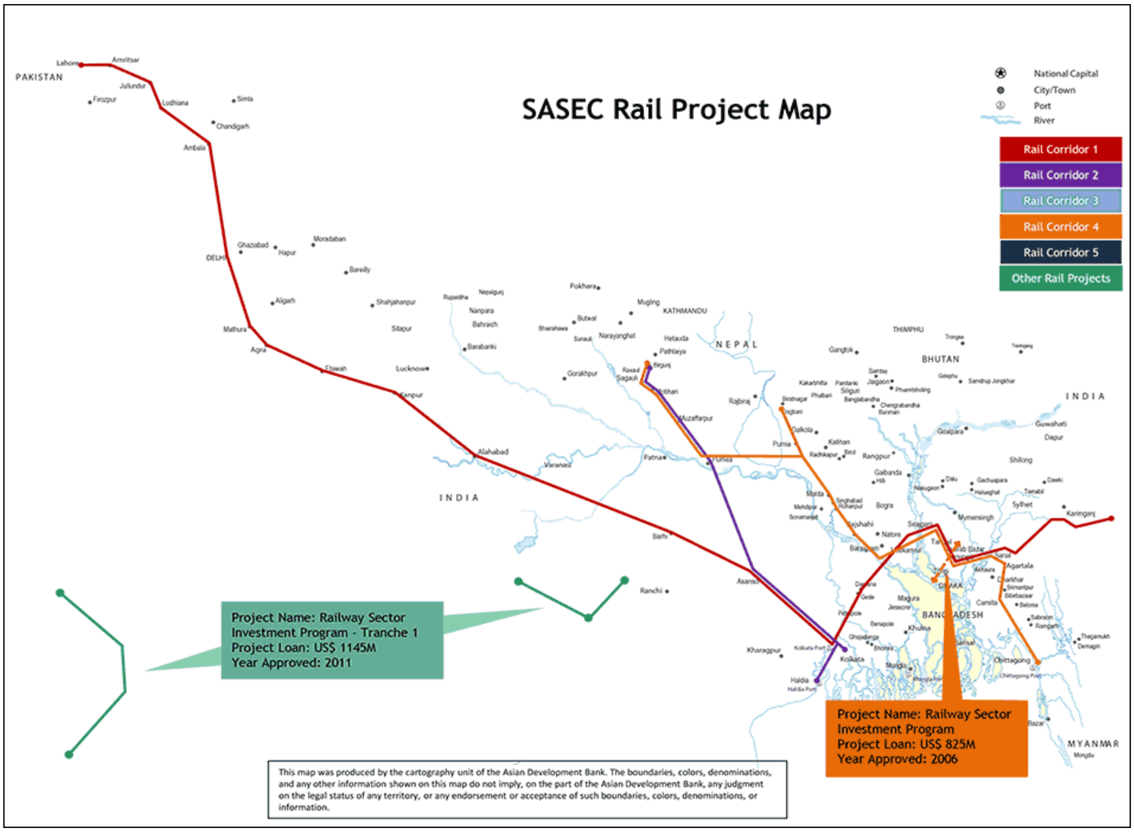
Track gauge	Length of track		
	West Zone	East Zone	Total
Broad gauge (1,676 mm)	660	-	660
Meter gauge	598	1,222	1,820
Dual gauge (both gauges)	375	-	375
Total rail network	**1,633**	**1,222**	**2,855**

Source: Bangladesh Railway

The condition of the rail network on general is poor. Yet the Government of Bangladesh is set to improve the infrastructure and, in the framework of the 6th Five-Year-Plan 2011-2015 and the Transport Strategy 2020, the Bangladesh Railway will seek to developing an integrated national railway system by rehabilitating lines and closing gaps in the network. This particularly applies to missing international links with the countries involved in the Trans-Asian Railway (TAR) network and the South Asia Sub-regional Economic Cooperation (SASEC) network (see also Figure 4-6).

In spite of the comparatively large network rail's modal share of goods transport in Bangladesh is only 4 per cent. In contrast to that, road transport accounts for 80 per cent and inland waterway for 16 per cent of the total traffic volume. The remarkably high market share of inland waterways is based on the vast network of rivers and canals, of which about 6,000 km are navigable for commercial barges, according to the Bangladesh Inland Waterway Transport Corporation. Container hinterland services by barge, however, are not implemented currently.

Figure 4-6: SASEC rail project



Source: http://www.sasec.asia/

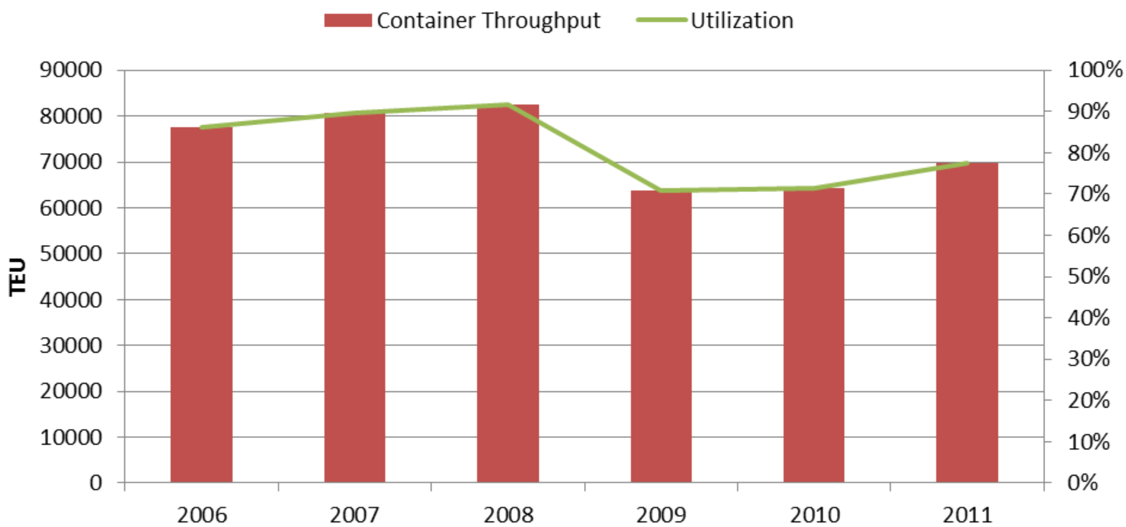
4.3.3 Current state of multimodal freight transport

Since 1991 Bangladesh Railway serves the trade lane Chittagong-Dhaka by intermodal container trains. This trade lane has remained the only intermodal service offering up to date. Currently, the company operates four daily pairs of dedicated block train on this trade lane. The scheduled rail transit times - that is between departure and arrival of the trains - varies from 9 to 13 hours for the 300 km transport distance. This corresponds to an average travel speed of 23 to 33 km/h.

Between 2005 and 2009 the intermodal transport volume declined from 80,000 to about 64,000 TEU due to a poor quality of service, strong competition with road and the impacts of the global economic crisis. But traffic has slightly recovered from this trough and rose to 70,000 TEU by 2011 (see also Figure 4-7).

In the financial year 2008-2009, the last year for which data were available, Bangladesh Railway shipped 3 million tonnes of commodities, of which 613,000 tonnes or more than 20 per cent accounted for the intermodal transport of containers. This clearly shows the importance of this market segment of rail freight traffic in the country.

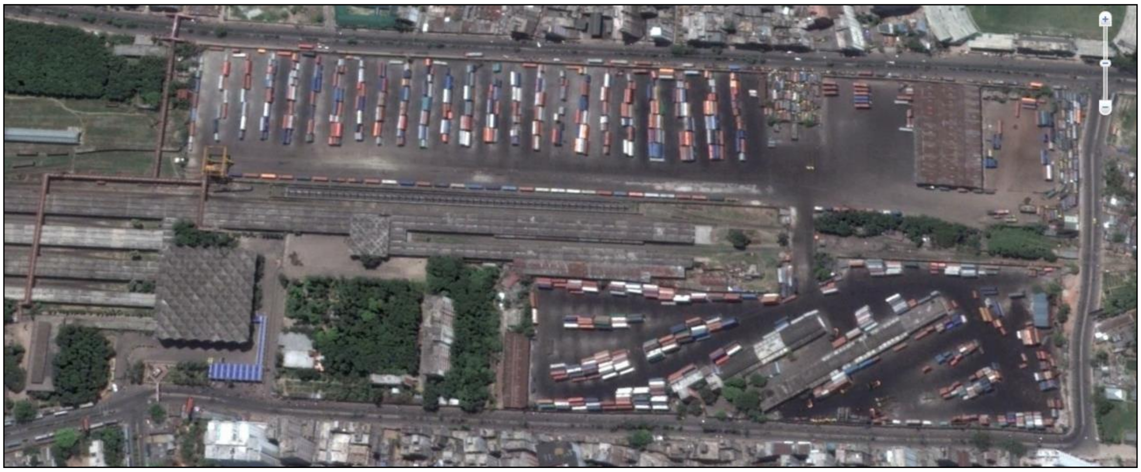
Figure 4-7: Container handling volume of Dhaka-Kamalapur ICD



Source: Port Authority of Chittagong, KombiConsult analysis

The intermodal trains call at the port of Chittagong's rail yard and the only inland intermodal terminal at Dhaka-Kamalapur ICD (see Figure 4-8). According to Regmi (2013) the Dhaka ICD is owned by Bangladesh Railway and operated by Chittagong Port Authority (CPA). The ICD is a dedicated inland intermodal terminal for the container ports and provides custom-bonded services as B/Ls can be issued to/from the terminal. The site has an indicated handling capacity of 90.000 TEU per year. The area of the ICD cannot be enlarged due to constraints from adjacent buildings.

Figure 4-8: Kamalapur ICD in Dhaka/Bangladesh



Source: Google earth

With respect to the continuous growth of seaborne container traffic the performance of intermodal transport in Bangladesh in terms of containers moved could be significantly better than it is now. But the intermodal system actually is faced with a range of challenges and disadvantages. First, rail is in tough competition with low-cost road hauliers. Second, the railway or its shareholder is also responsible for the stagnation of the traffic volumes. The main reasons are a lack of commercial focus, the low efficiency and poor quality of rail operations, an aging rolling stock and the saturated rail network, which results in a priority for passenger over freight services. Third, intermodal transport currently is limited to a domestic trade lane. The following factors impede the implementation of competitive cross-border services:

- Different track gauges between the east and west zone;
- Missing rail sections between Bangladesh and the north-eastern states of India (MoU has been recently signed for construction of rail line) and between Bangladesh and Myanmar;
- Weight restrictions of the Jamuna bridge prevent to run fully loaded trains;
- Lack of container transhipment facilities near Dhaka with dual gauge access and high performance;
- Constraints to operate container block trains between Bangladesh and India.

Fourth, the rolling stock has been neglected for a long time due to a lack of financial resources. Bangladesh Railway was not able to properly maintain wagons and locomotives or even purchase new, more efficient material. Currently containers are carried by converted flat wagons, which are only accessible for the meter gauge network. For the time being, the fleet comprises of 213 units. But recently, Bangladesh Railway has ordered 180 new container wagons from producers in China and India.

4.3.4 Development of rail infrastructure and multimodal freight transport

The Government of Bangladesh has given emphasis to strengthen the cross-border rail infrastructure especially with India and develop further ICDs in the hinterland (see also Figure 4-9). This step is intended to enhance the opportunities for international intermodal services between both countries and to feed the Trans Asian Railway (TAR) network. In February 2013 India and Bangladesh signed a MoU for the construction of a new railway link between Akhtaura in Bangladesh and Agartala in India, which is under the TAR Agreement. Both national railways aim to provide intermodal transports across this rail corridor. It will also include a gauge-break station. Bangladesh intends to develop a new ICD in Dhirasram with handling capacity of 354.000 TEU. The planned Dhirasram ICD will be located some 45 km north from Kamalapur ICD.

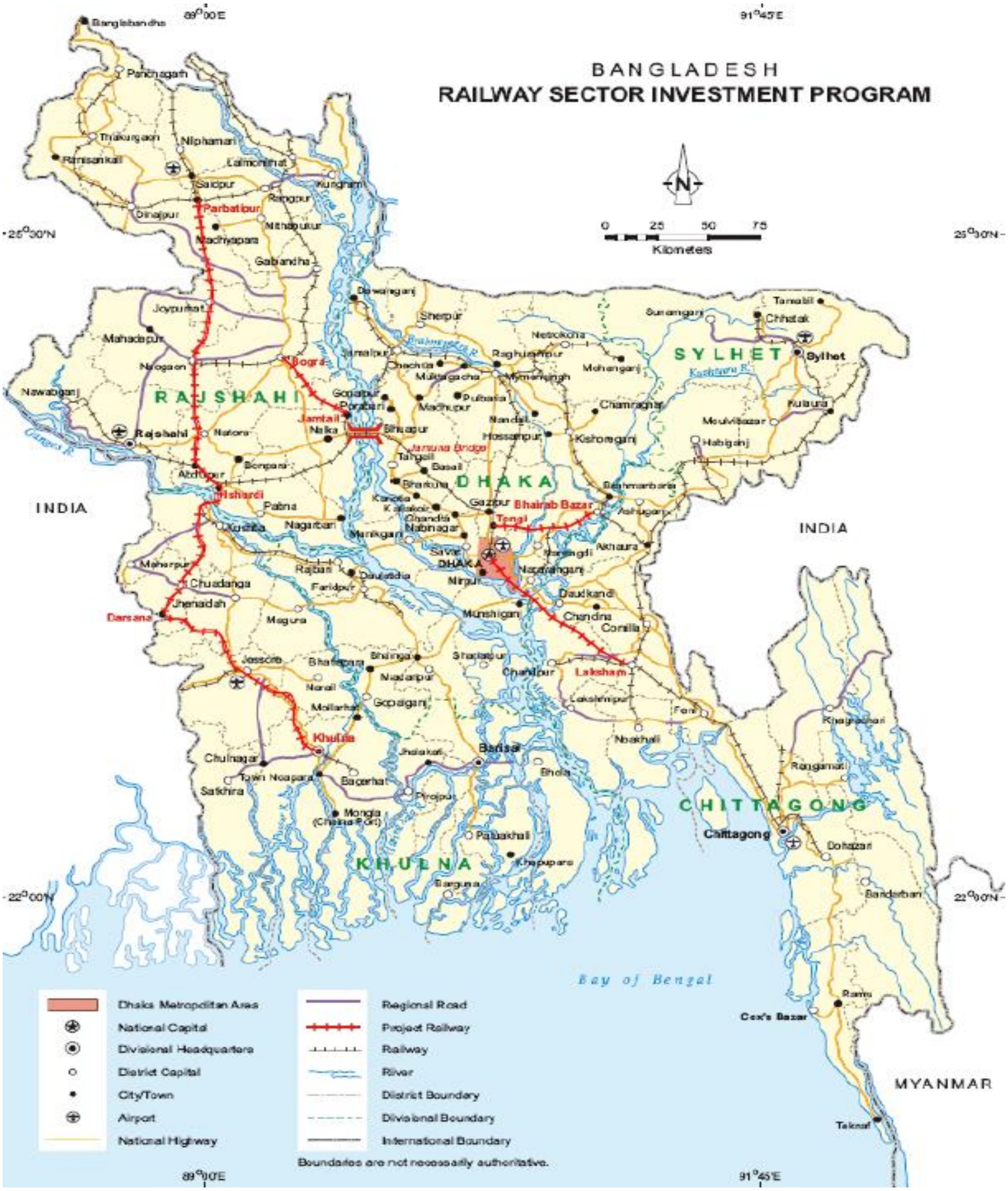
The Bangladesh Railway has already started to build missing railroad sections, rehabilitate pitiable tracks and upgrade the signalling system. The Tongi – Bhairab Bazar rail corridor is almost completed. The Railway Sector Investment Program has prioritized to complete the 64km double rail line, which is expected to open in 2014. The rail line has a meter gauge track system. This rail project aims to reduce transit time and ensure a seamless transportation. Too, several rail bridges are under construction. Priority is given to the Bangabandhu Bridge Railway Link, which is to link the west and east zones across the Jamuna River and, additionally, provide an access to neighbouring countries.

After completion of further railroad tracks and construction of missing links, intermodal transports are expected to grow significantly.

4.3.5 Access to financial resources

The major financial assistance for the rail sub-sector is the Asian Development Bank (ADB). The ADB is the leading agency in supporting the development of railway infrastructure. It provides financial resources through grants and loans. The ADB has launched a Railway Sector Investment Program for Bangladesh, which was approved in 2006 with a loan of $430 million for financing the passenger and freight railway infrastructure. In addition, the ADB granted the Bangladesh Railway with a technical assistance project totalling $10.6 million. India also has approved loans for railway infrastructure development and for procuring rolling stocks, totalling some $680 million.

Figure 4-9: Bangladesh rail network: existing lines and enlargement projects



Source: Asian Development Bank, www.adb.org

4.4 INDONESIA

4.4.1 Current state and evolution of container seaports

Indonesia has more than twenty seaports which are involved in the container business. Five ports, Tanjung Priok, Tanjung Perak, Belawan, Panjang and Tanjang Emas, however, account for 95 per cent of the total seaborne throughput. These ports also dominate the domestic container market with a percentage share of 84 per cent (OEDC, 2012).

Tanjung Priok is the busiest port in Indonesia and the fourth largest in south-east Asia. It has made a considerable progress in the past years (see Figure 4-10). The seaborne throughput increased within four years from 3.8 (2009) to 6.2 million TEU (2012). The forecast for 2013 was 7 million TEU though the nominal capacity is just 5 million TEU. The port is located at the north Jakarta coast near the industrial area of Java Island and also provides for good rail links to the hinterland of the country. The port pursues an ambitious plan to build additional capacity of 13 million TEU scheduled to be completed by 2023.

The port of **Tanjung Perak** is the second largest gateway in Indonesia. Based on its geographic position the port constitutes the centre of inter-island shipping for eastern Indonesia. The port also has a proven record of fast growth. In 2012, the terminal handled 2.85 million TEU thus almost 50 per cent more than four years earlier (see Figure 4-10). The port is linked to the national rail network.

Figure 4-10: Container throughput of main container ports in Indonesia

Port	Seaborne container throughput (TEU)			
	2009	2010	2011	2012
Tanjung Priok	3,800,000	4,714,900	5,649,100	6,200,000
Tanjung Perak	1,950,600	3,030,000	2,643,500	2,849,100

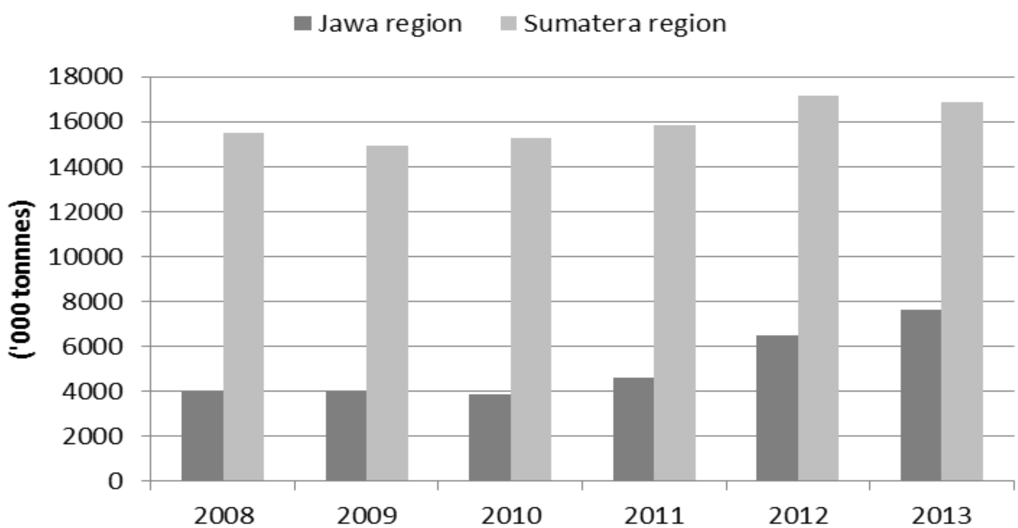
Source: Containerisation International

4.4.2 Current state of railway infrastructure and rail freight transport

Indonesia railway infrastructure is largely concentrated on the two most populated islands Sumatra and Java. The national rail network is built to 1,067 mm narrow gauge and consists of four unconnected rail systems. Three of them are in different parts of Sumatra. The Java rail network extends throughout the island and also connects the ports of Tanjung Priok and Perak. The maximum axle weight of the Java rail network ranges from 15 to 18 tonnes, which clearly limits the productivity of freight trains.

The Indonesian state-owned railway is operated by PT Kereta Apu (PTKA) that moved some 2.5 million tonnes in 2013. The main commodity accounting for about two thirds of the total volume is coal. This market is concentrated on Sumatra. Freight traffic on Java, in contrast to that, is focused on general cargo and in particular container hinterland transports. Due to that Java's freight traffic displays a remarkable growth curve since 2010 with an average annual increase of 26 per cent. In 2013 the volume rose 7.6 million tonnes (see Figure 4-11).

Figure 4-11: Evolution of rail freight transport in Indonesia by region



Source: Badan Pusat Statistik (BPS-Statistics Indonesia, http://www.bps.go.id

4.4.3 Current state of multimodal freight transport

PT Kereta Apu (PTKA) is the only operator of intermodal services in Indonesia. Currently, it offers multimodal services for the transport of marine containers between the major seaports on Java Island and railheads in the hinterland. The survey was able to identify domestic intermodal services between the major seaports and the intermodal terminals Gedebage and Cikarang.

The Gedebage intermodal terminal is located near Bandung in West Java and is linked to the port of Tanjung Priok over a distance of 180 km. The Gedebage terminal provides MFT services for the industry within the region particularly for exports. Two handling tracks of some 200 m length each and one gantry crane are installed (see Figure 4-12). The typical train length of the intermodal services with the seaports is 200 m resulting in a load capacity of about 28 TEU. This is a rather low capacity raising the question if the railway can ensure sufficient economies of scale to match the cost of road hauliers.

Figure 4-12: Gedebage intermodal terminal

Source: Google earth

The Cikarang intermodal terminal and dry port is located in the Cikarang industrial zone along the Bekasi – Cikampek corridor. The industrial zone of west Java consists of some 2,500 manufacturing companies and generates over half of the total container throughput of Indonesia's Tanjung Priok container seaport (ESCAP, 2013). The dry port is operated by PT Cikarang Inland Port as a private and dedicated inland terminal for the port of Tanjung Priok. Too, it provides a good access to the eastern part of Java for further domestic distribution. The set-up of the Cikarang intermodal terminal is one of many initiatives by the Government to improve the competitiveness of intermodal transport.

According to WB (2013) rail operations should have started in July 2012. But as there is still a missing rail section, which would require for extra trucking services, forwarders and shipping lines reportedly avoid using the service offering. The inland dry port has a nominal annual handling capacity of 400,000 TEU, which could be extended to 2 million TEU (see also Figure 4-13). The current rate of utilization is reported to be at 10 per cent of the capacity (WB, 2013). Against this background the Indonesian Port Corporation and the PT Cikarang Inland Port signed a MoU in September 2013 to enhance the co-operation with the port of Tanjung Priok, which is suffering from high dwell times and congestions. However, as long as the rail line is not completed the use of the dry terminal is likely to remain a challenging issue.

As concerns intermodal rolling stock the Indonesian Railway currently provides for 20' and 40' flat-bed rail wagons. According to the Indonesian Infrastructure Initiative report PTKA owns 540 units.

Figure 4-13: Cikarang intermodal terminal

Source: Cikarang Dry Port, Development and operations intermodal connectivity in Indonesia, Bangkok, 21 Nov. 2012

4.4.4 Development of rail infrastructure and multimodal freight transport

The Government of Indonesia seeks to strengthen the logistics industry in the country. One of the priorities of the strategic railway programme based on the “Master Plan for Acceleration and Expansion of the Economic Development 2011 -2025 (MP3EI)” is enhance the connectivity of all Indonesian islands by expanding the national railway network and providing a rail access to all industrial zones It is also scheduled to develop double-track main lines, eliminate missing links, install state of the art signalling systems and extend the rail network to 10,000 km by 2025. The vision is to make rail the backbone of the freight transport system (see also Figure 4-14).

Figure 4-14: National railway vision 2030

Source: Ministry of Transportation of Indonesia, Directorate General of Railways

Specifically for Java Island the railway company PTKA aims to providing intermodal services across all major corridors (see Figure 4-15).

As concerns regulatory and administrative measures to support or promote multimodal transport, Indonesia plans or undertakes the following actions:

- Involvement of stakeholders through MoU (Government and industries);
- Public-private partnerships for investments;
- Reduction of heavy loads on road.

Figure 4-15: Prospects for Java network of intermodal services

Source: Indonesia Infrastructure Initiative, 2010

Based on the findings of the survey the following key challenges for intermodal services in Indonesia have been recognized:

- Tough price competition from road hauliers;
- Improvement of road infrastructure benefits road hauliers;
- Comparatively short distances between seaports and hinterland sources and destinations of containers;
- Missing rail sections and limited axle weight of rail network.

What may release new opportunities for intermodal services, on the other side, is the increasing congestion of roads in economic centres. A major international forwarder who basically anticipates that container traffic in Indonesia will continue its double-digit annual growth has put it as follows: "Whilst our contracted road hauliers previously have achieved three rotations per day (roundtrips of 3 containers full/empty) we are now down to almost one daily rotation per truck!"

As there are immensely large container volumes regularly carried between the main industrial zones and the ports, the PTKA should be capable of ensuring the necessary economies of scale even over comparatively short distances to beat the cost of road. If PTKA also is able to supply a fairly reliable service intermodal traffic is likely to boost.

4.5 IRAN

4.5.1 Current state and evolution of container seaports

The major container ports in Iran are the port of Shahid Rajaee (Bandar Abbas) and Imam Khomeini. Both ports are connected to the national rail network.

Shahid Rajaee has always been the leading container handling site in Iran thanks to its privileged location at the crossroad of nine international transit corridors. Iran's capital of Tehran is about 1,500 km northwest of the port. The handling capacity of the port is reported to be at 3 million TEU currently but is planned to be extended 6 million TEU by 2020. While the container facilities at Shahid Rajaee had been employed close to their existing limits in 2011, the throughput plummeted to some 2.3 million TEU of containers in 2012 (see Figure 4-16). This corresponds to a decrease of about 18 per cent. The survey could not definitely spot whether the slowdown of activities resulted from trade restrictions imposed on Iran, their impacts on the domestic demand for import goods or was due to a shift of volume to the port of Imam Khomeini.

There was also not much information available about the port of **Imam Khomeini**. It seems as if it has started into the container era only a few years ago. In the period from March to December 2009 the port recorded a container throughput of about 75,000 TEU. The capacity is indicated with 1.5 million TEU. As, according to the Ministry of Roads and Urban Development, Iran's container handling volume totalled to about 3 million TEU in 2012, the port of Imam Khomeini is estimated to have achieved a throughput of about 700,000 TEU in this year (see Figure 4-16).

Figure 4-16: Container throughput of Iran's main container ports

Port	Seaborne container throughput (TEU)		
	2010	2011	2012
Shahid Rajaee	2,592,500	2,839,300	2,317,600
Imam Khomeini	-	-	*700,000 *)*

Source: Ports and Maritime Organization of Iran (PMO), KombiConsult analysis

Current port development plans include the construction of a container terminal at the port of **Chabahar**. It is located in southeast Iran and is the only port with a direct access to the Gulf of Oman. The berths feature a draught of up to 16 m and will be capable of serving ultra-large container vessels. The container terminal shall also be connected to the domestic rail network and, after the completion of the Kerman –Zahedan line, additionally could provide container hinterland services from and to landlocked Afghanistan.

The port of **Astara** situated at the Caspian Sea was selected to be the first multipurpose port in Iran based on a public-private-partnership. Due to its location it is designed as a transhipment hub and will have a rail access as well. It is expected that the port will process transit containers in a later stage of the evolution of traffic.

4.5.2 Current state of rail infrastructure and rail freight transport

The national rail network has a length of approximately 10,000 km and is almost exclusively built to 1,435 mm standard track gauge (see also Figure 4-17). The majority of the rail infrastructure features single lines. Double-tracked lines are located inland on the sections Tehran - Mashhad (926 km) and Kerman – Bam - Zahedan (545 km).

Figure 4-17: Iran's national rail network

Source: Ministry of Roads and Urban Development of Iran

In 2012, the Iranian railway company RAI carried about 33 million tonnes of goods on its network. As road hauliers, in contrast to that, moved almost 20 times more of freight in the same period rail's market share ended up at about 5 per cent (like in Egypt). The more surprising is that, for rail freight transport, international services accounted for 32 per cent of the total compared to a meagre 3 per cent for road. Rail even slightly outperformed road with respect to the aggregate of export and import flows (see Figure 4-18). Yet, this fine result should not obscure the simple fact that rail freight transport in Iran – like in many other OIC countries – has not been capable of making more use out of its large network and catch a bigger slice of the total market volume.

Figure 4-18: Freight transport volumes by road and rail in Iran, 2012

Market segment	Transport volume (million tonnes)	
	Road	Rail
Domestic	582.8	22.5
Export	5.7	6.0
Import	2.2	3.0
Transit	9.3	1.5
Total	**600.0**	**33.0**

Source: Ministry of Roads and Urban Development of Iran

4.5.3 Current state of multimodal freight transport

According to available sources, **multimodal transport services** by rail are virtually only performed on international trade lanes between Iran and CIS countries, especially Turkmenistan. The main source or destination of this container hinterland traffic is the port of Shahid Rajaee. The trade lanes are used to be served by dedicated intermodal trains. They reportedly are executed by a private railway company, whereas the rail wagons are leased from the Iranian Railway RAI. In the year 2008, a daily average throughput of 200 containers was counted at the Iranian border crossings. This would lead to a total annual volume of 50,000 to 60,000 containers (250 – 300 traffic days) corresponding to 80,000 to 100,000 TEU (ratio of 1.5-1.6 TEU per container).

In previous years, private companies had pushed to implement container trains between Iran and Turkey in co-operation with the railways affected. The services included a journey with the rail ferries across the Lake Van. According to a Turkish source the services had to be suspended owing to trade restrictions imposed on Iran.

The survey could not identify regular domestic intermodal services between the seaports and inland destinations. Yet, it may be assumed that containers, though not shipped on dedicated trains, are conveyed in the framework of conventional wagonload services. This is because the existing container handling facilities or dry ports providing for a rail access should be called by trains with at least irregular schedules. A confirmation of this assumption, however, could not be obtained.

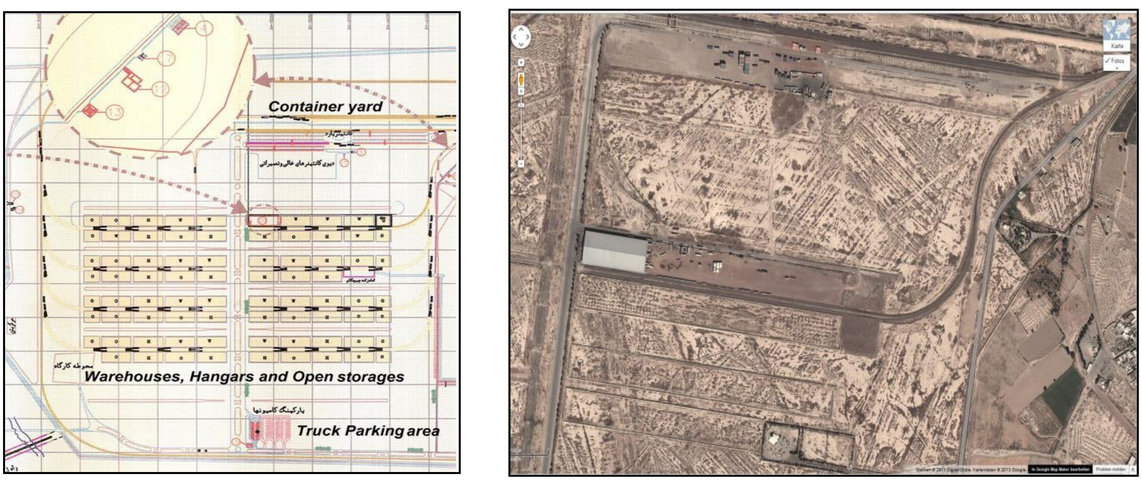
The Iranian administration is keen to create the **inland logistics infrastructure** needed to promote multimodal transport services. It therefore is set to investing in a total of eight dry ports, which may also include intermodal rail/road terminals. Two are already in operation and another six are planned or under construction. The three key inland facilities are Tehran Shahriar Complex, Aprin and Sirian. Tehran Shahriar Complex known as “Shahriar Customs” is operated and managed by PTB Group. The container terminal is a subsidiary of the Public Warehouses Company and Customs services of Iran (see Figure 4-19).

Figure 4-19: Shahriar Complex, Tehran

Source: Google Earth

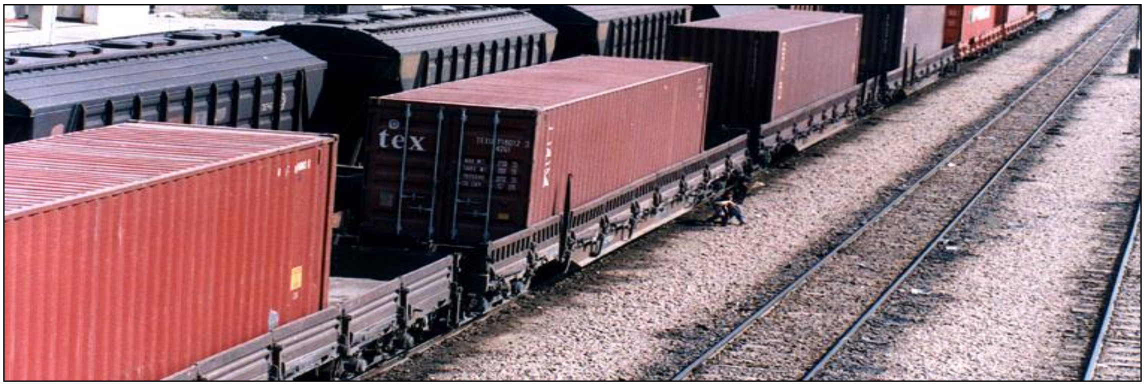
Aprin intermodal terminal, which is under construction, is situated about 20 km southwest of Tehran. It is considered an important turntable in Iran due to its geographical position at the intersection of the east-west and north-south railroad freight corridors. The terminal will have a very good motorway access and is able to supply Tehran and the industrial centres in the region (see Figure 4-20). Sirjan intermodal terminal is located in the Kerman province (southeast Iran) and is approximately 300 km from Shahid Rajaee container terminal. Due to its closeness to the industrial zone in Sirjan and its central position within the national rail network the terminal shall be used both to serve local volumes and as a transhipment hub for container hinterland traffic.

Figure 4-20: Aprin intermodal terminal



Source: Ministry of Road and Transportation of Iran: Presentation to the Regional Expert Group Meeting on the Development of Dry Ports along the AH & TAR, ESCAP, Bangkok, Nov 2010.

Figure 4-21: RAI intermodal rail wagons



Source: Iranian Railway, www.rai.ir

As concerns **intermodal rolling stock** the Iranian Railway RAI currently provides for 20' and 40' flat-bed rail wagons (see Figure 4-21). The Ministry of Transport has announced further orders for new equipment.

4.5.4 Development of rail infrastructure and multimodal freight transport

The authorities in Iran are set to foster multimodal transport services through a variety of measures. They can be classified into three categories:

- Rail infrastructure improvement measures, which generally are due to enhancing the operating conditions both for conventional and intermodal freight trains;
- Regulatory and administrative measures;
- Financial and other aids and incentives.

Iran is about to modernize the existing network, which includes the installation of state-of-the-art signalling systems and the construction of new single and double-track lines especially on international corridors with Armenia, Iraq, and Afghanistan. The rail network is to be expanded to about 15,000 km by the year 2015 and to 25,000 km by the horizon 2025.

Since 2007, Iran has been partaking in building a 900 km long rail section Uzen - Gorgan along the Caspian Sea's eastern coast. The Kazakhs-Turkmenistan rail section is already in operation. The main commodities being transported are oil products and grains. Iran's 70 km rail section built to standard gauge between Gorgan and Inchen Borun at the border to Turkmenistan is operative since mid-2013. The line shall late be connected with the ports of Shaheed Rajaee and Chabahar. In 2012, Iran also signed an agreement with Afghanistan and Tajikistan to build a 392 km rail section in order to link the three countries as well as Kyrgyzstan and western regions in China (see also Figure 4-22)

The investments into rail infrastructure, the upgrading of the network and improvement of signalling systems, can release a range of positive impacts on intermodal transport in Iran and international services with neighbouring countries:

- Ensure more reliable, road-competitive services and an increased productivity: faster transit times; stable time-schedules; less technical failures and accidents;
- Capture of additional domestic market potentials in container hinterland transport;
- Capture of additional international markets in container hinterland transport;
- Opening up of the continental goods markets for intermodal services on the corridors between the Central Asian countries, Afghanistan, Iran, Turkey and Middle East countries.

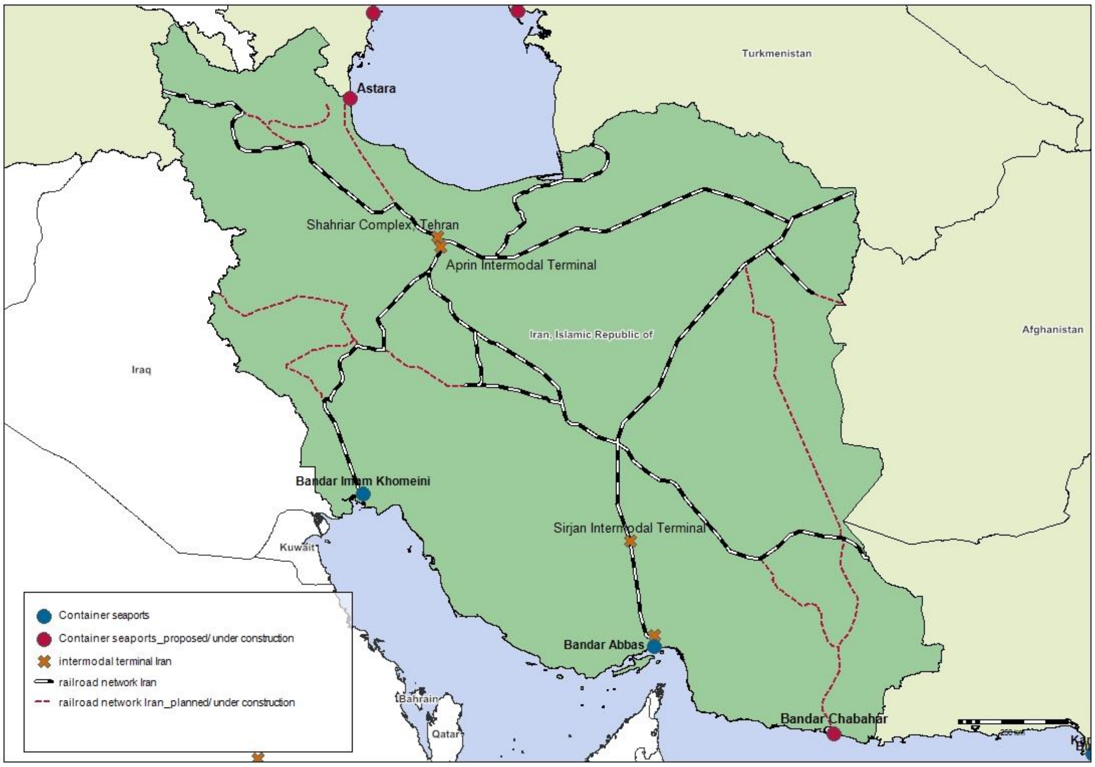
As concerns regulatory and administrative measures to support or promote multimodal transport the Government of Iran has set up a programme of actions:

- Simplification of customs clearance procedures;
- Facilitation of regulations on customs, insurance and commercial conditions;
- Privatization of rail forwarding industry;

In addition to the above measures the Iran has put the following incentives and financial aids on its agenda:

- Discount on freight rates for container hinterland transports;
- Construction of inland dry ports and logistics centres;
- Investment into handling equipment;
- Incentives for private investors procuring of container wagons.

Figure 4-22: Development of Iran's rail and intermodal network



Source: KombiConsult

4.6 *KAZAKHSTAN*

4.6.1 Current state and evolution of container seaports

The port of Aktau is Kazakhstan's only seaport located at the east coast of the Caspian Sea. The port recently has installed a new container terminal. Statistical data were not available. Yet we assume that it handles a significant amount of containers, which are arriving or leaving by intermodal rail services, as the container subsidiary of the Kazakstan Railway "Kazakhstan Temir Zholy (KTZ)" has several service offerings from/to this port (see section 4.6.3).

4.6.2 Current state of rail infrastructure and rail freight transport

Kazakhstan has an extensive rail network built to 1,520 wide gauge with a total length of 14,800 km, of which 28 per cent are electrified and 33 per cent have two tracks. The network consists of four international corridors:

- Northern corridor of Trans-Asian Railway Line (TARM): Western Europe – China, the Korean Peninsula and Japan through Russia and Kazakhstan (section Dostyk – Aktogai – Sayak – Mointy – Astana – Petropavlovsk (Presnogorkovskaya);
- Southern corridor of TARM: South-East Europe – China and South-East Asia through Turkey, Iran, Central Asian countries and Kazakhstan (section Dostyk – Aktogai – Almaty – Shu – Arys – Saryagash);
- TRASECA: Eastern Europe – Central Asia across the Black sea, the Caucasus and the Caspian Sea (section Dostyk – Almaty – Aktau);
- North-South: Northern Europe – countries of the Persian Gulf through Russia and Iran, with the participation of Kazakhstan on sites, seaport Aktau – Ural regions of Russia and Aktau – Atyrau.

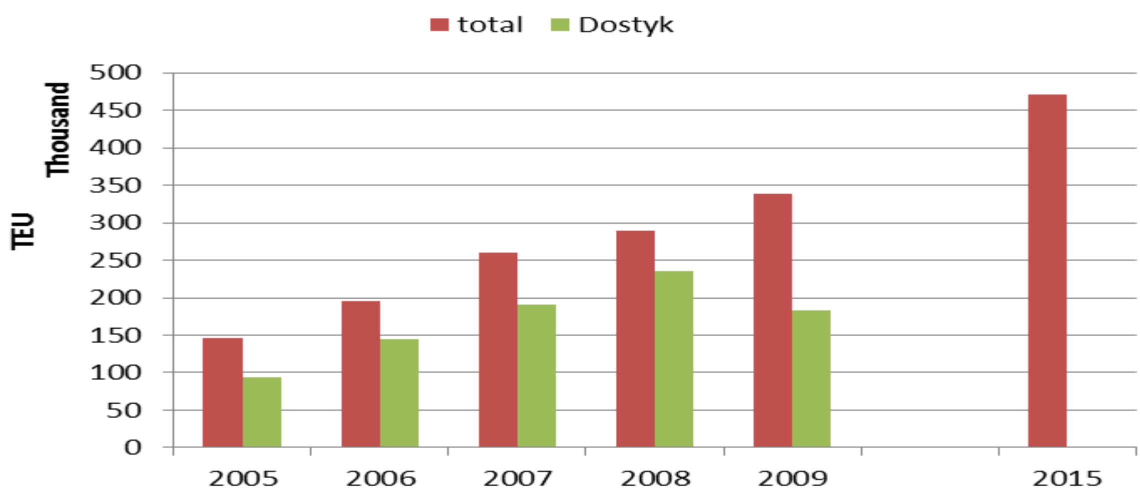
Recently, works on the 298 km rail section Zhetygen – Khorgas were terminated and the line opened for freight transport. It enables a better service and a shorter distance.
Kazakhstan's rail network is linked with other central Asian countries and Russia using the same track gauge. At Dostyk, at the border to China using the standard gauge, a break-gauge facility has been installed.

In 2012, the rail freight services in Kazakhstan conveyed a total of nearly 258 million tonnes, an increase of 3.6 per cent compared to the previous year. The huge majority of commodities are raw materials such as coal, ore, and oil products. According to an ATF Bank study, coal accounts for about 50 per cent of the rail freight tonnage. The modal share of rail of total land transport is about 12 per cent whilst road has gained 80 per cent of the market.

4.6.3 Current state of multimodal freight transport

According to ATF Bank, containerized rail traffic in Kazakhstan achieved a linear annual growth rate of about 25 per cent between 2005 and 2009. This means that the total transport volume doubled in this period from 150,000 to 300,000 TEU. International services had a slightly smaller growth rate of 22 per cent. Intermodal traffic crossing the border with China at the reloading station of Dostyk accounted for approximately 50 per cent of the total volume by TEU (see Figure 4-23). The ATF Bank study estimated that intermodal traffic would rise to 470,000 TEU by 2015. Actually, the Kazakhstan railway industry already has exceeded this mark in the year 2013 when a volume of 540,000 TEU was recorded.

Figure 4-23: Container traffic in Kazakhstan



Source: ATF Bank Research

Intermodal container services from/to and in transit through Kazakhstan are offered by several companies such as the Russian container operators TransContainer and FESCO, Transsystem or InterRail. It could not be completely clarified how far these companies are co-operating or competing for intermodal shipments. Yet we assume that the Kazakhstan Railway KTZ has allocated the intermodal business to JSC Kaztransservice (KTS), a KTZ subsidiary, that has the role of something like a general intermodal service provider responsible for designing and implementing services while KTZ is supplying the traction service. Likely, the other intermodal operators are purchasing train capacities or, eventually, full trains from KTS.

KTS operates dedicated container block trains as well as the transport of containers on single-wagon services. Intermodal services can be operated regularly at defined schedules or ordered according to customer needs (see Figure 4-24). Container block trains must have a minimum of 20 and a maximum of 25 wagons, each providing for a capacity of 4 TEU. This results in maximum train capacity of 100 TEU.

The intermodal terminal in Dostyk is considered the main transit gateway for the west Europe – China corridor. In contrast, the intermodal cross-border terminal located in Khorgas will be the main gateway for Chinese cargo with railhead to CIS countries.

It can be estimated that the continental intermodal container traffic within the Asian sub-region will increase as far the Chinese western regions are positively developing as well as the CIS countries, and demand of consuming goods is increasing simultaneously requiring for further containerized cargo transports. This may also entail balanced roundtrips of full containers both ways. If so this would reduce the costs and make rail much more competitive.
In order to ensure a seamless international transport KTZ has already strengthened the international cooperation by signing bilateral and multilateral agreements and harmonizing legal issues. For instance, Kazakhstan is already working on the Transport and Legal Harmonization of CIM/AIGTR waybill project, which covers most of the Eurasian continent, aiming to cover much freight traffic volumes and to reduce time of delivery. The launch of the container block trains departing at Chongqing in China and headed to Duisburg in Germany, which took place in November 2012, already used this unified CIM/AIGR waybill.

In addition, the Government of Kazakhstan in cooperation with several countries such as Azerbaijan, Georgia, and Turkey, signed a MoU in November 2012 to operate the Silk Wind container block train service, which will depart in Kazakhstan at the Dostyk cross-border terminal and run to the port of Aktau port at the Caspian Sea. There containers will be shipped by a train ferry to the port of Alyat in Azerbaijan and continue the journey to Tbilisi and Kars via the up-coming railroad section Baku-Tibilsi-Kars.

Figure 4-24: Container trains in Kazakhstan

Route	Length	Average time of train	Average train speed	Year of route opening	Regularity of train
Urumchi-Dostyk-Petropavlovsk-Krasnoye-Brest-Kunovice-Berlin	6,658km.	8 days 03 hours 45 min	817km/day	2001	according to necessity
Nakhodka-Lokot-Almaty-Tashkent	8,689km	9 days 20 hours	880km/day	2003	according to necessity
Nakhodka-Lokot-Almaty	7,712km	8 days 12 hours	907km/day	2003	1 train per week
Almaty-Alashankou	873km	1 day 8 hours 30 min	645km/day	2003	5 trains per week
Almaty-Tashkent	1,006km	1 day 7 hours 35 min	727km/day	2003	according to necessity
Lanjugan-Almaty	5,043km	8 days 4 hours 25 minutes	605km/day	2004	7 trains per week
Tianjin-Almaty	4,852km	7 days 19 hours 12 min	622km/day	2004	4 trains per week
Almaty-Ozinki-Novorossiysk (Turkey)	4,406km	6 days 5 hours	709km/day	2004	according to necessity
Almaty-Lokot-Nakhodka-Vostochnoe	7,712km	8 days 20 hours 44 min	870km/day	2004	according to necessity
Lianyungang-Assake	6,491km	8 days 7 hours	282km/day	2005	2 trains per week
Akaltyn-Qingdao	6,622km	8 days 16 hours	764km/day	2005	according to necessity
Aksu 1-Tobol-Kherson	4,159km	6 days 11 hours 22 min	642km/day	2006	according to necessity
Nakhodka-Lokot-Saryagash-Assake	9,170km	12 days 23 hours	708km/day	2006	2 trains per week
Urumchi-Novorossiysk	5,792km	7 days 10 hours	780km/day	2006	according to necessity
Urumchi-Kulindorowo	6,865km	8 days 7 hours 20 min	770km/day	2006	according to necessity
Aksu-Klaypeda	3,677km	4 days 23 hours	741km/day	2007	according to necessity
Urumchi-Almaty	1,333km	1 day 23 hours	680km/day	2007	according to necessity
"Baltika-Transit"	4,349km	6 days 14 hours	660km/day	2001	1 train per week
Novorossiysk-Almaty	4,406km	6 days 5 hours	709km/day	2007	according to necessity
Lianyungang-Moscow	9,061km	12 hours 9 hours	732km/day	2007	according to necessity
Lianyungang-Chukursay	6,026km	7 days 14 hours	794km/day	2007	according to necessity
Qingdao-Chelyabinsk	6,521km	8 days 04 hours	798km/day	2007	according to necessity
Urumchi-Chukursay	2,328km	3 days 04 hours	735km/day	2007	according to necessity
Tianjin-Ulugbek	6,161km	8 days 06 hours	746km/day	2007	according to necessity
Aksu-Qingdao	5,762km	8 days 23 hours	643km/day	2008	according to necessity
Zhinishke-Klaypeda -	2,940km	4 days 21 hours	602km/day	2008	according to necessity
Muuga-Almaty	5,803km	10 days 08 hours	561km/day	2008	according to necessity
"Kazakhstan vector"	4,502km	6 days 15 hours	679km/day	2008	according to necessity
Lianyungang-Osh	6,577km	8 days 14 hours	766km/day	2008	according to necessity
Lianyungang-Alamedin	5,616km	8 days 6 hours	680km/day	2008	according to necessity
Shenzhen-Pardubice	12,360km	18 days	687km/day	2008	according to necessity
Qungtzindun-Cherkessk	8,969km	16 days 03 hours	569km/day	2008	according to necessity
Urumchi-Hamburg (via Riga port)	5,806km	10 days 20 hours 46 min	533km/day	2008	according to necessity
Tianjin-Kuncevo	8,488km	15 days 02 hours	562km/day	2008	according to necessity
Tianjin-Magnitogorsk	6,815km	12 days 15 hours 58 min	538km/day	2008	according to necessity

Source: ATFBank Research

Most of the intermodal terminals in Kazakhstan are owned and operated by JSC Kedentransservice, a joint venture of private investors such as TransContainer and the KTZ (33% of equity). According to TransContainer this company provides for 17 terminals across the entire country. One of the most important sites is in Almaty. It has started operations in 2007 and has an annual handling capacity for about 80,000 TEU or roughly 50,000 to 60,000 containers (ESCAP, 2009). An overview of intermodal terminals and the main intermodal trade lanes is presented in Figure 4-25. KTZ owns a fleet of 5,000 container wagons recently upped from 4.500 units earlier.

Figure 4-25: Location of intermodal terminals and main intermodal routes

Source: KombiConsult

4.6.4 Development of rail infrastructure and multimodal freight transport

The Ministry of Transport and Communication of the Republic of Kazakhstan has taken several measures to develop and enhance the current infrastructure, border crossings, and intermodal terminals. On-going rail infrastructure investments include the following projects:

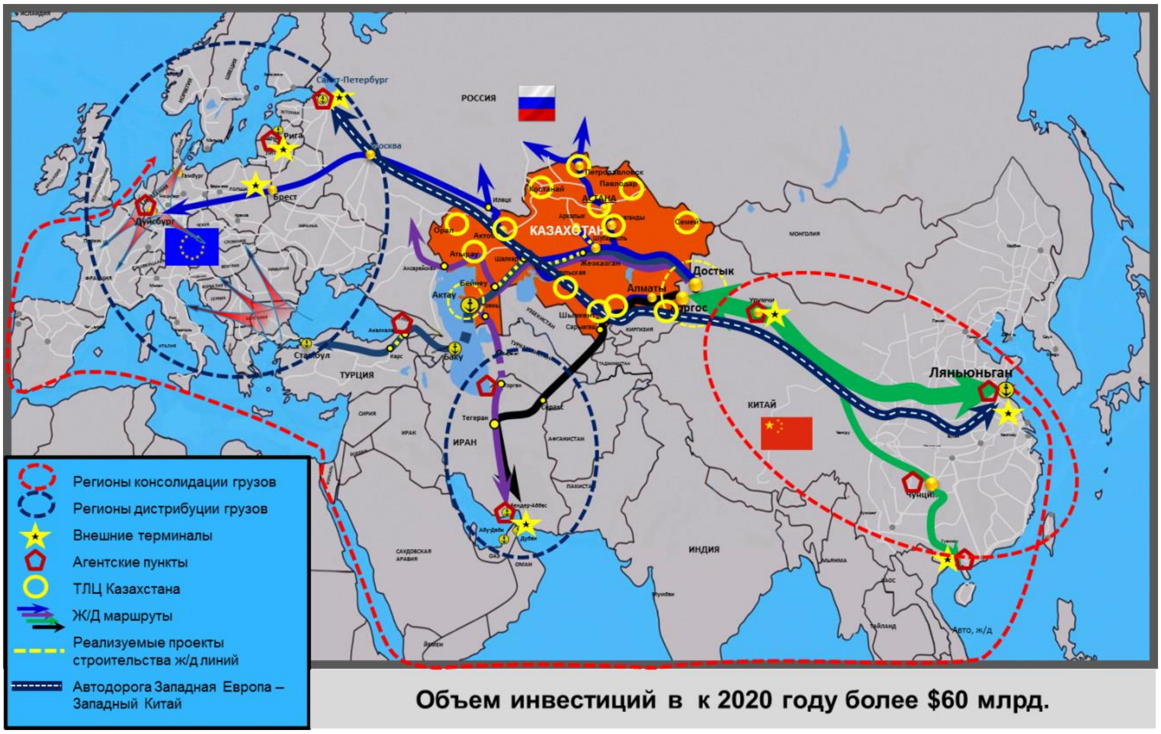
- Construction of the Kazakhs section of the railway line 146km – Uzen-Gyzylgaya-Bereket-Etrek-Gorgan that connects Kazakhstan with Turkmenistan and open further transport access to Iran and the Persian Gulf. Project started in 2012;
- Construction of Zhezkazgan – Saksaulskaya railway: the new rail section is some 517 km and is completion is expected by 2016. The railway project aims to develop the railway infrastructure in central Kazakhstan and reduce the freight transport distance between west and east of Kazakhstan;
- Construction of the Zhezkazgan – Kyzylorda railway: the railway line is some 420 km and completion is expected by 2015. The railway project aims to reduce the freight transport distance between Western-Central and North-Western Kazakhstan by 600 km, Central Kazakhstan – Southern direction from central Kazakhstan by 800 km;

- Electrification of Makat – Kandash rail line: the rail section line of 392 km will be electrified. The railway project aims to decrease the capital and operational costs as well as to increase the rail line reliability;
- Electrification of Aktogay – Mointy rail line: 521 km will be electrified and completion is expected by 2016. The railway project aims to decrease the capital and operational costs as well as to increase the rail line reliability;
- Electrification of Aktogay – Dostyk rail line: 312 km will be electrified and completion is expected by 2016. The railway project aims to decrease the capital and operational costs as well as to increase the rail line reliability.

Once being completed it is expected that intermodal transport in Kazakhstan will get another boost. This expectation first relates to "incumbent" trade lanes such as bilateral traffic with China and Russia and transit traffic Russia-China. Cross-border intermodal transports between China and Kazakhstan shall increase significantly especially after the flag-off of the new border terminal in Khorgos and the implementation of the new railway section Khorgos - Zhetygen in 2013. The container traffic is not only estimated to increase for the binational trade between Kazakhstan and China but also between China and Tajikistan, Kyrgyzstan, Uzbekistan, and Turkmenistan (see also Figure 4-26).

Many observers also forecast an increasing traffic volume between Europe and China though this trade lane will continue to be in severe cost competition with sea transport and in service level competition (transit time) with combined rail-air transport for high-value and fashion goods.

Figure 4-26: Main intermodal container transport corridors



Source: KTZ Presentation held at the New Railway Conference in Astana on November 7, 2013.

4.7 KYRGYZSTAN

Kyrgyzstan is not only a landlocked country with no direct access to seaports it is also positioned so much in the centre of the Asian land mass that the nearest seaports are almost equally far away. The country's neighbours are China in the East, Tajikistan in the South, Uzbekistan in the West and Kazkhstan in the North. Moreover the mountainous topography of Kyrgyzstan imposes constraints on rail freight and intermodal transport services. Against this background this report, first, explains the current situation in the rail sector and its implications for multimodal freight transport. Then it displays the opportunities for implementing further intermodal services.

4.7.1 Current state of rail infrastructure and multimodal freight transport

The national rail network of the state-owned Kyrgyz Railway had a total length of 417 km unelectrified tracks in 2011. The freight transport volume amounted to nearly 6,000 tonnes in the year 2011, of which 1,000 tonnes of freight were moved on international services.
In spite of the comparatively small freight traffic Kyrgyzstan provides for two intermodal terminals, Alamedin container terminal located near the capital city of Bischkek and the Osh intermodal terminal (see also Figure 4-27). Both are operated by the Kyrgyz Railway:

- The Alamedin facility is equipped with a reachstacker and is able to handle 20' and 40' containers;
- The Osh terminal located in south Kyrgyzstan employs a rubber-tyred gantry crane and also can handle 20' and 40' containers.

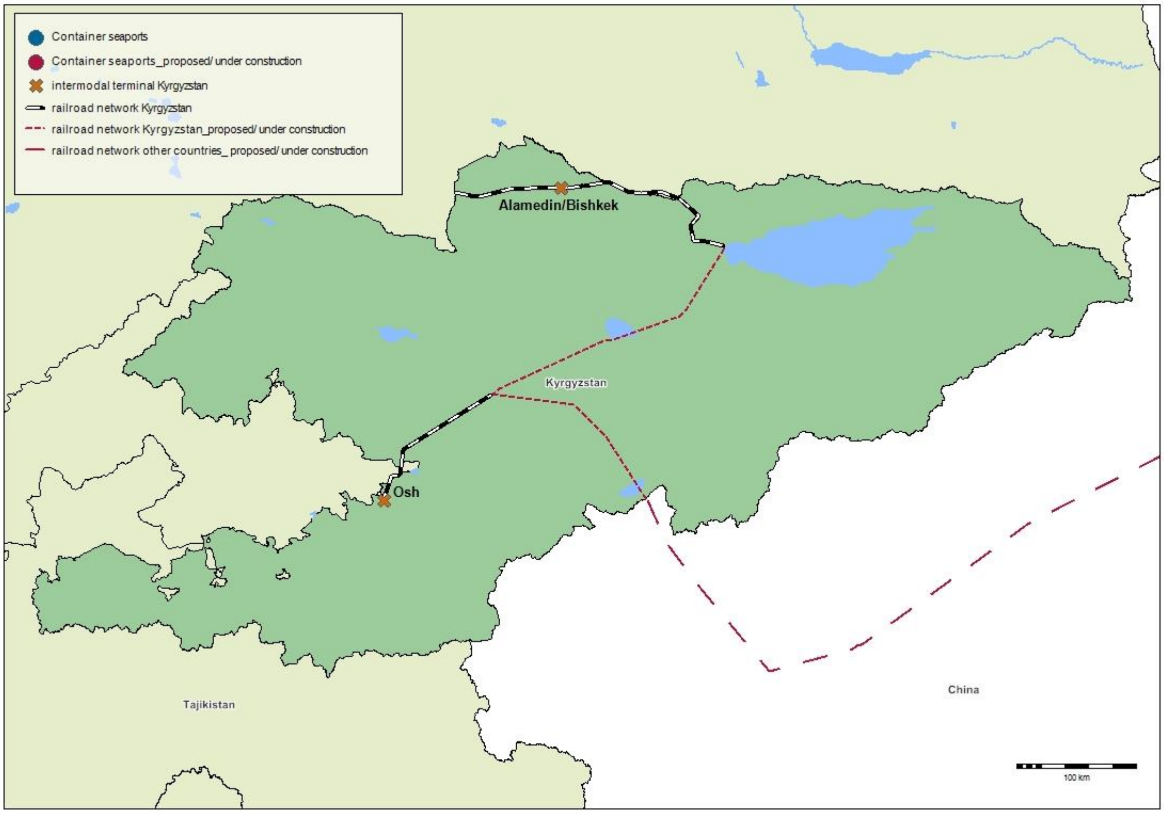
Owing to an increased demand for intermodal container transports between China and Kyrgyzstan a new container block train was launched between the terminals Dostyk and Alamedin in 2008. Since then the transit time and the costs of the service could be cut almost by half compared to the initial situation resulting in a considerable increase of container throughput at the terminal.

Additionally, Kyrgyzstan receives import containers from the ports of Shanghai (China), Vladivostok (Russia) and Shahid Rajaee (Iran).

4.7.2 Development of rail infrastructure and multimodal freight transport

A feasibility study examining a new rail line between China and Uzbekistan is being conducted. The 268 km line would extend from Kashi in China and run via Osh in Kyrgyzstan to Andizhan in eastern Uzbekistan. The project has been discussed for more than 10 years. Up to date, the high investment costs of $2bn have prevented the implementation of the project. The line would reduce the transport distance for trains between Europe and Europe or Russia by about 900 km. As the demand for container transports on these trade lanes has considerably increased lately the project has received more attention. This may essentially have contributed to the recent conclusion of a Memorandum of Understanding between China and Kyrgyzstan (ESCAP, 2013).

Figure 4-27: Main intermodal routes and intermodal terminals in Kyrgyzstan



Source: KombiConsult

4.8 MALAYSIA

4.8.1 Current state and evolution of container seaports

Malaysia can back on two of the world's largest container ports and several seaports, which feature a significantly smaller throughput in the one million TEU range such as Penang or Johor. The principal port is Klang. With a throughput of 10 million TEU in 2012 it was the second largest container port in south-east Asia after Singapore. The third biggest port, Tanjung Pelepas, also is located in Malaysia. Its seaborne throughput totalled to 7.7 million TEU in 2012 (see Figure 4-28). All ports are linked to the national rail network.

The port of Klang raised its container throughput by 2.7 m TEU or about 37 per cent between 2009 and 2013. In a period characterized by a rather weak world trade and a stagnating global container traffic this significant growth highlights two factors. First, it displays the strong economy of the country and the ever increasing demand of the world for products manufactured in Malaysia. Klang is the main gateway for Malaysia's exports but is strong for import containers as well. Second, the port of Klang also benefits from its location on one of the main trade lanes of container shipping making the port an attractive transhipment hub.

The main transhipment port in Malaysia, however, is Tanjung Pelepas as it provides for an even better position along the east-west trade lanes of liner shipping. The port is equipped with state of the art container handling equipment and has very good connections to the hinterland.

Figure 4-28: Container throughput of main container ports in Malaysia

Port	Seaborne container throughput (TEU)			
	2009	2010	2011	2012
Klang	7,309,800	8,871,700	9,603, 900	10,001,500
Tanjung Pelepas	6,020,000	6,530,000	7,502,000	7,700,000
Penang	958,500	1,106,100	1,198,800	1,160,000
Johor	-	985,900	1,165,700	-

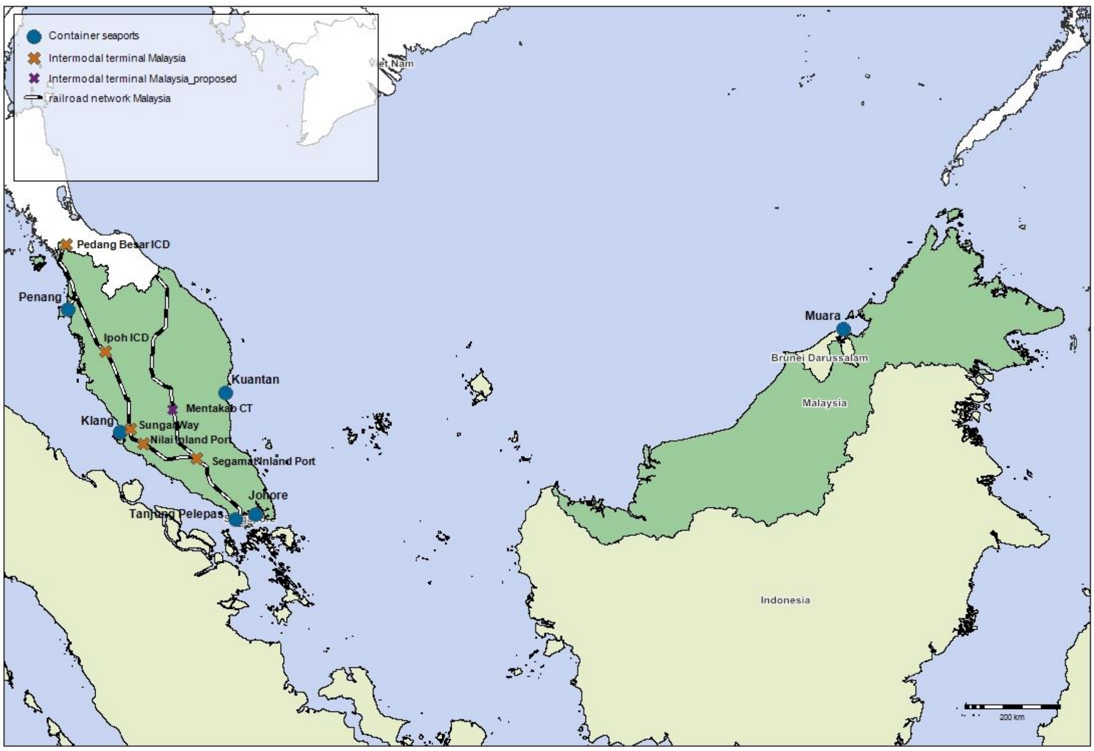
Source: Containerisation International, Port operators

The port of Penang is of considerably smaller size than the leading ports. Too, the development of its volume has been fairly flat lately fluctuating around the 1.1 million TEU mark. Despite that the port has a regional importance as its Butterworth Container Terminal provides for intermodal services with Thailand. The future development of container ports in Malaysia includes among local enlargements projects the building of a new deepwater port in Kuantan with a draught of up to 20 m. The works of the first phase commenced in 2012 and are scheduled to be completed by 2016.

4.8.2 Current state and evolution of rail infrastructure and rail freight transport

The national rail network using the meter gauge comprises of 1,792 km of tracks. The lines used for freight trains are single-tracked. The infrastructure generally stretches north-south via the East Coast Line and the West Coast Line. The Malaysian rail network has international links with Thailand in the north and Singapore in the south (see Figure 4-29).

Figure 4-29: Malaysia's main freight rail network



Source: KombiConsult

There are two key rail infrastructure development projects under way. A 329 km long new electrified line is being built between Ipoh and Pedang Besar. It will be used both for freight and passenger traffic and feature seven cargo stations. The rail line is scheduled to be completed by November 2014. An even larger project concerns the set-up of a rail corridor extending from Singapore via Malaysia to Kunming in south China. Details should be available later this year.

4.8.3 Current state and evolution of multimodal freight transport

Intermodal container hinterland services once were established to reduce road congestion, increase the efficiency of seaports and provide the cost-efficient transport of containers especially for long hauls with adjacent countries. The state-owned rail way company Keretapi Tanah Melayu Berhad (KTMB) was able to capture a large share of containerized freight transports. In order to match customer expectations for delivering integrated port-to-door services KTMB, additionally, established a road haulage company, Multimodal Freight Services, which seems to offer competitive rates and services.

KTMB was successful in growing the multimodal rail/road transport of marine containers, which has become one of the key businesses of Malaysia's rail freight transport. The revenues from intermodal services are reported with $14.2m in 2011 and thus accounting for 37 per cent of KTMB's total revenues from freight.

KTMB supplies the overall intermodal service and the rail haulage for container hinterland transport. Although the railway is providing a range of domestic services between the ports and inland terminals such as Ipoh it seems as if the international rail corridor with Thailand is key to the success of Malaysia's intermodal traffic. These international intermodal services are supplied under the brand name cross-border rail landbridge. According to Valautham (2007), the services between the ports in Malaysia, mainly Penang and Klang, and the terminals and inland container depots (ICD) in Bangsue and Lat Krabang in Thailand, however, are managed by four private intermodal operators: T.S Transrail, Freight Management; T.S. Allied Solution; and PTP Landbridge Services.

Eswaran (2008) has elaborated an overview on the service level, the frequency of service and the cost of a port-to-door container transport for the reference year 2008. According to this study, the intermodal services had absolutely road competitive freight rates but the transit time was considerably higher than what road hauliers could promise at that time (see Figure 4-30).

Figure 4-30: Characteristics of intermodal services Malaysia - Thailand

Intermodal service	Distance (km)	Transit time (hours)	No. of services per week	No. Wagons per train	total cost (USD/ TEU)
Bangsue -Klang	1600	72	12	24	619
Lad Krabang – Klang	1630	72	6	24	622
Bangsue – Tanjung P.	1900	90	2	24	681
Pedang Besar - Penang	170	6	3	35	188
Pedang Besar - Penang	170	6	2	22	188
Suraththani - Penang	520	13	3	20	425
Trang - Penang	520	13	3	20	421

Source: P. Eswaran: Maritime Sector Study of the Indonesia-Malaysia-Thailand Growth Triangle, 2008

Malaysia is linked with the Thai rail network at Padang Besar. A Joint Traffic Agreement between both KTMB-Malaysian railway and State Railway of Thailand was concluded in 1954 and reviewed in 2007 to facilitate the flow of freight especially the transport of containers and cement. Based on the Joint Traffic Agreement and the support of both the Malaysian and Thai customs goods are cleared at the border station in Pedang Besar within three hours. Standard procedures do not require for any physical examination of the cargo (Valautham, 2007).

The success of this rail landbridge cannot be better measured than in terms of the its traffic level and the modal split of container hinterland transport between the ports in Malaysia and Thailand. From 2002 to 2007 the intermodal volumes grew by nearly 40 per cent to 219,000 TEU. Even if rail's market share dropped from 90 per cent to almost 75 per cent in the same period rail clearly has remained its leading position.

It is reported that road hauliers could increase their market share mainly owing to a lack of container wagons to meet the demand and construction works along the rail line, which temporarily impeded the quality of intermodal services (see Figure 4-31).

International intermodal services currently are only operated with Thailand via Pedang Besar although a second cross-border point exits at Ranau Panjang.

The intermodal container trains usually are dedicated block trains and have a maximum weight of 1,200 tonnes.

Figure 4-31: Modal split of container traffic between Malaysia and Thailand

Mode	Container transport volume (TEU)					
	2002	2003	2004	2005	2006	2007
Rail	168.465	175.480	194.761	184.071	211.365	219.146
Road	12.500	15.000	20.000	19.610	22.000	45.000
Sea	8.310	12.000	18.000	22.101	25.802	36.000
Total	**189.275**	**202.480**	**232.761**	**225.782**	**259.167**	**300.146**

Source: P. Eswaran: Maritime Sector Study of the Indonesia-Malaysia-Thailand Growth Triangle, 2008

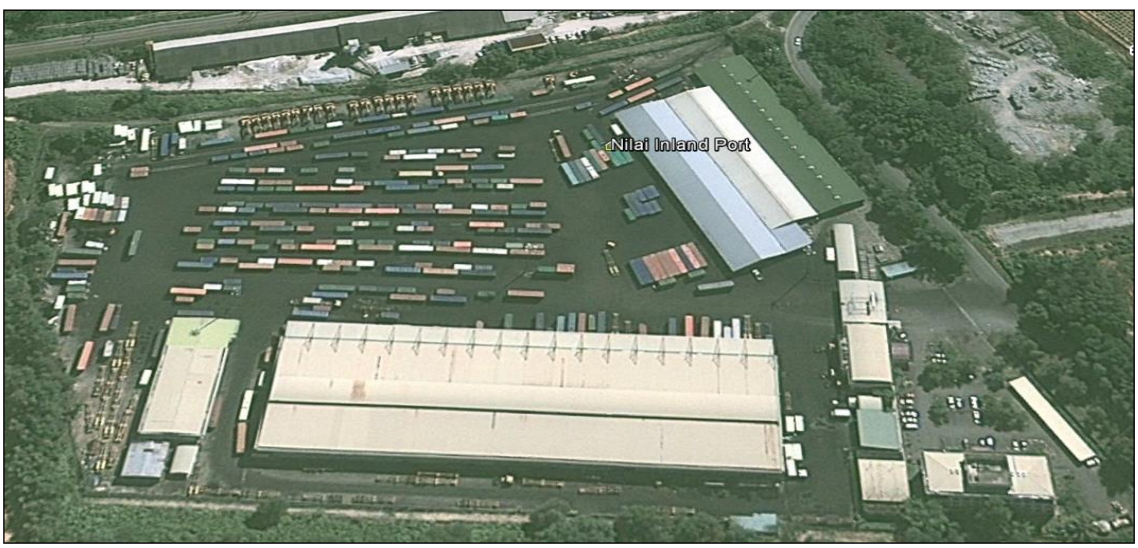
4.8.4 Inland container terminals and ICDs

Malaysia has established a well-functioning and integrated network of intermodal terminals or ICDs, respectively. Most of them are located along the East Coast Line. The main ICDs are Pedang Besar ICD owned by KTMB and situated at the border between Thailand and Malaysia and the inland ICD at Ipoh Cargo Terminal (see Figure 4-32). Other facilities are in Sungai Way, Nilai Inland Port (see Figure 4-33), and Segamat Inland Port. All ICDs have been established in the hinterland as an extension for container seaport activities. The objective was to promote intermodal transports services, decongest ports and raise their productivity and ensure competitive prices. The ICDs in Malaysia have been set up either as PPP such as the Ipoh ICD, which was funded by the Malaysian Railway KTMB and four Port Authorities, or as completely state-owned or private companies.

Figure 4-32: Ipoh ICD

Source: Google Earth

Figure 4-33: Nilai Inland Port



Source: Google Earth

The Government endorsement was evident in promoting the development of the intermodal terminals and supported the national ports to play a strategic role in the region as many shipping liners prefer to enter Thailand via Malaysia's ports due to competitive rates especially when considering the total supply chain costs.

Figure 4-34 provides an overview on existing intermodal terminals in Malaysia. KTMB further plans to extend its network by developing a container terminal in Mentakab.

Figure 4-34: Intermodal Terminals in Malaysia

Name	Location	Handling Equipment	Rail access ?	Infrastr ucture	Annual Capacity (TEU)
Pedang Besar	158 km north of Penang Port and 588 km north of Port Klang	reachstackers	yes	4x rail lines à 30 TEU	>100.000
Ipoh Cargo Terminal	181 km north of Penang Port and 250 km north of Port Klang	reachstackers	yes	6x rail lines à 30 TEU	>100.000
Nilai Inland Port	50 km of Kuala Lumpur and 93 km from Port Klang	reachstackers	yes	2x rail lines à 30 TEU	4.000
Segamat Inland Terminal	212 km south of Kuala Lumpur and 188 km north of Port Tanjung Pelepas	reachstackers	yes	2x rail lines à 30 TEU	1.000
Prai ICD	10 km from Butterworth Container Terminal (Port Penang)	reachstackers	yes	1x rail line à 30 TEU	3.000
Sungai Way ICD	22 km from Port Klang	reachstackers	yes	2x rail lines à 30 TEU	6.000

Source: KombiConsult Research, UNESCAP: Review of Developments in Transport in Asia and the Pacific 2011

4.9 TURKEY

4.9.1 Current state and evolution of container seaports

Based on the significant economic growth and the strategic location at the junction between Europe and Asia, Turkey has become an important trade hub. As a result the container throughput of Turkish seaports has trebled to about 6.6 million TEU in the period from 2003 to 2011 (Meys, 2012).

Over the past decade **Ambarli** has become Turkey's main container port. In 2012 it moved 3.1 million TEU, almost 600,000 TEU more than three years earlier (see Figure 4-35). The port is located at the Marmara Sea on the European side close to Istanbul. It is privately held by ALTAŞ and effectively consists of several terminals, Kumport, Marport, Mardas, and Akansa. The total nominal capacity is 6.5 million TEU.

The Mediterranean seaport of **Mersin** providing for a capacity of 2.5 million TEU also is in private hands and managed by a joint venture of PSA International and Akfen Holding. It handled a record volume of 1.26 million TEU of containers in 2012, up about 50 per cent from 843,900 TEU in 2009. Other than Ambarli, the port of Mersin is connected directly to the Turkish rail network. From a dedicated rail terminal container hinterland services are being operated with most economic centres in Turkey.

The port of **Izmir** is Turkey's third largest container site. Its seaborne container throughput has been stagnating for years. It amounted to 810,000 TEU in 2012. The port still is operated by the state-owned Turkish railway TCDD but shall be privatized in due time.

Figure 4-35: Container throughput of main container ports in Turkey

Port	Seaborne container throughput (TEU)			
	2009	2010	2011	2012
Ambarli	2,517,100	2,540,000	2,686,000	3,097,500
Mersin	843,900	1030,400	1,113,900	1,263,450
Izmir	826,600	726,700	-	810,000

Source: Containerisation International, TCDD, KombiConsult analysis

In addition to existing container ports other projects are either under way or envisaged:

- New Aegean Gateway Terminal (AGT) in the port of Izmir with a 1.5 million TEU handling capacity expected to start operations by 2015;
- New container terminal in the port of Candarli for of a capacity of 2 million TEU;
- New container port Filyos.
- Enlargement of the container port of Mersin

4.9.2 Current state of rail infrastructure and rail freight transport

The Turkish railway TCDD is a state-owned company. With a length of 11,120 km excluding high-speed lines it operates one of the largest rail networks in the world (see also Figure 4-36). The lines are built to standard track gauge. Some sections of the network suffer from a lack of maintenance or under-investment. But the Government of Turkey has made large efforts to rehabilitate and upgrade the main lines.

Figure 4-36: Rail network and container ports in Turkey

Source: KombiConsult

Turkey's national rail infrastructure is linked with the networks of Bulgaria, Greece, Syria, and Iran, each of them provide for a standard gauge rail system. The rail connection with Georgia via Kars is still under construction and also presents a technical handicap due to the break-of-gauge at the border. TCDD has increased its freight traffic between 2008 and 2012 from 23.5 to 25.7 million net tonnes. This result is even more remarkable as the traffic volume had dropped sharply to 21.8 million tonnes in 2009 following the global economic slump. So TCDD did not only recover from the trough but even exceeded the previous 2008 high. There are not many rail freight companies in Europe that can point out to such a progress.

In spite of this positive development Turkey remains a road-oriented country. Road haulage has a share of about 94 per cent of the total volume of land-based freight traffic leaving rail with a share of about 6 per cent.

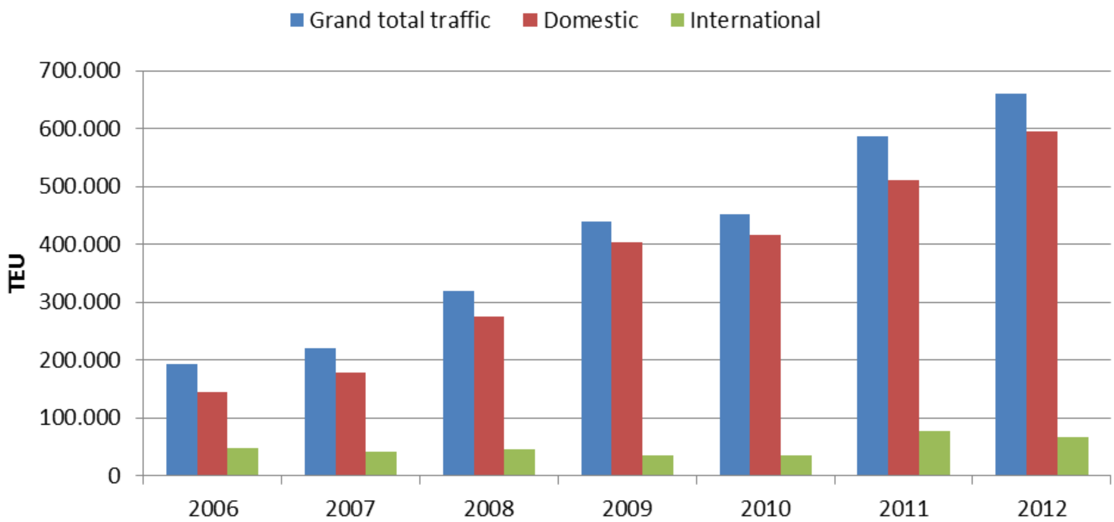
4.9.3 Current state of multimodal freight transport

The TCDD has achieved a significant increase of the volume of multimodal services by rail. Between 2006 and 2012 the total number of intermodal shipments in Turkey more than trebled from 190,000 to 650,000 TEU. The key driver was the domestic market, which are essentially container hinterland services. The volume quadrupled in the same period of time to nearly 600,000 TEU and thus accounting for about 90 per cent of the entire intermodal traffic (see Figure 4-37). Measured by tonnage, the TCDD achieved a growth of its intermodal business from 5.9 to 8.3 million tonnes between 2008 and 2012.

According to the Turkish Ministry of Transport, Maritime Affairs and Communications, the daily supply of intermodal services in Turkey currently comprises of 135 domestic and 14 international block trains. The majority both of international services and volumes are on trade lanes with Central and Western European economic centres. The trains virtually only ship continental cargo, for which customers deploy 45’ domestic containers, semi-trailers, swap bodies or tank and bulk containers.

As there is not yet a through freight rail line between the European and Asian parts across or under the Bosphorus, intermodal service providers are effectively forced to origin or terminate their trains at Turkey’s European side, particularly at Halkali intermodal terminal. This area, however, is an infrastructure bottleneck due to severe road congestions. Moreover it requires from clients with cargo on the Asian side to carry the intermodal units by truck to Halkali – or any suitable site. Apart from the heavy trucking costs these journeys are also threatened by delays due to congested roads in the Greater Istanbul area. Therefore we assume that the best part of the entire market potential from/to Turkey’s Asian side currently cannot be captured by intermodal services starting in the Halkali area.

Figure 4-37: Intermodal rail/road transport in Turkey



Source: Eurostat, KombiConsult analysis

Until recently, MFT services between Turkey and the European mainland have been initiated by western European logistics service providers or intermodal operators. In 2013, however, BALO, the first entirely Turkish intermodal company, launched its first service. In the initial phase the trains will shuttle between Halkali/Tekirdag and Köln (Germany) twice a week. The frequency is scheduled to be increased in line with a growing demand.

Other Turkish forwarding companies have developed an innovative intermodal logistics concept to bypass the Halkali and Bosporus bottlenecks and capture volumes from the Asian part of Turkey, whose economy has been becoming increasingly important. The solution is a multimodal transport in the strict sense: They forward their intermodal loading units, overwhelmingly craneable semi-trailers, with ferries from Aegian ports to the port of Trieste in north-east Italy. Here the semi-trailers are loaded with reachstackers on dedicated intermodal block trains, which run on trans-alpine corridors via Austria mainly to Germany. Here the units usually are hauled to their final destinations by road.

The TCDD in cooperation with various partners pursues a similar concept. There is an existing intermodal service between the Baltic States, particularly the seaports in Lithuania, and the Black Sea port of Odessa. These shuttle trains shall now also be fed with Turkish cargo by offering an integrated service including a ferry/short-sea transport between Odessa, on the one side, and Samsun and Istanbul, on the other side (see Figure 4-38).

Figure 4-38: VIKING intermodal ferry/rail/road service

Source: www.railwayinsider.eu

Whilst the intermodal transport volumes between Turkey and the European mainland has been continuously progressing taking into account both the entire land corridor via Bulgaria and the multimodal ferry/rail/road solution, intermodal services with Asian countries are not such important yet. According to TCDD data, the aggregate volume of rail-based container shipments with Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan just amounted to some 2,000 TEU in 2012. Against this background several initiatives have been started to improve the situation on those corridors.

4.9.4 Development of rail infrastructure and multimodal freight transport

The Government of Turkey is pursuing – amongst others - three major transport infrastructure projects on its own or in co-operation with adjacent countries, which once completed are due to enabling or facilitating cross-border intermodal services. First of all, Azerbaijan, Georgia and Turkey are very well under way to build a missing rail link on the corridor Europe – China. That is the rail line extending from Kars and continues via Tbilisi to Baku at the Caspian Sea. 90 per cent of the investment has already been completed (see Figure 4-39).

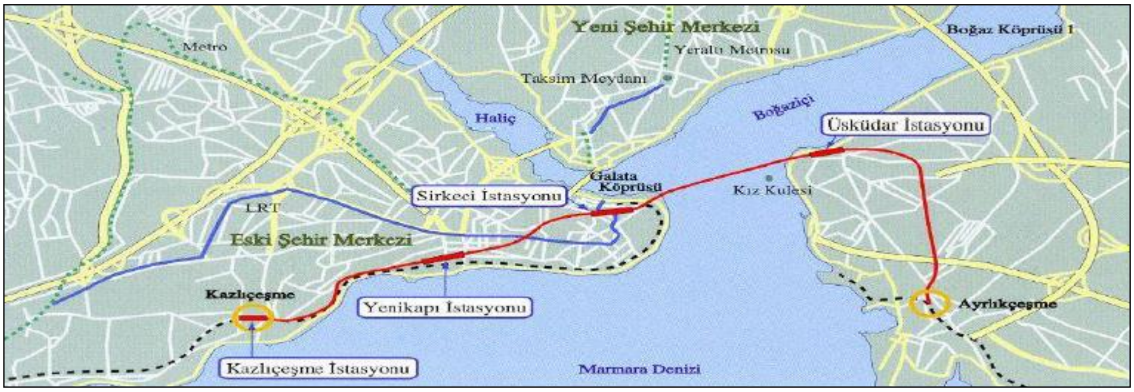
Figure 4-39: Kars-Tbilisi-Baku rail project

Source: Ministry of Transport, Maritime Affairs and communications of Turkey

The second key investment is the Marmaray project scheduled to be terminated by 2015. It is a rail tunnel under the Bosporus strait thus linking the European and Asian parts of the TCDD rail network (see Figure 4-40). The Marmaray project will enable to establish through-trains of intermodal services to European locations starting on the Asian side. In conjunction with the Kars-Baku rail line it will moreover enable virtually uninterrupted intermodal services between all European countries via Turkey to Central Asian countries and China. Additionally, it offers market actors an alternative to the Trans-Siberian route.

The above infrastructure measures are further accompanied by an Intergovernmental Agreement for the TRACECA Silk corridor to promote the intermodal transport network and improve transit conditions. The concrete objective is to launch the Silk Wind container block train, which shall run over 4,200 km within 12 days between Dostyk, the border between Kazakhstan and China, and Istanbul (see Figure 4-41).

Figure 4-40: Marmaray tunnel project – the Bosporus Crossing



Source: TCDD

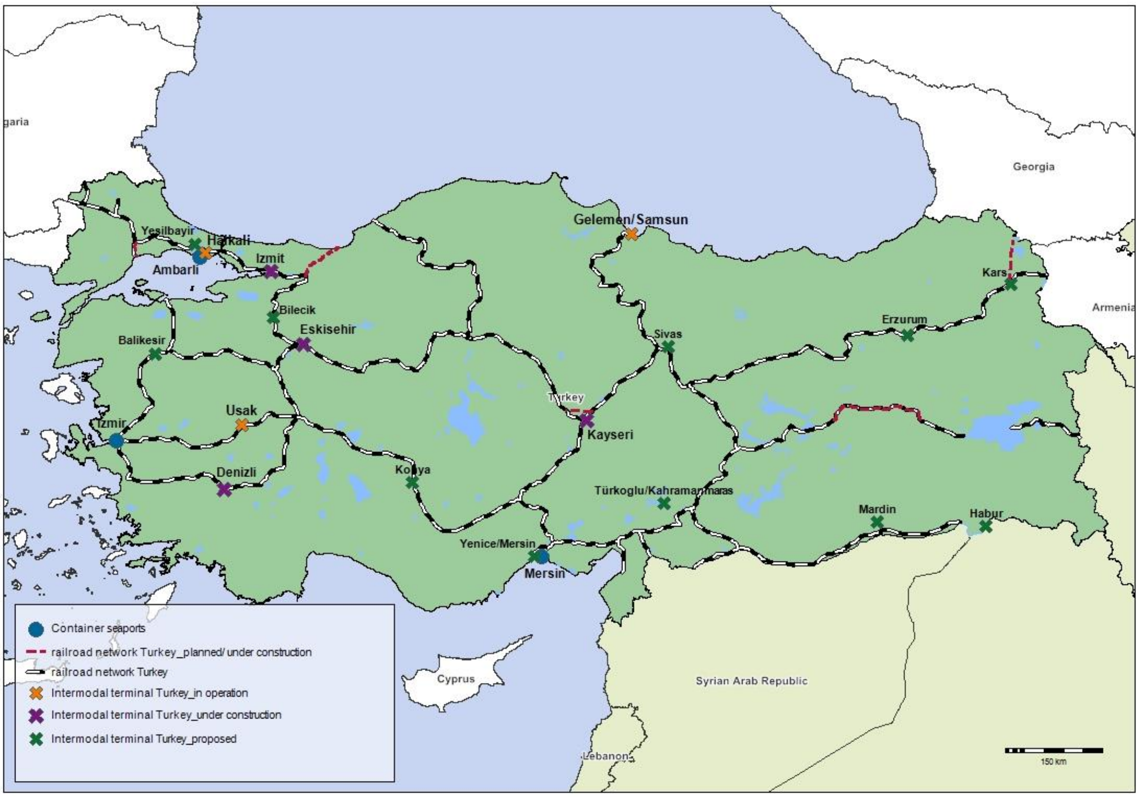
Figure 4-41: TRACECA Silk Wind container block train project

Source: Ministry of Transport, Maritime Affairs and communications of Turkey

Another intermodal service project is the ECO (Economic Cooperation Organization) container train, which is due to connect Istanbul with Islamabad (Pakistan) via Teheran. This intermodal service is to be a component of a greater agreement between Turkey and Pakistan on strengthening the bilateral trade and contributing to an improved integration of the entire region.

The third major infrastructure investment of the Turkish Government relates to the establishment of logistics centres and intermodal terminals in Turkey. This move is supposed to strengthen the logistics competences of the country, increase Turkey's attractiveness for foreign investments as a manufacturing location and also ensure more cost-efficient intermodal services. In addition to the existing sites four more intermodal terminals are planned, one terminal has already been completed while the other are under construction. All terminals are to provide storage service as well as customs clearance and inspections (see also Figure 4-42).

Figure 4-42: Overview on current and planned intermodal terminals in Turkey



Source: Ministry of Transport, Maritime Affairs and communications of Turkey, KombiConsult

4.9.5 Transport policy for multimodal freight transport

The Government of Turkey has developed an almost unique policy for promoting multimodal freight transport within Turkey and on international corridors. The policy for combined transport is a component of the current Transport Strategic Plan for the period from 2014 to 2018 and comprises of three main pillars.

The first pillar is a Combined Transport Strategy Paper designed to:

- Promoting the co-operation and collaboration in the intermodal industry;
- Determining strategic tools for competitive and efficient intermodal transport systems.

The second component is the promotion of intermodal operations through the following individual measures:

- Establishment of a combined transport regulation;
- Set-up of a permanent platform for intermodal transport involving all public and private stakeholders;
- Financial aids;
- Definition of requirements towards intermodal terminal operators;
- Licensing of intermodal terminals;
- Enhancement of ports' container handling capacities;
- Development of international rail links (e.g. Marmaray).

The third pillar of Turkey's policy for multimodal freight transport is the development of multilateral and bilateral co-operation with respect to:

- Joint studies and workshops with adjacent countries and international organisations (OIC, TRACECA, BSEC, ECO) to develop tangible projects;
- Conclusion of intermodal agreements with countries located at Black Sea, Middle East and North Africa.

4.10 TURKMENISTAN

4.10.1 Current state and evolution of container seaports

Turkmenistan, like Azerbaijan, is landlocked in the strict sense but as a country bordering the Caspian Sea it provides for a seaport in Turkmenbashi .For the time being, the port does not have a container terminal. Instead it provides for a double rail ramp to load and discharge rail ferries serving other Caspian Sea ports. The infrastructure is told to be in poor conditions.

The Government of Turkmenistan is planning a new seaport in Turkmenbashi city, which is due to be equipped with state-of-the-art infrastructure including a container terminal. The terminal will be linked to the TRACECA corridor and give an impetus to the economic development of the country and the inter-regional growth of intermodal container transports.

4.10.2 Current state and evolution of rail infrastructure, rail freight and multimodal transport

The national rail network of the Turkmen State Railway totalled to 3,115 km in 2011. It generally is single-tracked and unelectrified. The Ministry for Railway Transport oversees and regulates the operations of the railway and has the final decision on investments into infrastructure or rolling stock.

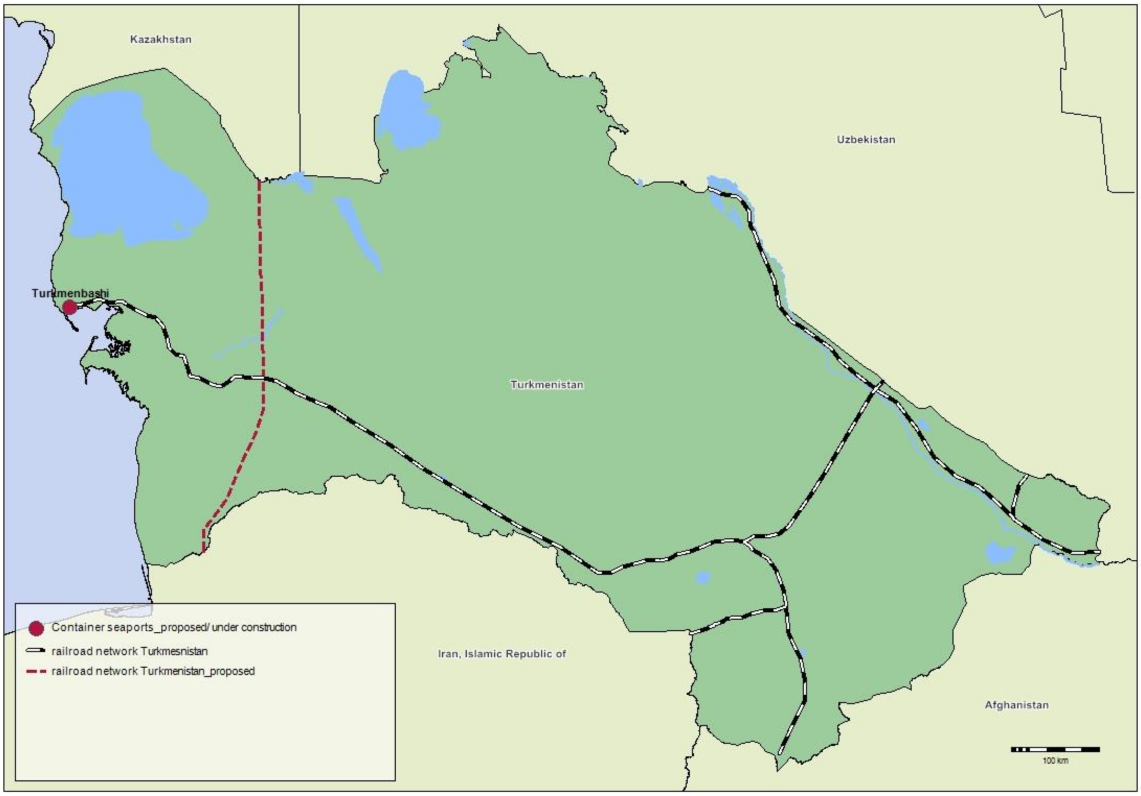
In 2011, the Turkmen Railway carried 27,000 tonnes of goods, of which nearly 30 per cent accounted for international traffic. The main bilateral trade lanes were with Uzbekistan (4,700 tonnes) and Iran (2,300 tonnes). 862 tonnes of freight were exported or imported via the port of Turkmenbashi.

The Government of Turkmenistan is committed to raise the importance of rail freight transport. It therefore supported the construction of a new rail line between Uzen (Kazakhstan) and Serhetvaka (Turkmenistan), which was completed in 2013. This was a first step in the strategic project linking Kazakhstan with Turkmenistan and Iran. The next step is the building of 400 km of tracks that will connect the Turkmen area of Atamyrat-Imamnazar with Andkhoy in Afghanistan and later continue to Iran. The official start of this major project was celebrated in June 2013 (see also Figure 4-43).

According to available sources, the multimodal freight transport business has not yet been taken foot in Turkmenistan. Although there are several container terminals, for example, in Ashgabat, Zerger, Mayskaya, Gapdjak, and Altyn, managed by the Turkmen Railway, they cannot offer intermodal rail/rod services. They effectively are road-based container yards as they do not provide for a direct rail access.

Since a container terminal shall be built in the Caspian Sea port of Turkmenbashi we anticipate that the country will enter into the intermodal era latest by completion of this project. But this assumption could not be verified during this survey.

Figure 4-43: Main existing and planned rail lines in Turkmenistan



Source: KombiConsult

4.11 SUMMARY ON OIC ASIA GROUP

The present study investigated the current state and the future development of multimodal freight transport as well as the container throughput of seaports in ten countries of the OIC Asia Group. Five members of the sample – Afghanistan, Azerbaijan, Kazakhstan, Kyrgyzstan and Turkmenistan – are actually landlocked countries even if some are located at the Caspian Sea. The container handling volumes of the Caspian Sea ports, however, are insignificant if any. The other countries, in contrast to that, can back on container ports that are located along main global trade lanes and, as a result, display large throughputs of freight containers (see Figures 4-44 and 4-46). The three biggest ports of the Asia Group by volume are located in south-east Asia, in Malaysia and Indonesia. The largest port, Klang, passed the 10 million TEU mark in 2012 while Tanjung Pelepas handled some 7.7 million TEU and the Indonesian port of Tanjung Priok over 6.2 million TEU of containers in the same year. These ports generally benefit from two factors, from the booming export economy of their home countries and the transhipment of containers based on their strategic location as consolidation point for container flows between the Far East, Europe, the Middle East and Africa. Considerably smaller, with a throughput of 3 million TEU, but of increasing importance is the port of Ambarli in Turkey. Located close to Istanbul at the joint between Europe and Asia it has experienced a strong growth of volume in the recent years. It mainly resulted from the dynamic development of the Turkish economy.

All countries of the Asia Group, unlike the members of the Arab Group, have established rail networks, on which rail freight services are being operated. Kazakhstan, Turkey and Iran even provide for an extensive rail infrastructure of, respectively, 14,800 km, 11,100 km or 10,000 km of tracks.

The survey, too, has identified a regular supply of intermodal rail/road services in eight out of ten countries. But even in the other two states, Afghanistan and Turkmenistan, containers likely are sporadically carried by rail. For most countries statistical data on the intermodal transport volume were not available. But based on the findings of the survey, it is obvious that Turkey is the leading intermodal country of the group. Here the transport volume amounted to about 650,000 TEU in the year 2012. The latest available data for Kazakhstan display a volume of about 350,000 TEU (see also 4-45).

Figure 4-44: Container throughput of Asia Group's main container ports

Port	Country	Seaborne container throughput (TEU)		
		2010	2011	2012
Klang	Malaysia	8,871,700	9,603, 900	10,001,500
Tanjung Pelepas	Malaysia	6,530,000	7,502,000	7,700,000
Tanjung Priok	Indonesia	4,714,900	5,649,100	6,200,000
Ambarli	Turkey	2,540,000	2,686,000	3,097,500
Tanjung Perak	Indonesia	3,030,000	2,643,500	2,849,100
Shahid Rajaee	Iran	2,592,500	2,839,300	2,317,600
Chittagong	Bangladesh	1,329,000	1,392,100	1,405,500
Mersin	Turkey	1,030,400	1,113,900	1,263,450
Penang	Malaysia	1,106,100	1,198,800	1,160,000
Johor	Malaysia	985,900	1,165,700	-
Izmir	Turkey	726,700	-	810,000

Source: KombiConsult

Figure 4-45: Annual intermodal rail/road transport volume of Asia Group countries (latest available years)

Country	Intermodal transport volume (TEU)
Afghanistan	-
Azerbaijan	n.a.
Bangladesh	70,000
Indonesia	n.a.
Iran	80,000 - 100,000 (a)
Kazakhstan	540,000
Kyrgyzstan	n.a.
Malaysia	250,000 (a)
Turkey	650,000
Turkmenistan	-

(a) KombiConsult estimate
n.a. = not available

Source: KombiConsult

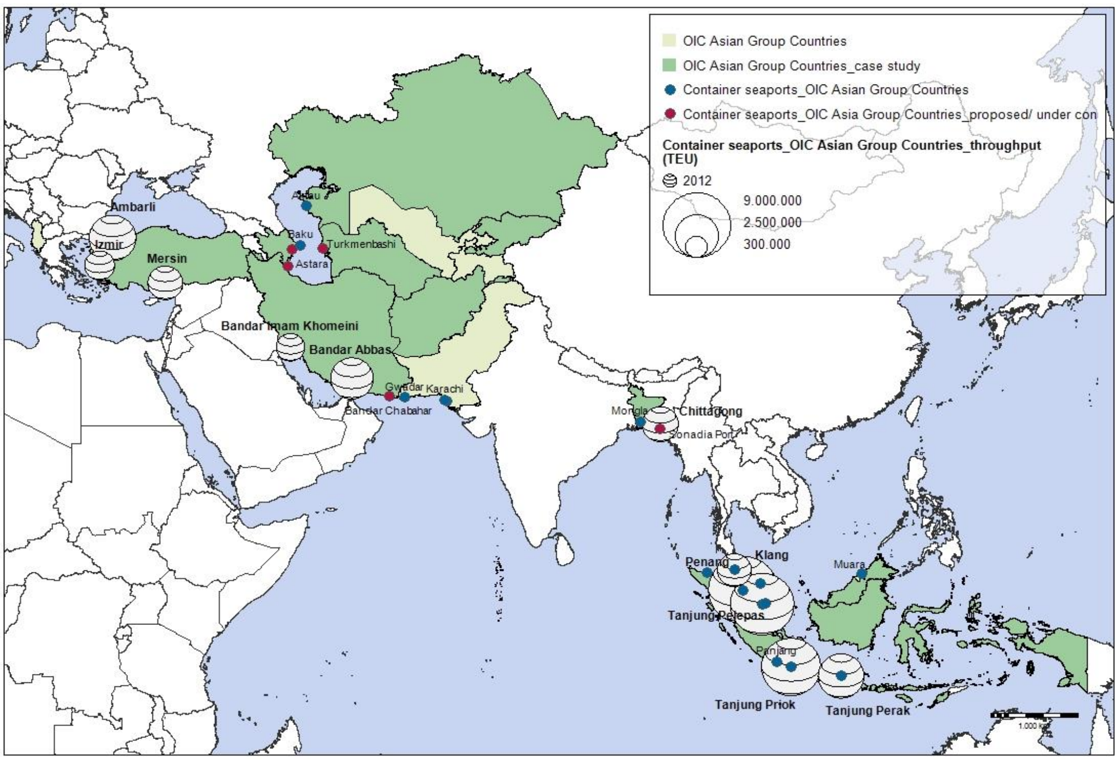
The intermodal industry in the countries of the Asia Group overwhelmingly is based on container hinterland services. According to the information provided by the national railways, all container ports displayed in Figure 4-44, except for Ambarli, are likely to be served by container trains on a more or less regular basis. In some countries continental intermodal services are operated in addition to container hinterland traffic. This particularly applies to Turkey, from which continental services are supplied with various European countries, and the landlocked countries of Kazakhstan and Azerbaijan. As concerns Turkey, a substantial percentage of the continental volume is carried on "really" multimodal services. The intermodal load units first are shipped by ferries from Turkish to Italian ports where the units are transferred to dedicated intermodal block trains, which take them to their final destinations at central European terminals.

The survey finally has delivered evidence that, if intermodal service offerings have been implemented in Asia Group countries the trains are primarily operated in dedicated systems. This shows that the railways have recognized that intermodal services can better compete with road hauliers in terms of cost and transit time if they avoid interfaces with wagonload traffic and thus reduce the vulnerability for irregularities and delays.

Even if the clear majority of Asia Group countries already can back on a substantial scale of intermodal services each has ambitious plans for enhancing this business. Similar schedules have also been designed in Afghanistan or Turkmenistan that do not provide for relevant intermodal activities yet. Generally, the development plans for intermodal services are a component of more comprehensive programmes, which refer to the enlargement of the rail infrastructure and promoting rail freight services. Here the approach often is very similar to the actions taken or scheduled by the Arab Group countries. They comprise the following measures:

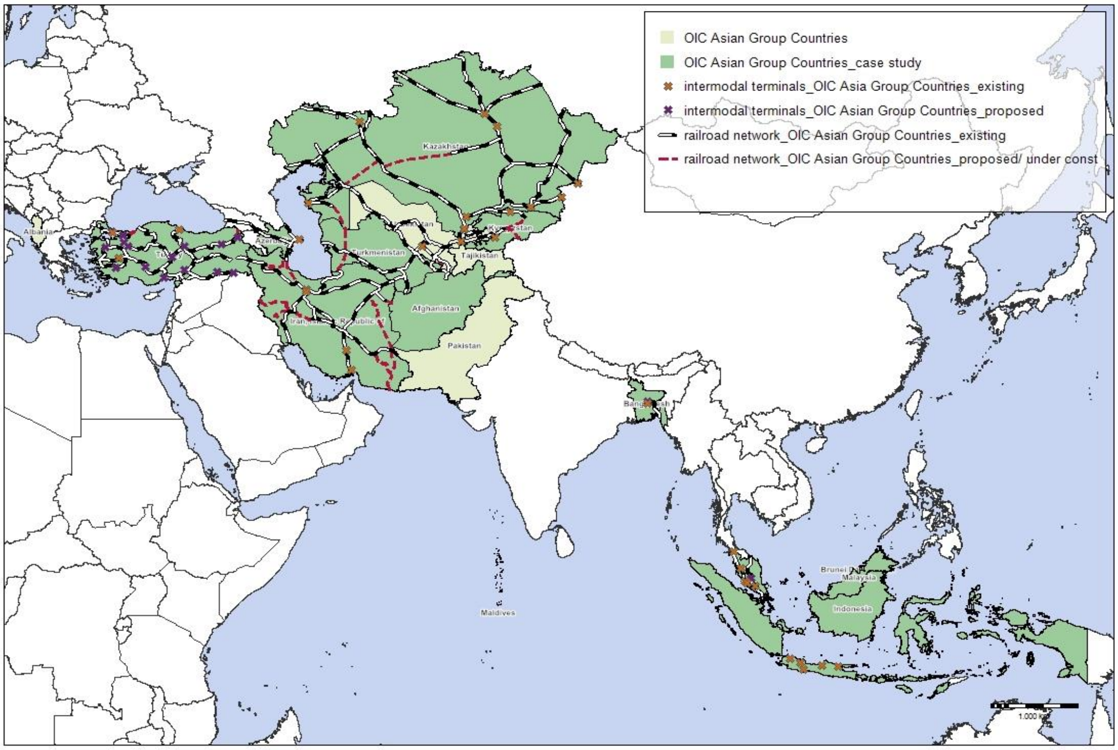
- Construction of new rail links and enlargement of existing rail infrastructure;
- Upgrading and modernization of poor rail and intermodal terminal infrastructure;
- Construction of cross-border rail links, which once finished would enable to implement international long-distance intermodal services, for example, between Europe and China or India;
- Set-up of new intermodal terminals and inland container depots;
- Procurement of modern locomotives and intermodal wagons.

Figure 4-46: Asia Group countries: container ports



Source: KombiConsult

Figure 4-47: Asia Group countries: rail and intermodal network



Source: KombiConsult

5 OIC African Group

From the African Group, six OIC Member States have been included in the analysis (see Figure 5-1). Rail networks, which are used or have been used for rail freight transport and MFT services, exist in Burkina Faso, Coté d'Ivoire, Nigeria, Senegal, and Uganda. Niger is the only country which does not have any rail network.

Figure 5-1: Rail infrastructure and MFT services in Africa Group Countries

Country	Rail network	Rail freight services	MFT services	UIC Member
Burkina Faso	X	X	X	X
Coté d'Ivoire	X	X	X	X
Niger	-	-	-	-
Nigeria	X	X	X	X
Senegal	X	X	X	-
Uganda	X	X	X	X

Source: KombiConsult analysis

5.1 BURKINA FASO

As a landlocked country Burkina Faso has no immediate access to seaports. The geographically closest ports for processing external trade flows with overseas countries are located in Coté d'Ivoire and Ghana, if goods should not be carried over very long distances through other West African countries such as Benin or Togo. For each option, with an exception via Coté d'Ivoire, the conditions to employ rail freight services are equally poor. Owing to a very limited rail infrastructure in Burkina Faso, merchandise have to be exported and imported almost entirely by road, not to mention the domestic supply. The intermodal hinterland services to /from Burkina Faso almost are provided for the port of Abidjan in Coté d'Ivoire; however, MFT services are still limited due to the railroad infrastructure quality condition in both Burkina Faso and Coté d'Ivoire.

5.1.1 Current state of rail infrastructure and rail freight transport

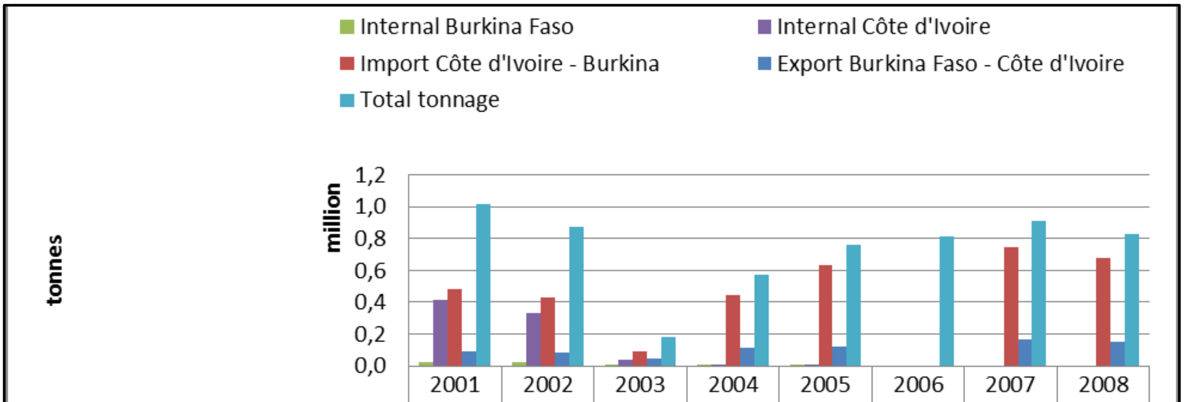
Being a landlocked country in West Africa the 1,260 km Abidjan – Ouagadougou railroad corridor is the economic heart of the country as freight trains serve the hinterland of the country via the port of Abidjan. The railway network within Burkina Faso comprises of approx. 623 km and stretches at the border near Ouangolodougou to Ouagadougou and Kaya. Yet, only the 518 km Ouangolodougou-Ouagadougou is currently in operation. The meter gauge network is single tracked with an axle load of 17 tonnes.

The transnational railway line is jointly owned by Coté d'Ivoire through the Sitarail concessionaire, private owned, which was established in 1995 as a result of the merger of both countries' national railways. Sitarail is the first in Sub-Saharan Africa to be awarded in such a private concession, being under the supervision of Bolloré Group, a French company. It operates as a key conduit for bulk freight from and into the hinterland of Burkina Faso.

The binational trade between Coté d'Ivoire and Burkina dropped dramatically by some 80 per cent in 2003 due to the political disruptions in Coté d'Ivoire, which started in 2002 (see Figure 5-2). However after the crises, the freight traffic has progressively recovered, reporting a significant increase of 217 per cent in 2004 when compared to previous year.

Since 2005, international traffic volume is increasing and reached its highest level by some 0.9 million tonnes. The majority of freight traffic along the transnational line refers mainly to the imported goods through Coté d'Ivoire (see Figure 5-2). Notably, Sitarail did not provide any domestic freight services between 2006 and 2008. This can be assumed due to the lack and deteriorated condition of conventional wagons deployed by Sitarail for domestic services as well as the priority for operating the international line, however, a confirmation could not be obtained. The main international freight commodities being shipped by Sitarail from Burkina Faso to Abidjan are minerals, manganese, and agro-industrial products.

Figure 5-2: Evolution of freight traffic volume of SITARAIL



	2001	2002	2003	2004	2005	2006	2007	2008
Internal Burkina Faso	25.147	24.861	6.274	4.876	4.855	0	0	0
Internal Côte d'Ivoire	416.972	330.430	38.464	2.704	44	0	0	0
Import Côte d'Ivoire - Burkina	481.077	432.094	90.897	447.421	635.412	0	742.492	677.007
Export Burkina Faso - Côte d'Ivoire	93.133	82.284	44.027	114.241	119.646	0	164.924	152.975
Total tonnage	1.016.329	869.669	179.662	569.242	759.957	812.417	907.416	829.982

Source: Société de Gestion du Patrimoine Ferroviaire du Burkina Faso (SOPAFER), SITARAIL

5.1.2 Current state of multimodal freight transport

Sitarail is the only intermodal operator in Burkina Faso. Currently, Sitarail provides for marine containers predominately cross-border MFT services, from the rail-based port of Abidjan to the hinterland of Burkina Faso. According to available information, Sitarail serves the main trade lane which originates in Abidjan in Coté d'ivoire – and ends in Ouagadougou, the capital city of Burkina Faso. The survey could not identify any regular domestic MFT services in Burkina Faso, but only international services. Rail operation is being mainly deployed through 40' intermodal wagons, which can accommodate either 20' or 40' container.

The main rail-based dry port in Burkina Faso is located in the capital city Ouagadougou and comprises of only one handling rail track as well as a mobile crane for handling the containers. The length of the track where containers are being loaded and unloaded is estimated by 200 meters.

Figure 5-3: Ouagadougou railway facility

Source: Google Earth

5.1.3 Development of rail infrastructure and multimodal freight transport

There is quite a long list of plans or projects which aim at enlarging the transnational rail network and connecting it with the neighbouring countries. The clear focus of all investments is on freight transport. The following key rail infrastructure programmes have been identified:

- Rehabilitation of the national railway section of the Abidjan – Ouagadougou – Kaya railroad corridor due to the extensive degradation of the rail route, outdated equipment, and limited axle loads. The project started in 2013 and is expected to be completed by 2017. The project is also linked to other projects such as the extension of the Abidjan port and the new construction of the Ferkessédougou rail-based dry port north of Coté d'voire.
- Construction of a new standard rail gauge network which will be linked to the neighbouring countries.

5.2 IVORY COAST (COTÉ D'IVOIRE)

5.2.1 Current state and evolution of container seaports

The port of **Abidjan** is located in Vridi and is one of the busiest container terminals in the country as well as in West Africa. It is the key transhipment hub after the port of Lagos in Nigeria and comprises of a single container terminal. This terminal is the main gateway to the landlocked countries of Mali and Burkina Faso and is operated and managed by Societé d'exploitation du terminal de Vridi (SETV), a joint venture between Maersk APMT (40%) and Bolloré (60%). The handling capacity is reported to be at 675,000 TEU, but is planned to be extended to 1.3 million TEU by completion in 2016. The new deep terminal will be capable of accommodating vessels carrying about 8,000 TEU. The Abidjan port handles about 80 per cent of the Coté d'Ivoire's container traffic volumes. In 2011, the container traffic in Abidjan was slightly hit by some 3 per cent due to political crises, which paralysed the port's activity for some three months. In this regards, the port of **San Pedro** took advantage of the situation and recorded an increase of some 52 per cent. However, the port of Abidjan recovered in 2012 with an increase of 16 per cent and counted 633,917 TEU. Abidjan now is the only port in Coté d´lvoire that is connected to the national rail network and can back on a near-dock intermodal terminal.

Figure 5-4: Container throughput of Coté d'lvoire container ports

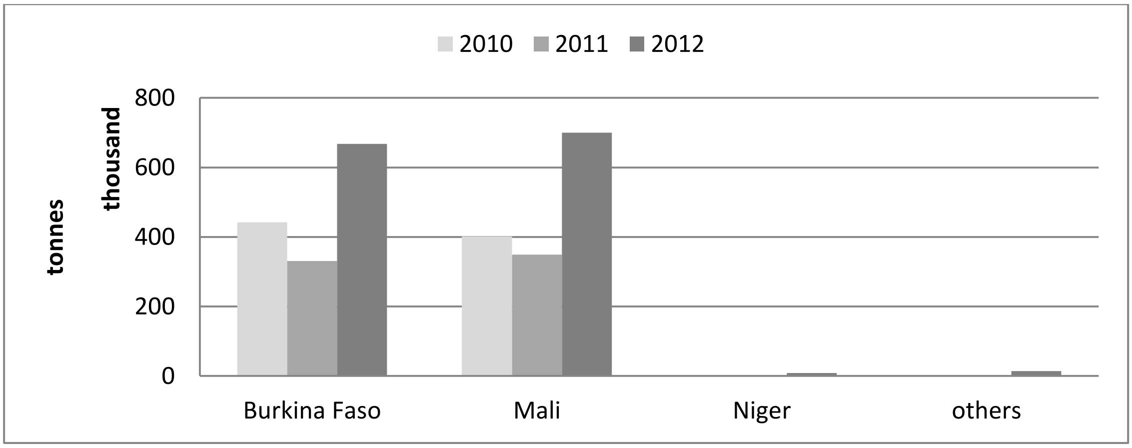
Port	Seaborne container throughput (TEU)		
	2010	2011	2012
Abidjan	561,535	546,417	633,917
San Pedro	77,730	118,071	246,187

Source: Abidjan Port Authority, Terminal Operator

Due to the congestion at the port of Abidjan, San Pedro was able to take advantage of the situation and recorded 246,187 TEU, a growth of 109 per cent in 2012. San Pedro is located some 350 km from Abidjan in the Southwest of Coté d'Ivoire. The container terminal is managed and operated by Terminal Investment Limited SA. In 2013, MSC has reached an agreement to sell 35% of its stakes. The terminal has only a road access. The increasing container traffic at the port of San Pedro has therefore resulted in a decision by Authorities and operator to expand the terminal layout up to 500,000 TEU. Project completion is expected by 2017 and 2018. The port of Abidjan is recently playing a major role in freight transport for the landlocked countries, particularly for Burkina Faso and Mali. Both landlocked countries have increased their import and export significantly via the port of Abidjan in 2012 when compared to previous year, reporting an import-growth by 102 per cent (Burkina Faso), 100 per cent (Mali), and 528 per cent to Niger. In contrast, the export traffic volume to Burkina Faso reported an increase by 41 per cent and 624 per cent to Mali (see Figure 5-5 and Figure 5-6). Almost, all import and export of the freights to and from the landlocked countries can be estimated by road mode.

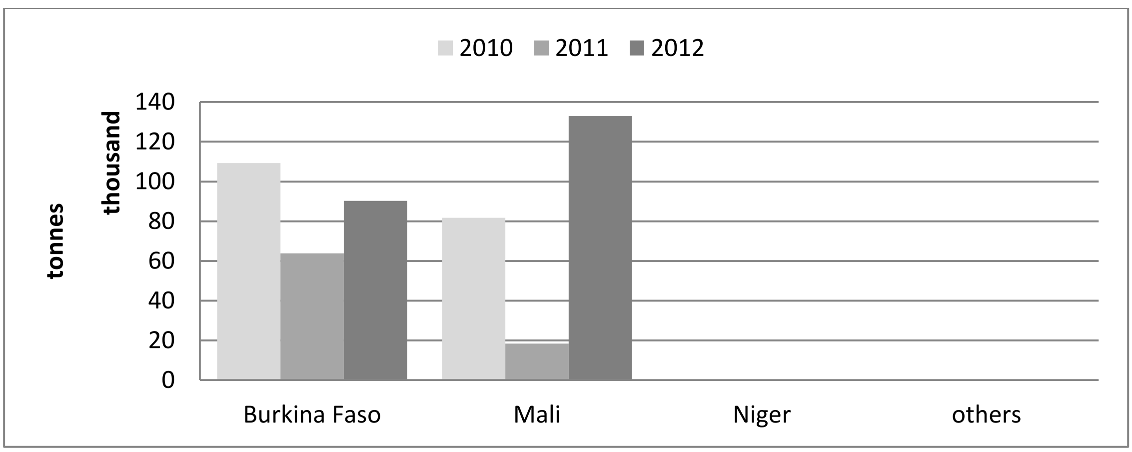
The sudden increase of Mali's import and export of freight traffic can be explained due to the recent intermodal transport barriers along the Dakar – Bamako railroad corridor, since some rail section along the corridor were closed and, as a result, cargoes were shipped via the port of Abidjan, being the second closest port after Dakar in Senegal, ensuring competitive transport costs and lead time.

Figure 5-5: Import transit traffic via Port of Abidjan (by road + rail)



Source: Port Authority Abidjan

Figure 5-6: Export transit traffic via Port of Abidjan (by road + rail)



Source: Port Authority Abidjan

5.2.2 Current state of rail infrastructure and rail freight transport

Sitarail, the private owned railway and under the supervision of Bolloré, operates and manages the entire 690 km single tracked and narrow rail gauge system of 1,000 mm. The axle load in Coté d'Ivoire is reported to be 17 tonnes (same as in Burkina Faso).

Sitarail operates mainly the international freight railroad corridor between Abidjan and the capital city of Burkina Faso in Ouagadougou. It operates as a key conduit for bulk freight from and into the hinterland of Burkina Faso. Since 2005, international traffic volume is increasing and already reached its highest level by some 0.9 million tonnes (for further information, see above the country report of Burkina Faso).

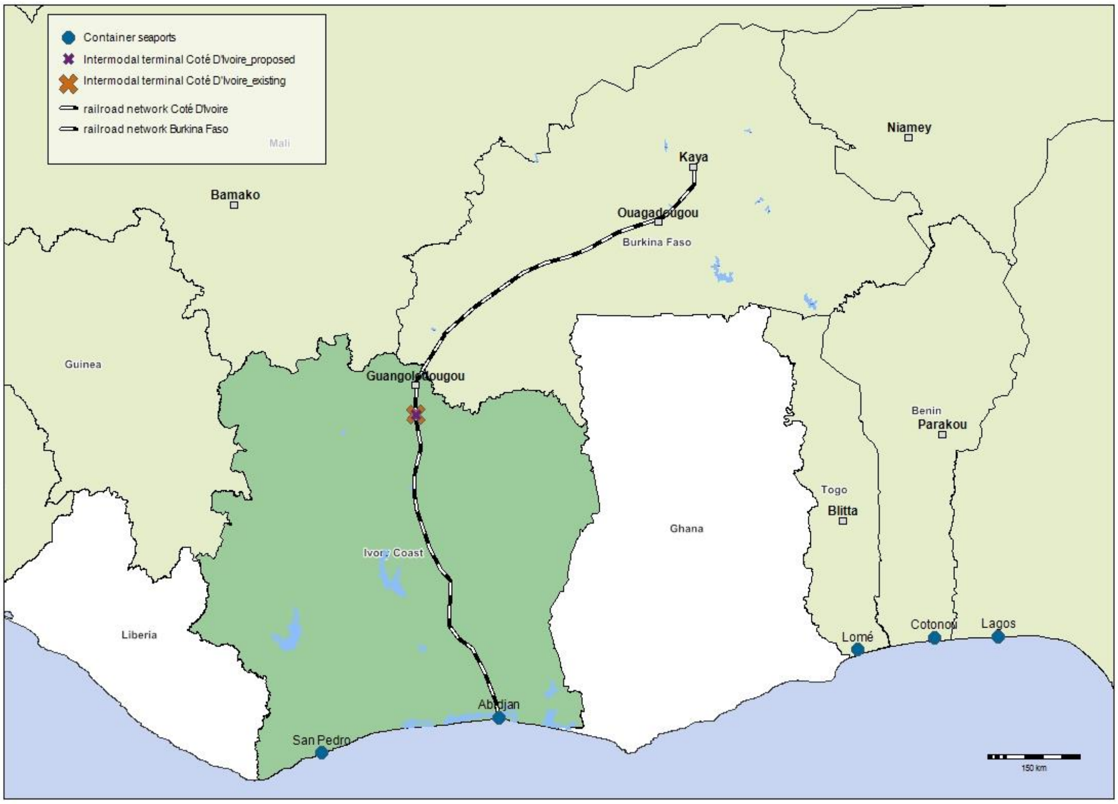
5.2.3 Current state of multimodal freight transport

Sitarail is the only intermodal operator in Coté d'Ivoire. Currently, it provides for MFT services of marine containers between the rail-based port Abidjan and the hinterland as well as cross-border MFT services to Burkina Faso (see Figure 5-7). According to the available information, Sitarail serves the following trade lanes:

- Port of Abidjan - Bouake railway station (domestic transports);
- Port of Abidjan - Ferkessédougou railway station (domestic transports);
- Port of Abidjan – Ouagadougou (cross-border transports).

The survey could not identify any dedicated intermodal container services for domestic as well as cross-border MFT services. Yet, it may be assumed that marine containers are deployed in the framework of conventional wagonload services. However, a confirmation of this assumption could not be obtained. As concerns intermodal rolling stock, Sitarail currently provides for 20' and 40' intermodal wagons. Sitarail owns approx. 300 flatbed wagons, whereas some need refurbishment. The corporate had ordered some 100 flatbed wagons with the capacity of 2x20'ft and 1x40'ft containers.

Figure 5-7: Rail network linking Coté d'Ivoire with Burkina Faso



Source: KombiConsult

There are only two key railway stations along the railroad corridor. Bouake railway station: played before 2002 a key role in intermodal transports and to the Bourke economic region since all local manufacturing industries and logistics warehousing around Bouake had their own private rail siding and freight wagons used to be shunted directly to customers, till the trade and industry was deteriorated and as a result disappeared, and therefore such door-door services do not exist anymore. Instead, a special siding with a loading/unloading quay has been constructed, which can handle simultaneously maximum 8 x 40 ft. container flatbed wagons. Hence, no shunting services are needed anymore.

Ferkessédougou railway station/yard can be considered as a transshipment hub and is located 60 km south of the Burkina Faso's railroad cross-border. Currently, the yard has only one siding quay and can handle 10x 40' ft. container flatbed wagon. The railway station consists of six tracks with a total length of 600 meters. In addition, the yard is equipped with one reach stacker, capable of handling 40 tonnes.

Figure 5-8: Ferkessédougou railway station in Coté D'lvoire

Source: Google Earth

5.2.4 Development of rail infrastructure and multimodal freight transport

The following key rail infrastructure programmes have been identified:

- Rehabilitation of the national railway section of the Abidjan – Ouagadougou rail line due to the extensive degradation of the rail route, outdated equipment, and limited axle loads. Project is currently in progress.
- Development of an advanced intermodal terminal in Ferkessédougou
- Construction of a new standard rail gauge network which will be linked to neighbouring countries.

5.3 NIGER

As a landlocked country Niger has no immediate access to seaports. The geographically closest ports for processing external trade flows with overseas countries are located in Benin, Togo, and Nigeria. Currently, Niger has no railway network, and thus, is not linked with any neighbouring country by rail. The majority of the Niger's external trade is via the ports of Lomé (Togo) and Cotonou (Benin). Due to the dependency on the transit countries, Niger has constructed a dedicated container terminal in Cotonou port in Benin.

5.3.1 Current state of multimodal freight transport

Niger operates as a joint venture with Benin the Cotonou – Parakou railway line (438 km), managed by the Organisation Commune Benin-Niger des Chemins de fer et des Transport, which has embarked on a concession process to enhance the management and operating processes via Benin. The corporation also provides trucking services through its subsidiary company from Parakou to the cross border at Niger.

In general, more than 95 per cent of the freight goods are predominately transported by road and the rest can be split in a very limited scale to airway and inland waterway (IMF, 2013). The transportation services are also hampered due to major barriers such as the renewal of the obsolescence truck fleet, limited institutional and management capacities, and unsuitable quality of land transport services. In addition, the transport sector (road and rail) also suffers from inadequate and inconsistent financial resources allocated for maintaining and rehabilitating the road as well as rail system.

5.3.2 Development of rail infrastructure and multimodal freight transport

Due to the high importance of rail freight transports in West Africa, in particular to and from the landlocked countries such as Niger as well as Burkina Faso, several railway project has been identified by Niger, which we believe will release range of positive impacts on intermodal transports in Niger and international services with neighbouring countries.

- Niger will be part of the regional railway project, which have been initiated to connect all West African countries with each other and further connection to be implemented with other regional African countries. The West African railway project will consist of constructing a standard gauge railway system and will enable Niger to be linked to Burkina Faso, Togo, Benin, Nigeria, and Coté d'Ivoire, thus facilitating MFT services especially along the railroad Cotonou – Parakou – Dasso – Niamey – Ouagadougou – Abidjan rail loop.
- Starting 2014, a seven-year railway project is on track to link Niger with the main commercial hub in Abidjan.
- Construction of an intermodal terminal in Dosso through a public private partnership investment. Project is still under review process.

5.4 NIGERIA

5.4.1 Current state and evolution of container seaports

Nigeria has several container seaports located along the coastline, in Lagos, Harcourt, and Warri. The main gateway of Nigeria is the port of Lagos with a maximum handling capacity of 1,500,000 TEU per year. The port comprises of two container terminals: Apapa Container Terminal, which is operated by APM Terminals Apapa Limited and Container Terminal Tin Can, which is operated by Africa Bolloré Logistics and Grimaldi.

Since August 2013, only the container terminal Apapa has been linked to the national railway network (off-dock) and thus, provides intermodal container hinterland transports services. However, intermodal traffic is still experiencing many delays due to the poor infrastructure condition and custom clearance issues. The container traffic of the port of Lagos recorded a positive trend in 2011. The container throughput increased by 25 per cent up to 1,413,000 TEU.

Figure 5-9: Container throughput of Nigeria's main container port

Port	Seaborne container throughput (TEU)		
	2010	2011	2012
Lagos	1,128,100	1,413,200	1,500,000 *)
* KombiConsult estimation			

Source: KombiConsult analysis, Terminal Operators

Recently, the Lagos State Government has imposed additional port landing fees on the imported containers which are handled via the port of Lagos. These additional set of charges aims to help the Lagos state and city to finance the rising maintenance costs of roads, which are severely damaged by the increasing number of overloaded trucks using the port of Lagos. Also, the Nigerian Port Authority (NPO) has implemented new strategies to reduce the congestion at roads leading to the port and around the City of Lagos. After years, overdue containers are now forcibly removed from the container terminal and empty containers are to be stored outside the port or even in the hinterland such as at ICDs located in Kaduna and Kano.

The government of Nigeria aims to develop a new container seaport at Badagry in Lagos. The current policy of container seaport developments are inaugurated through public private partnerships. The container seaport of Badagry is expected to start operation in 2016 and is located some 55 km apart from the congested city of Lagos with a population estimated as high as 11 million people. The port will be able to handle an annual capacity of 1.5 million TEU and is estimated to take over the import/export containerized transports to Lagos and the hinterland of Nigeria due to the superior hinterland access as it is located outside the metropolitan city of Lagos and along the Benin-Lagos expressway which is currently being upgraded from a 4-lane to a 10-lane highway. The container seaport will also have a significant hinterland access to railway and inland waterway.

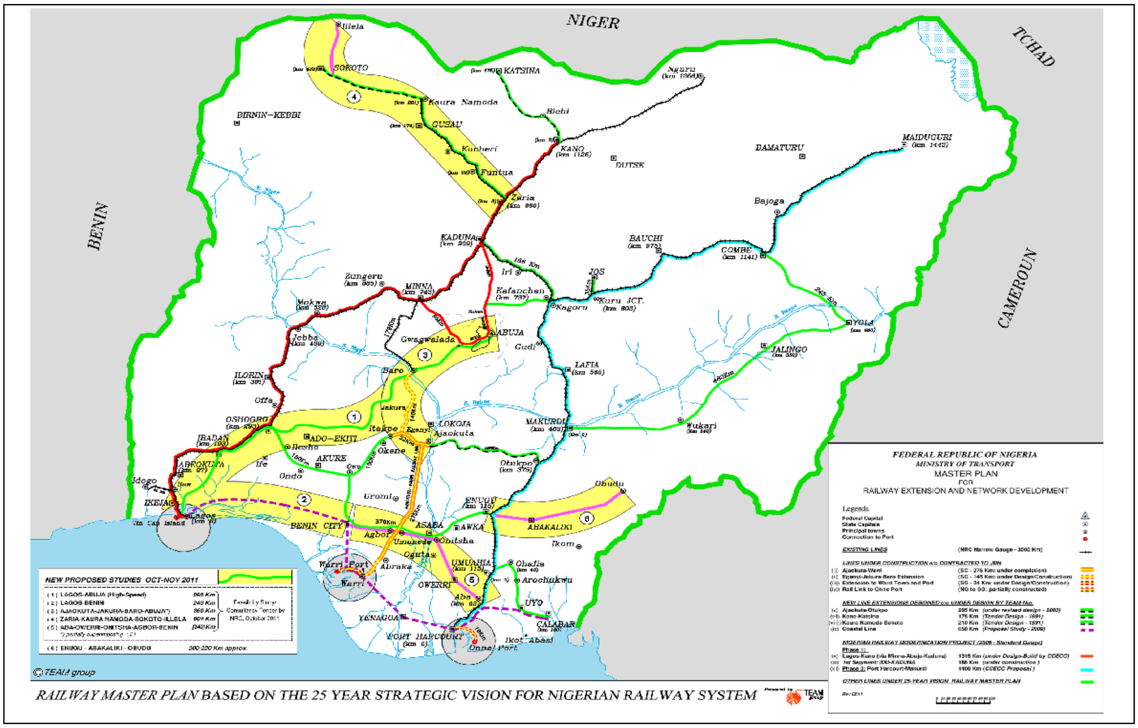
Figure 5-10: The new Port of Badagry

Source: Port of Badagry, http://www.badagry-port.com

5.4.2 Current state of rail infrastructure, inland waterway and rail freight transport

Nigeria's railway network consists of 3,505 km narrow gauge rail lines (1,067 mm), of which half of them are sharp curves. Currently, the rail lines are under rehabilitation as they have suffered deterioration due to the long period of neglecting and lack of repair and maintenance. The only standard gauge rail lines are the 274 km Itakpe – Ajaokuta - Port of Warri rail route and the 187 km Abuja – Kaduna rail route. The majority of the Nigeria's rail lines are single tracked and only 30 per cent are double tracked, however, are mostly located around the city Lagos. In general, it can be mentioned that the Nigerian railway network is dilapidated and vastly underutilised. The Nigerian railway network runs diagonally from south-east (Port of Harcourt) through Kafanchan to north-east (Maiduguru) and southwest (Port of Lagos) through Kaduna to north-east (Nguru) (see Figure 5-11).

Figure 5-11: Rail network in Nigeria



Source: Federal Ministry of Transport, Nigeria

There is no doubt that almost all freight volumes are moved by road in Nigeria. Rail freight traffic has collapsed from 3 million tons to 15,000 tons between 1960 and 2005 also due to the low performance and poor infrastructure especially bridges.

The inland waterways in Nigeria, the second largest in Africa, comprise approx. 8,600 km, of which some 850 km are located along the coastline and is in some sections navigable. The inland waterways pass through 20 of 36 States of the country. Despite the high potentials for inland waterway transports, it is still underdeveloped. However, the Niger Government hopes to revise these barriers by dredging the lower Niger River from Warri to Baro in Niger state.

5.4.3 Current state of multimodal freight transport

In August 2013, the Nigeria Railway Corporation (NRC) started to provide three dedicated intermodal container trains per week along the 1,000 km rail corridor Lagos – Kaduna – Kano. The intermodal trains departure from Lagos and ends at the rail-served Inland Container Nigeria Ltd. depots in Kaduna and Kano. The NRC has therefore purchased four new locomotives in order to provide intermodal services and to meet the needs of the market. According to NRC, the trial intermodal train comprises of 20x 40’ flatbed wagons, ensuring at the first stage a train capacity of 40 TEU. The survey was not able to identify if NRC is aiming to increase the train capacity.

The Nigerian Railways owns in total some 170 locomotives, thereof 54 are only for shunting purposes and most of them are in poor condition. More than 70 per cent were not operational in year 2009. However, NRC is investing and rehabilitating its current fleet in order to meet the current market demand. In Nigeria there are two main inland container facilities located along the diagonal railroad corridor in Kaduna and Kano. Both are operated by Inland Containers Nigerian Limited.

5.4.4 Development rail infrastructure and multimodal freight transport

The Nigerian government has taken various actions or plans to implement measures that could contribute to developing regular and competitive multimodal services by rail and, eventually, by inland waterways. The following key rail infrastructure programmes have been identified:

- Nigeria's ambitious plan is to convert the narrow gauge rail lines from 1,067 to 1,435 mm standard rail gauge system as planned to the West African region;
- Rehabilitation and construction of new railway section line linking Nigeria with Niger, Burkina Faso, Coté d'voire as well as Benin and Togo;
- Nigerian Government contracted China Civil Engineering Construction Corporation for constructing a new -double tracked - standard gauge rail line from Lagos to Kano and freight trains will be able to travel more than 80 km/h;
- African Development Bank approved a loan to the Nigerian Government to support and finance the transport sector and economic Governance Reform Program, especially the Nigerian Country Strategy Paper (CSP) for 2013 - 2017;
- Construction of a double track rail line between Lagos – Abadan. Project is expected to be complete by 2015.

In order to step forward and to realize the strategic transport vision driven by the Ministry of Transport, the NRC procured some 25 new locomotives, whereas 4 new locomotives are expected end of 2013 and are estimated to be deployed for MFT services. All trains are diesel-powered. Further, NRC procured 200 container wagons expected to be delivered by December 2013 and early 2014. The Federal Government also approved to establish inland container depots in six domestic zones under a PPP arrangement. This will significantly facilitate the intermodal container hinterland transports as they will be linked to the national rail network.

Figure 5-12: Nigeria's proposed inland dry ports

Location	State	Handling capacity (TEU)
Isiala – Ngwa	Abia	50,000
Ibadan	Oyo	50,000
Kano	Kano	20,000
Haipang	Plateau	20,000
Funtua	Katsina	10,000
Maiduguri	Borno	10,000

Source: Infrastructure Concession Regulatory Commission of Nigeria, http://www.icrc.gov.ng/

5.5 SENEGAL

5.5.1 Current state and evolution of container seaports

The only port in Senegal is in **Dakar**, which is well positioned as a transhipment gateway for West Africa. The port is set at a crossroad of major trade lanes, especially to the landlocked countries such as Mali. The port, which is operated by DP World, is capable of handling 335,000 TEU. In addition, Grimaldi handles marginal container traffic volumes.

The port of Dakar has lately fallen far short of its potential as it handled more than 400,000 compared to its initial handling capacity of 335,000 TEU per annum. The terminal operator aims to expand the container capacity from 300,000 to 550,000 TEU, with potential expansion of more than 1 million TEU depending on market demand. The port is directly linked to the national rail network ensuring direct intermodal container trains with railheads to Bamako in Mali.

In 2012, the port of Dakar recorded a slight decline of 3.3 per cent from 415,592 to 401,803 TEU (see Figure 5-13). This can be explained due to the deteriorated rail infrastructure in Senegal, since carriers decided to reroute Mali's cargoes through neighbouring countries, for instance port of Abidjan.

Figure 5-13: Container throughput of Dakar Container Terminal

Port	Seaborne container throughput (TEU)		
	2010	2011	2012
Dakar	349,231	415,592	401,803

Source: Dakar Port Authority, http://www.portdakar.sn/

5.5.2 Current state of rail infrastructure and rail freight transport

The railroad network in Senegal comprises of the main rail corridor between port of Dakar and railway station in Bamako in Mali. The approx. 1,240 km transnational railroad corridor of meter-gauge system is the main entry gateway to Mali as it provides short distance and better transit time compared to road.

However, the Dakar – Bamako rail corridor is currently in a deteriorated condition due to the lack of railway infrastructure investments, although minor investments has been implemented along the railroad corridor after the operations were privatized in 2003.

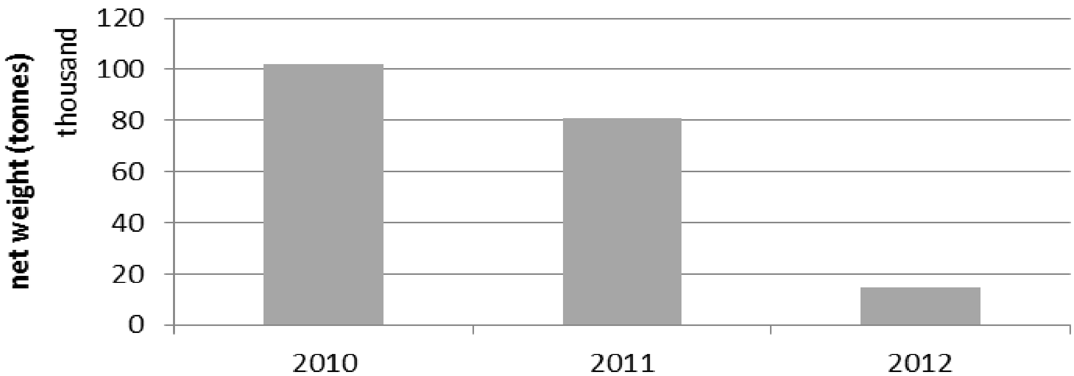
Since 2010, cross-border intermodal container transports from Dakar to Bamako in Mali are poorly performing due to the deteriorated railroad infrastructure situation and the derailment of trains as well as the limited axle-load of 15 tonnes. Many of the broken rail sections are being currently repaired and are expected for completion by 2014. Figure 5-14 illustrates an example of the current rail infrastructure situation.

Figure 5-14: Derailment of container trains in Senegal

Source: Ministry of Infrastructure and Transports, Senegal Railways

Transrail, a private concessionaire, is the only railway operator in Senegal and operates the national network as well as the transnational line with Mali, the Dakar – Bamako railroad corridor. Concerning domestic railway transportation, freight traffic has continuously declined since 2010, accounting 81,048 and 15,020 tonnes in 2011 and 2012, respectively. This implies a reduction of 81.5 per cent in 2012 (see Figure 5-15). Domestic rail freight transports refers predominately to commodities such as mineral, iron ore, and phosphate. These volumes originate from plants located in the hinterland and are destined to the port of Dakar for export.

Figure 5-15: National freight traffic between plants to port of Dakar by rail

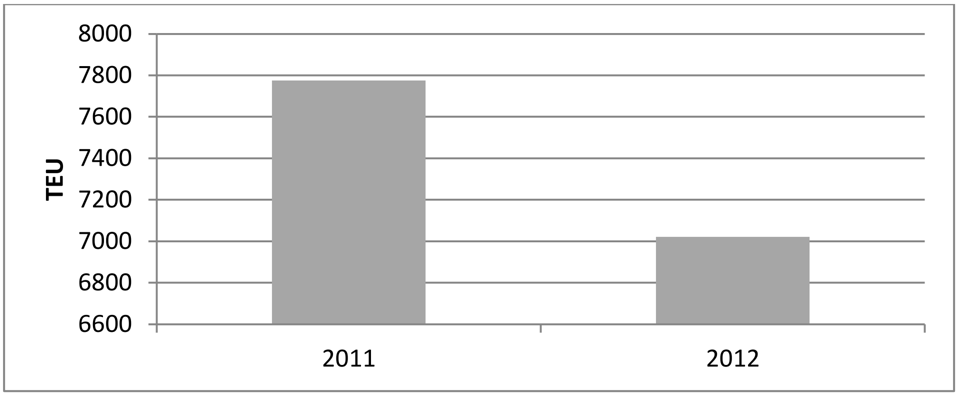


Source: Dakar Autonomous Port (PAD)

5.5.3 Current state of multimodal freight transport

Transrail provides nonstop dedicated intermodal container trains from Dakar to Bamako in Mali. Currently, direct intermodal services along the railroad corridor has been put out of service due to deteriorated railway infrastructure along several rail sections. It has been reported that intermodal trains are running along a very limited number of rail sections. Intermodal container hinterland transports to the entire West Africa landlocked county Mali has notably declined by minus 9.7 per cent in 2012 (see Figure 5-16). This can be explained due to the deteriorated railway infrastructure, poor quality services, and empty roundtrips of the container rail wagons back from Mali to Dakar.

Figure 5-16: International intermodal traffic between Dakar and Mali



Source: Dakar Autonomous Port (PAD)

Intermodal trains originate at the dedicated container terminal at the port of Dakar. The rail wagons are capable of handling 20’ and 40’ container. The typical length of intermodal train consists of 25x 40ft. container rail wagons, which is equivalent to a length of some 350 meter and can carry up to 50 TEU.

Figure 5-17: Major intermodal container railroad corridors in West Africa

Source: KombiConsult

The trucking industry in Senegal is dominated by large number of small operators, who owns and operates an obsolete trucking fleet. This has resulted of Mali's trucking industry to compete and takeover of the import trucking, accounting almost 90 per cent of the Mali's freight import traffic (B. Hamilton, 2010). Although, the intermodal transports used to play an important role between Senegal and Mali, however, due to the lack of investments in railway infrastructure, rehabilitation of tracks and replacing the old rolling stock, have greatly deteriorated the railway infrastructure and diminished any means of intermodal transport. Thus, intermodal transport requires investments from both countries. However, Mali is reluctant to invest in intermodal transports, because of the strong lobbying from Malian hauliers and the dependency of this sector to Mali's economy.

Currently, international intermodal container transport to Mali is far from providing a reliable and sustainable service. Thus, the road sector is predominating along the Dakar – Bamako corridor. The major commodities being transported by road along the corridor are rice and cotton. In 2008, Senegal imported some 750,000 tonnes of rice and eighty per cent were transported along the corridor, whereas one per cent of the total amount (almost 7,500 tonnes) were delivered by road to Mali, however as bulk and break-bulk (B. Hamilton, 2010). In many cases, shippers and customers use almost truck mode as they can overload the trucks (see Figure 5-18) and save costs per tonne. In this regards and due to the lack of regulatory and administrative frameworks, intermodal transports is experiencing tough competition against road, especially due to the lack of governmental incentives for intermodal transports.

Figure 5-18: Overloaded truck in West Africa

Source: left: (O. Omoluabi, 2013), right: (M. Pinard, 2010)

The only railroad cross-border and entry gate to Mali is via at village Kidira, where rail-siding is located. Both railroad network of Senegal and Mali are of narrow gauge system (1067 mm). Due to the bilateral agreements such as the TIF agreement between Senegal and Mali, intermodal container trains as well as conventional trains, do not stop at border and, thus continue their journey to the final-destination at Bamako. The loading/ unloading process takes place at the Bamako railway station.

5.5.4 Development of rail infrastructure and multimodal freight transport

Improving the railroad network connectivity must be considered at the regional level in West Africa and not only bilateral between Senegal and Mali, since new railway projects are in progress within several countries in West Africa such.

5.6 *Uganda*

As a landlocked country, Uganda has no immediate access to container seaports. The geographically closest ports for processing external trade flows with overseas countries are located in Kenya and Tanzania. Currently, the most convenient seaport for processing external trade is via the Mombasa port in Kenia due to the shortest transport distance and possible MFT services being provided by the state-owned joint venture railway company between Uganda and Kenia, known as Rift Valley Railways (RVR). However, MFT services are still limited between both countries due to the limited rail infrastructure conditions. Owing to the limited rail infrastructure in Uganda as well as in Kenya, cargo is almost carried by road for domestic and international trade.

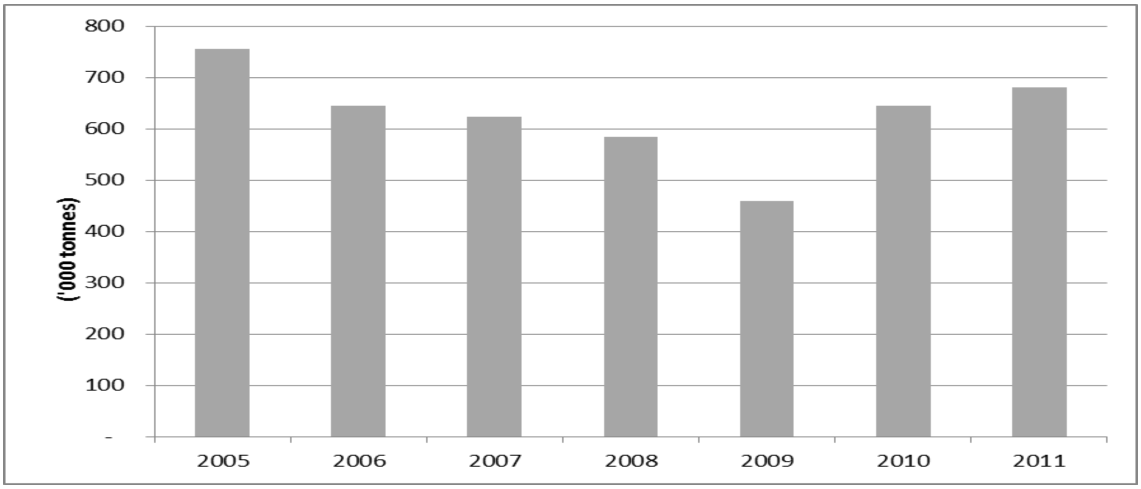
5.6.1 Current state of railway infrastructure and rail freight transport

Uganda's railroad network composes of two major routes. The first stretches for some 500 km, connect the cross-border point at Malaba with Pakwach at northwest near Albert Lake. The second route stretches for some 580 km, connects Malaba with Kasese via Kampala, the capital city (see

Figure 5-20). All rail lines are not electrified and single tracked. Unfortunately, due to inadequate investment in rail infrastructure and equipment for more than a decade, the railroad infrastructure condition in Uganda as well as in Kenya is in a deteriorated condition and need of rehabilitation. This has resulted to the extend that freight traffic has roughly fallen as shippers and logistics service providers chose to transport by road rather than rail. The majority of the current lines are not operational. From the total 1,266 km rail lines, only 337 km are operational, mainly the Malaba – Kampala route, which is in fair condition. Worse sections such as Kampala –Kasese line have been put out of operation.

Nevertheless, the rail freight traffic volume is experienced a significant growth since 2009, recording a growth of 40.2 and 5.5 per cent in 2010 and 2011, respectively. The main commodities being carried by railway are cement, fuel oil, and petrochemicals. Figure 5-19 presents an overview of the evolution of the total rail traffic volume between 2005 and 2011.

Figure 5-19: Evolution of total freight traffic volume in Uganda



Source: East African Community, statistical portal

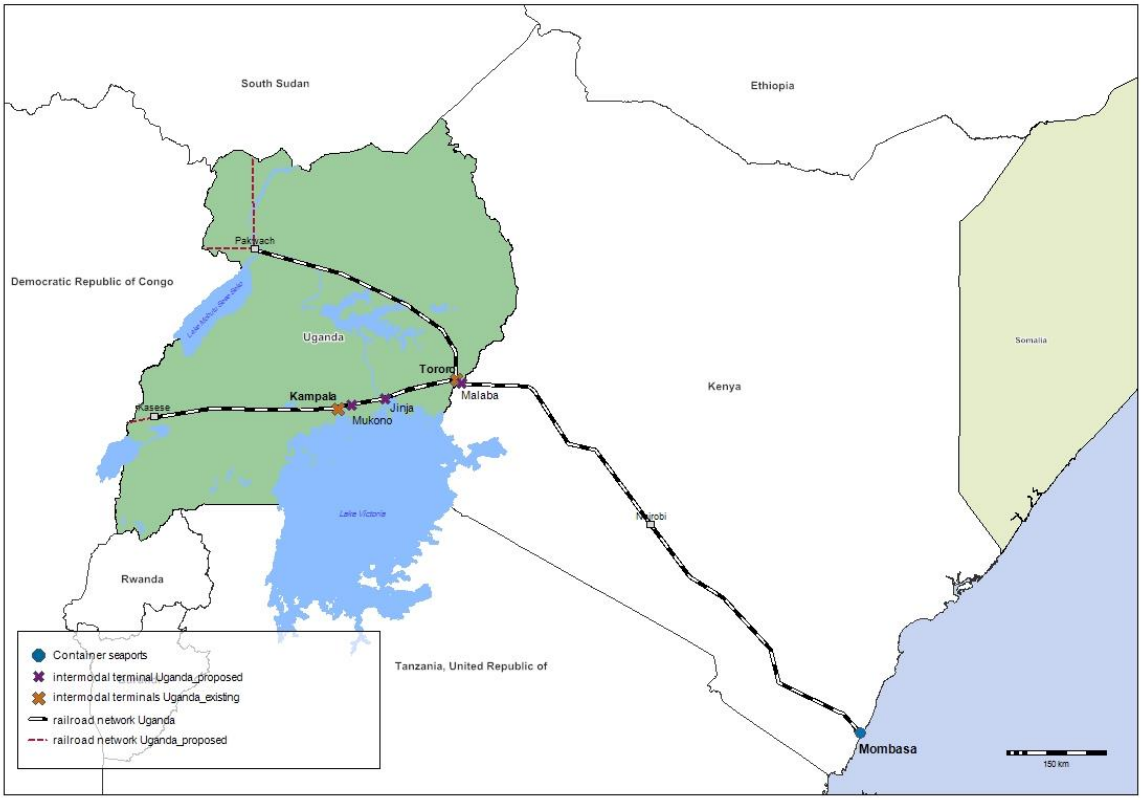
Uganda expects to increase its general freight traffic significantly by 2017 due to the new oil discovery in 2006 in Albertine region in the west of the country. The production of oil will be most probably for local use as well as for export. In this regard, RVR is expected to carry the freight volumes when it comes to stream and to utilize the northern railroad route with oil as a major commodity. Due to these developments, RVR already started to invest and maintained several rail sections along this rail section as well as procured accordingly rail wagons.

5.6.2 Current state of multimodal freight transport

Besides the general railway traffic, Uganda employs MFT services through its Rift Valley Railway (RVR), the concessionaire running the Kenya and Uganda railways, which is the only intermodal operator in Uganda. The agreement of both governments enables RVR to operate and maintain the railroad network, however, the infrastructure and facilities are still owned by the governments.

The Malaba – Kampala railway corridor is currently the main MFT corridor in Uganda. The MFT corridor originates in the port of Mombasa in Kenya, runs via Nairobi, Nakaru, Eldoret, Malaba, Tororo, Jinja and ends in Kampala (see Figure 5-20). The railroad network in both countries is currently meter gauge, hence saving any change of bogies at cross-border. However, intermodal container trains stops often at railway station and shunting yards, resulting in an uncompetitive transit time as well increase of costs.

Figure 5-20: Uganda's intermodal rail corridor



Source: KombiConsult

Currently, there are no dedicated container block trains between Mombasa and Kampala; hence container trains have to first run to Nairobi, where containers are transhipped on next train with railhead to Kampala but with further stops during the trip. RVR provides terminal-terminal as well doo-door transport services through its logistics arm. RVR provides free access to logistics services providers as well as to shipping lines to use its services. Based to RVR, the main customers with total volumes moved are categorized as follow: logistics service providers (42%), cargo owners (39%), and shipping lines (19%).

It should be noted that some shipping lines aiming to transport its containers via Mombasa to Kampala prefer to truck directly to Kampala rather than using intermodal services due to competitive prices as well as transport time. The main intermodal terminal in Uganda is located in Kampala, the capital city. The terminal is equipped with reach stackers for handling container and several rail tracks; however the length of the rail tracks are estimated to have a maximum length of 200 meters.

Figure 5-21: Kampala Intermodal Terminal

Source: Google Earth

RVR deploys two TEU container rail wagons for loading and unloading of 20' and 40' containers. Currently, RVR is rehabilitating the existing locomotives and container rail wagons as well. In addition, RVR seeks to further increase its rolling stock fleet and replace some old container rail wagons. RVR was able to refurbish 110 existing container rail wagons, resulting in a current fleet of some 750 unit in total. Furthermore, RVR aims to purchase further rail wagons to increase its fleet to a total number off some 1050 unit by 2014 (RVR, 2013).

5.6.3 Development of rail infrastructure and multimodal freight transport

Uganda has ambitious plans and on-going railway projects, aiming at rehabilitating, expanding, and linking its national railroad network with adjacent countries. The clear focus of all investments focuses on freight transport, particularly freight railway. The following key MFT infrastructure programs have been identified:

- Uganda aims in cooperation with East African governments to implement standard gauge railway line, which consist of the construction of a new Kampala and Malaba railroad corridor. The project has been agreed and final design report is expected at the end of 2013.
- Construction of new rail section line between Malaba – Gulu - Pakwach. This line is estimated to increase in rail freight traffic with a majority of petrochemical and oil fuel commodities due to the new industry site in the region which is expected to run by 2017.
- Construction of the missing Gulu – Atiak – Nimule railway line, aiming to link its national railway network in the north with south Sudan and ensure intermodal transports to port of Mombasa. This project is part of the East African Community, which is anticipated to reduce transport costs and transit time and hence contribute the economic development of the east African region. However, should any railway intermodal transports take place, there will be a break of gauge problem, since Sudanese railways have narrow gauge (1067mm).

5.7 SUMMARY ON OIC AFRICAN GROUP

As to the OIC African Group countries, the study investigated the current state and the future developments of MFT as well as the container throughput of seaports and their developments in different countries, namely Burkina Faso, Ivory Coast, Niger, Nigeria, Senegal, and Uganda. Three of the examined member countries – Niger, Burkina Faso, and Uganda– are landlocked countries and have only access to seaports through adjacent neighbouring countries. The same landlocked issue is reflected to the member countries Mali and Chad.

In contrast, other member countries take advantages of the import/export of the landlocked countries, especially for those container seaports that provide for rail access and are linked to the landlocked countries by intermodal services (see also below Figure 5-22 and Figure 5-23). According to the available information, the Lagos port in Nigeria is the leading port in terms of container throughput compared to all other OIC African Group member countries, followed by Abidjan, and Dakar (see Figure 5-22). The port of Lagos reported a nearly full utilization and is currently under optimization and expansion to catch up further container volumes. The port generally benefits from two main factors: (1) from the booming economy of their own home country and (2) from the transit transports to the landlocked country Niger due to its strategic geographical location. Too, the Nigerian government is constructing the new container seaport of Badagry, located some 55 km from Lagos and capable of handling 1.5 million TEU, and aims to bring it in operation in 2016.

Considerably smaller, with a throughput of approx. 640,000 TEU in 2012, but of increasing importance is the port of Abidjan in Ivory Coast as its provides for railroad access and is linked to the landlocked Burkina Faso via the Abidjan - Ouagadougou railroad corridor. However, the survey has identified a current majority of bulk rail freight transports along the corridor. Nevertheless, the port is being enlarged and will be capable of handling some 1.3 million TEU early 2016, hence competing with the Lagos port in Nigeria. According to the port of Dakar in Senegal, the port is the third largest container seaport within the OIC African Group countries, recording approx. 400,000 TEU in 2012. The port, however, faced a slight decline in container traffic volume in 2012, due to the increase of deteriorated infrastructure railroad condition along the Dakar – Bamako railroad corridor which forced the consignee and consignor in Mali to use other ports for trading.

The survey, too, has identified a regular supply of intermodal rail/road services in eight out of seventeen member countries (see Figure 5-23). However, intermodal containers likely are carried out sporadically and also in a very small volumes. For all African Group member countries, with an exception to Senegal, statistical data on intermodal transport volume were not available. Nevertheless, based on the findings of the survey, it is obvious that Senegal/Mali and Ivory Coast/Burkina Faso are the leading countries within the group. The intermodal traffic volume between Senegal and Mali, which is carried out by the private owned company Transrail, amounted some 7,800 and 7,000 TEU in 2011 and 2012, respectively. Further statistical data such as for Ivory Coast and Burkina Faso were published only in tonnes with majority of bulk volumes.

Figure 5-22: Container throughput of Africa Group's main container ports

Port	Country	Seaborne container throughput (TEU)		
		2010	2011	2012
Lagos	Nigeria	1,128,171	1,413,276	1,500,000 *)
Abidjan	Ivory Coast	561,535	546,417	633,917
Dakar	Senegal	349,231	415,592	401,803
Lomé	Togo	340,000	350,000	350,000 *)
Cotonou	Benin	316,700	334,800	348,200
Douala	Cameroon	290,000	340,000	340,000 *)
San Pedro	Ivory Coast	77,730	118,071	246,187
Libreville	Gabon	153,700	162,415	169,000
Freetown	Sierre Leone	50,000	75,000	75,000 *)

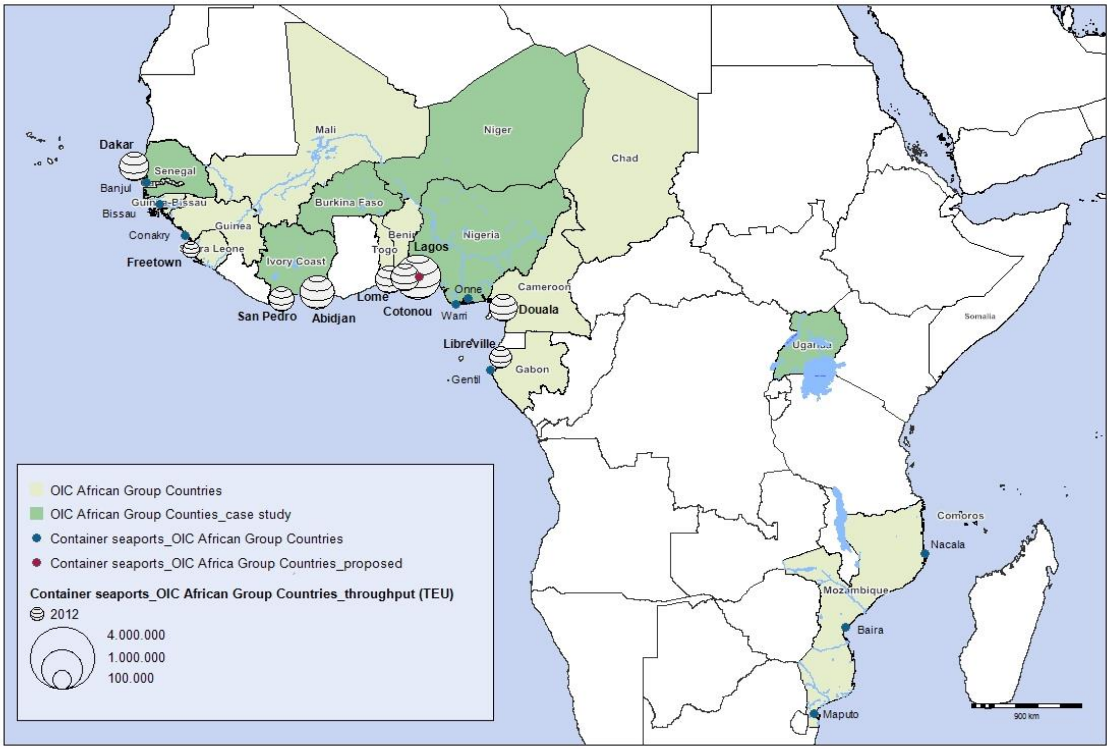
** KombiConsult estimations*

Source: KombiConsult

The intermodal industry in Senegal, Mali, Ivory Coast, Burkina Faso, Nigeria and also Uganda overwhelmingly is based on container hinterland services. Niger is the only country with no rail access. According to the information provided by national railways, most of the container ports displayed in Figure 5-23 are likely to be served by intermodal trains on a more or less schedule basis.

In general, the intermodal container transport services likely are being provided for cross bordering purposes, especially to the landlocked countries (see Figure 5-24). Senegal provides for only cross-border intermodal container hinterland services to Bamako in Mali. However, due to the deteriorated rail condition along the Dakar –Bamako corridor, direct dedicated intermodal trains has put out of order or even intermodal trains are running between limited number of rail sections, resulting with discontinues intermodal supply process and high costs to final destination in Bamako in Mali. Too, Ivory Coast provides for the majority of cross-border intermodal hinterland services to Burkina Faso. On the other hand, Uganda imports and exports its goods via the main artery corridor Mombasa - Kampala via Kenya. Yet, the corridor is likely used for conventional and bulk commodities. Recently, Nigeria, flagged-off a new intermodal container hinterland trains from the Port of Lagos to Kaduna and Kano, located in the hinterland. The Nigerian Railways will provide three dedicated intermodal trains per week along the railroad lane. In contrast, the survey could not identify any continental intermodal traffic within the OIC African Group countries.

Figure 5-23: Asia Group countries and container ports

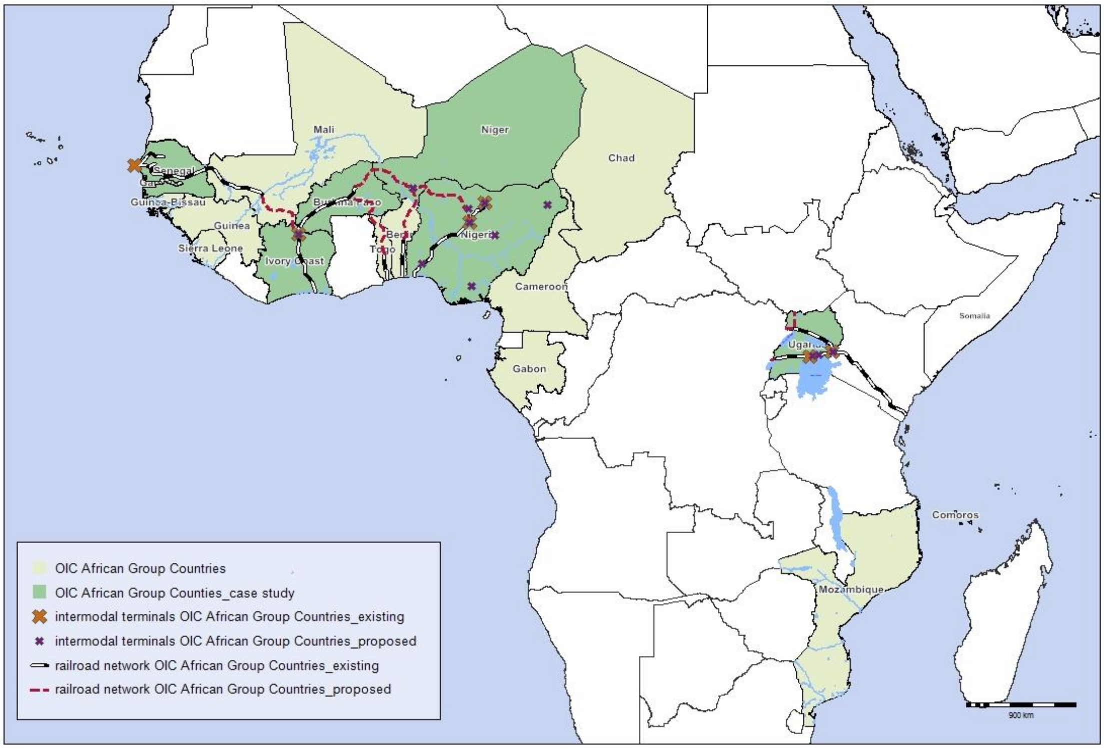


Source: KombiConsult

Same as of the Arab and Asian Group countries, the majority of the OIC African Group countries aims to increase the level of intermodal activities. Thus, ambitious plans have been recently introduced for enlargement, upgrading, and construction of new missing rail links to further strengthen the freight market rail industry. Local authorities and private sector have recognized the pivotal function of MFT for promoting external trade, decongest seaports and road infrastructure, and raise attractiveness of the country as a whole as well as the increase of PPPs and foreign investments into the manufacturing industries and distribution centres. Here an approach of the scheduled and action being taken by the OIC African Group Countries (see Figure 5-24):

- Construction of new rail links and enlargement of existing rail infrastructure;
- Upgrading and modernization of deteriorated rail and intermodal terminal infrastructure
- Construction of cross-border rail links, which once finished would enable to implement international long-distance intermodal services, for example, between Europe and China or India;
- Set-up of new intermodal terminals and inland container depots;
- Procurement of modern locomotives and intermodal wagons.

Figure 5-24: Existing and future rail network and intermodal terminals of Asia Group countries



Source: KombiConsult

6 CONCLUSIONS AND RECOMMENDATIONS

The OIC currently has 57 Member States, of which 39 or almost 70 per cent provide for at least a single rail line. Most of these countries actually operate extensive rail networks of some thousand kilometres, peaking in countries like Iran or Kazakhstan that manage 10,000 km or more of tracks. The survey clearly has recognized 20 out of 57 OIC Member States, in which intermodal rail/road transport services have been implemented. This is 35 per cent of the entire membership. For some other countries no evidence could be gathered in spite of thorough investigations if multimodal services are being supplied. However, conventional rail freight services are regularly performed at least in 38 out of 39 countries providing for rail lines.

The present study covers 23 OIC Member States. Out of these 23 OIC Member States, only 15 provide for regular intermodal services and another eight countries have not yet established an intermodal business but, in most cases, are on the threshold to push and open the doors to this rail freight market segment.

This chapter, first of all, presents the key barriers for implementing intermodal services. This part is based on the results of the analysis and assessment of the current state and the anticipated development of the intermodal business in the individual OIC Member Countries.
Secondly, we shall highlight good practice examples from various OIC Member States displaying how to overcome the implementation barriers. In addition, the report concludes suggestions on how OIC Member States can enhance their involvement in multimodal transport based on the findings of this survey and the results of the first stage of the study in respect of key success factors for intermodal services.

6.1 MAIN BARRIERS FOR IMPLEMENTATION OF MFT SERVICES

This section summarizes the findings of the main challenges and impediments for first implementing a multimodal business or extending the scope and magnitude of existing service offerings in the OIC Member States. It relates to barriers, which, first of all, are common in several countries and of general importance. The barriers, secondly, must be of high relevance and critical for designing, setting up and operating viable intermodal services. This analysis therefore will not take into account specific factors that impede the evolution of multimodal transport in a single country or factors of minor importance. The individual barriers have been clustered by five relevant topics.

6.1.1 Transport policy and regulatory framework

- Over many years, many OIC Member States have not recognized the crucial role of an effective transport system for improving the economic situation of the country and enhancing its external trade. If the importance of freight transport had been acknowledged at all, transport policies have set their priorities on road haulage. As a consequence, public budgets (financial resources) were primarily allocated to road infrastructure investments. The rail networks if provided, in contrast to that, were neglected leading to an increasing deterioration of the state of tracks and rail-side installations and preventing railway companies from offering competitive rail freight and intermodal services (see also under (2));

- The priorities of national transport policies, in some countries, are also reflected in fuel subsidies for the operators of commercial road vehicles. This instrument distorts the terms of competition to the detriment of rail freight;
- As governments did not realize the pivotal role of the employment of freight containers and the set-up of efficient hinterland transport systems for reducing transport costs, accelerating the flow of export and import commodities and thus contributing to the integration of a country's economy into global supply chains they failed to establish an appropriate regulatory framework for facilitating and/or supporting the development and extension of container-based intermodal services.

6.1.2 Infrastructure

- Existing layouts of container seaports often are not designed for allowing efficient operations of container trains. There are ports, which lack of a "last mile" of rail tracks. The missing rail link requires to moving the containers by truck to a rail/road transhipment facility off the port before they could be shipped to a hinterland location. Double handlings and extra cost for road haulage are due to threatening the competitiveness of a multimodal transport. In the case of on-dock rail tracks, the sea-to-shore operations usually have priority over the handling of intermodal trains. This might lead to train delays or inefficient operations owing to a mutual interference of both tasks. In the best case of near-dock terminals, the handling tracks often are too short to accommodate a full train. The shunting of wagon groups to merge or split the train is prone to irregularities and incurs additional costs;
- The rail network in many countries has been neglected for years owing to a lack of financial resources and/or commercial interests and therefore is in poor condition. Also, the infrastructure has not been maintained properly. Repairs of damaged installations were postponed and the upgrade and modernization of rail lines were omitted. This impacts severely the quality and cost of rail freight services. For example, the speed of trains will be limited on many sections along the rail network; axle loads and maximum train weights will be reduced; permitted train length will be restricted; increase of frequent derailments and blocking tracks will generate consequential delays and costs. As a result, railways are subject to a vicious circle. Hence, the poor service quality declines the demand for rail freight transport. The revenues drop and constraints the investments into the network even more. The state of the infrastructure gets worse and transport volumes will continue to decrease. If this happens, the freight containers will be carried by road although, as various studies show, the transport costs usually are higher than a movement by rail;
- Container hinterland transports both in import and export typically are much more time-critical as the movement of bulk cargoes. This particularly applies to domestic trade lanes. As intermodal services are in tough competition with road in every country, it is paramount that the intermodal rail journey can offer road-competitive transit times. If the rail network is either badly maintained or saturated owing to mixed operations giving priority to passenger transport, intermodal services may fail

to match the service level of road haulage;

- Inland intermodal terminals: as a rule, the handling tracks are too short to accommodate a full train requiring for costly and time-consuming shunting operations. Moreover, the length of the handling tracks often varies within one facility and, even more, between different intermodal terminals. Owing to this lack of harmonization, the railways cannot deploy efficient standardized shuttle trains. Finally, as tracks and ground are not well maintained, they hamper terminal operations particularly in countries with demanding climates (heat, heavy rains etc.);
- More generally, countries with a larger territory are lacking of dedicated intermodal terminals in the centres of economic activities and population, which could provide efficient handling, container storage and customs clearance services.

6.1.3 Equipment technology

- Except for a few advanced countries, the railways as a rule cannot rely on efficient and state-of-the-art locomotives and intermodal wagons. In contrast they typically must deploy ageing, often poorly maintained equipment. The impacts on their service level and competitiveness are equally severe: speed restrictions producing lengthy transit times; frequent break-downs of locomotives block single-track lines for hours or days until trains can be recovered; technical failures of wagons reduce transport capacity and, eventually, fall short of demand;
- The older the equipment and the poorer the state of maintenance, the lower the operational performance. This results in an increase of unit cost and may intensify the vicious circle displayed above;
- Poor conditions of the rail network also impact the type of wagons that can be deployed. For example, railways may not be able to use articulated 6-axle 80’ container flatcars owing to restrictions of track beds, axle weights or curves.

6.1.4 Market situation and MFT operational systems

- In many OIC Member States railways are confronted with comparatively short transport distances between the seaports and the main origins and destinations of marine containers. In order to ensure lower costs per container carried than those of road hauliers, it requires for extraordinarily effective operational systems such as shuttle trains, very reliable services and high transport capacities. These conditions are not easily to be produced;
- In many countries in addition to short distances between the container ports and the main origin/destination for container flows, the providers of intermodal services also are faced with the challenge that the economic centres have a large territory. It makes difficult to determine the right consolidation centres for operating efficient intermodal trains and ensure competitive costs for drayage services.

6.1.5 Situation of cross-border MFT

- International intermodal services are often confronted with a break of gauge at the border between two countries. Even if break-of-gauge stations are established, these operations generate additional costs compared to road haulage, which does not require for the trans-loading of containers or the change of axles;
- The implementation and the competitiveness of cross-border intermodal services suffer from a lack of bilateral or multilateral agreements between the governments of countries affected by a freight corridor, which would facilitate the co-operation between railways, customs and security authorities and thus reduce frictional losses.

6.2 GOOD PRACTICE IN AND LESSONS LEARNT FROM MFT SERVICES

Even if this survey has identified a variety of severe barriers for implementing intermodal services in a representative sample of OIC Member States, at the same time, it has also revealed that many OIC countries have already developed very effective measures designed to establish an intermodal industry as well as operate and/or stimulate efficient and competitive multimodal transport services. This section provides an overview of this good practice and highlights the lessons learnt from existing intermodal services. The findings generally are assigned to the same clusters as used in section 6.1.

6.2.1 Transport policy and regulatory framework

(1) In most of the countries covered by this study, the governments have set up comprehensive schemes for improving and extending their transport infrastructure, especially the rail network. Notably, the public sector has recognized the importance of such programmes which aims to put a particular emphasis to the development of an appropriate infrastructure for setting up or extending intermodal services by rail and, in a few cases, also by inland waterways. These initiatives provide evidence that authorities have recognized the key role of multimodal transport for enhancing the domestic economy and promoting external trade by cutting transport costs, reducing transit times, and increasing the reliability of service. Further, intermodal container hinterland transport can effectively contribute to relieve congested roads at or near seaports and enhance the attractiveness of the country for investments into industries.

(2) Other countries go even further in their quest for stimulating multimodal transport. Turkey, for example, is developing a regulatory framework and implementing a transport policy comprising of a set of various actions. Among them are measures, which we consider as particularly effective for supporting the development of competitive intermodal services:

- The Ministry of Transport, Maritime Affairs and Communications has created a department dedicated to intermodal transport topics;
- It is intended to establish a specific regulatory framework for combined transport,

which likely will refer to the legislation of the European Union;

- Financial aids for starting up new intermodal services;
- Turkey has separated the management of rail infrastructure from operations enabling competition for rail freight services also in intermodal transport;
- A permanent platform involving stakeholders from the public and private sector can ensure that problems or hurdles threatening the implementation of intermodal services are addressed and solutions prepared.

(3) Where the rail infrastructure is not fully in the responsibility of the private sector such as in North America but owned by the state like in European countries, the set-up of sort of public-private partnerships (PPP) have fostered the intermodal industry. The private sector, as a rule, is able to manage intermodal services more efficiently and, thus, ensures a road-competitive performance. The PPPs relate to two main areas. First, the construction of intermodal terminals is completely or partly financed by the public sector, but the management is leased to private operators. Second, the overwhelming majority of intermodal services by rail are offered by private companies while train operating services still remain with state-owned railways to the largest extent.

The situation of rail infrastructure in the OIC countries is comparable with Europe. It is owned by the public sector. As concerns the first area of public-private partnerships, we have identified initiatives or plans in many OIC Member States, among them Iran, Jordan, Indonesia, Malaysia, Nigeria, Senegal, Turkey or the United Arab Emirates. The second area certainly may be considered more critical in view of state authorities as they are keen to ensure that important industries are served in a non-discriminatory way. Yet, in the intermodal business we have recognized good practice in some OIC countries permitting the management of intermodal services by private service providers, for example, in Azerbaijan, Kazakhstan, Turkey or Uganda.

(4) Jordan seeks to enforce a similar PPP model for rail freight transport in general. Whilst a state-owned company shall finance, build and manage the planned new rail lines, a private company shall be selected during a tendering process that is to render operations afterwards.

6.2.2 Rail infrastructure and rolling stock

(1) Many OIC Member States are heavily investing into their rail infrastructure and rolling material. Depending on the current state in the respective country, the investment programmes comprise of the following measures:

- A main concern in many countries, especially in Africa and Asia, is the rehabilitation and modernization of poor maintained rail lines including signalling systems or operation control centres;
- Construction of rail access to container ports;
- Building of new intermodal terminals;
- Creation or improvement of cross-border rail links, e.g. in Afghanistan, Djibouti or Jordan;
- Rehabilitation of existing locomotives and wagons and procurement of new material.

Once finished, those investments will particularly benefit the implementation of intermodal services and make them much more competitive with road hauliers. The example of the Rift Valley Railway operating in Kenya and Uganda clearly displays the positive impacts of an upgraded rail network plus the rehabilitation of rolling stock: faster transit times; reduction of failures and break-down of locomotives; less blocked rail lines, especially single track lines; more roundtrips per wagon and locomotive; more capacity, increased productivity of the entire service.

(2) The Gulf Council countries are building a completely new rail network featuring state-of-the-art rail technology including a high axle load and clearing. This will enable to operate double-stack container trains like on the existing freight line in Saudi Arabia. Double-stack container trains can reduce the cost per unit carried by 30 to 40 per cent.

(3) The standardization of the rail infrastructure and the applied rail technologies between adjacent countries, including particularly the track gauge, the axle load as well as the signalling, control and power systems, is fundamental for implementing efficient cross-border intermodal services. Good lessons in this respect can be obtained from the GCC countries as well as the West and North African countries. The interoperable rail systems accelerate border crossings and reduce the vulnerability for delays or a lack of co-ordination between co-operating railways.

6.2.3 Market situation and MFT operational systems

(1) All OIC Member States provide for dedicated intermodal systems. This shows that the railways have recognized that intermodal services can better compete with road hauliers in terms of cost and transit time if they avoid interfaces with wagonload traffic and thus reduce the vulnerability for irregularities.

(2) There is a thumb of rule that intermodal services are competitive with road only over long distances of about 500 km (Europe) or more than 1,000 km (North America). Some rail operating companies such as in Bangladesh, Indonesia, Malaysia or Nigeria show that container trains between ports and inland economic centres running over comparatively short distances can be economic if the service set-up and the performance match customer requirements.

(3) If there is a large market potential of regular goods traffic both in the container hinterland and the continental business, an efficient rail operation system and frequency of service can be key to catching a large market share for intermodal services. In this respect, the railways in Saudi Arabia and Bangladesh deliver best practice. Both serve a single trade lane by block trains shuttling between a container port and an inland container depot and offering a couple of daily journeys.

6.2.4 Cross-border MFT services

The scale of international intermodal services, for the time being, is fairly limited and concentrated in Asia Group countries. The following good examples have been recognized:

(1) The Malaysian railway KTMB in co-operation with the State Railway of Thailand is operating intermodal trains between both countries. Based on a Joint Traffic Agreement and the support of the customs authorities of both countries the cargo can be cleared at a nominated border station within three hours. Standard procedures do not make it necessary to control the goods physically.

(2) The harmonization of consignment notes is fundamental for ensuring a smooth cross-border service. The common CIM/SMGS consignment note was introduced in 2006 as an initiative to streamline the intermodal transports between Europe and China. CIM is used for OTIF members and SMGS for OSJD members.

(3) Several OIC Member States have concluded bilateral or multilateral agreements for promoting rail freight and specifically intermodal transport. A key component of those agreements is to develop new intermodal services, which are due to pioneering efficient international freight services on the corridors in question and make sure that the trade and the regional integration between the countries affected will be improved. There are various ongoing initiatives such as the TRACECA corridor, the ECO container train or the VIKING multimodal ferry/rail service.

(4) Whilst all other cross-border intermodal services are performed in co-operation of two, typically state-owned railways, the situation in Uganda is distinctive. The rail network of landlocked Uganda is linked with Kenya, and container trains are running from the port of Mombasa to Kampala. The situation is distinctive as the network in both countries is operated by a single railway. Therefore many interfaces otherwise due to cause frictions or irregularities can be avoided and also contribute to raise the productivity of rail operations.

6.3 RECOMMENDATIONS FOR IMPLEMENTING MFT SERVICES

The survey among 23 OIC Member States has delivered clear evidence on barriers, which threaten, hamper or slow down the implementation or the extension of intermodal rail/road services. Apart from physical impossibilities such as the lack of a rail network for freight, the key implementation barriers have been highlighted under section 6.1.

The investigation, on the other side, has recognized a wide range of actions and instruments that contribute to ensure effective and competitive services, or support and promote the set-up of an efficient intermodal business environment. Those good practices, which have been exemplified and described under section 6.2, show that, in spite of numerous implementations deficits and hurdles, many public and private actors have gathered knowledge and positive experience on how intermodal services can be performed effectively and economically.

However, it seems that their approach to multimodal freight is not sufficient. Two critical actions are missing. First of all, the OIC Member States lack of disseminating and exchanging good practice across countries and actors. This study may contribute to raise the awareness for this issue. Secondly, and this is of paramount importance, the intermodal stakeholders are not used or not familiar with applying the whole arsenal of suitable and effective solutions but only some discreet measures. This is due to prevent them from relishing the fruits of a full-blown intermodal system.

As this study - against the background of time and economic limits - has been designed to provide, first, a general overview on the concept and success factors of intermodal transport and, second, an analysis and evaluation of the current situation of intermodal services in a sample of OIC Member States, it cannot deliver specific programmes of improvement measures for every single country in addition to the suggestions given in the individual country reports. What this study, however, can provide is a catalogue of concrete actions, which the authors consider key to establish a competitive intermodal industry and implement efficient and sustainable intermodal rail/road services in OIC Member States. The actions are structured according to the same clusters of topics applied in the previous sections.

As concerns the area of **transport policy and regulatory framework** we recommend to focus on the following actions:

- [redacted] It is fundamental that the governments create equal or fair terms of competition for all modes of transport. This refers both to the legal and administrative framework, which should acknowledge the mode-specific infrastructure, operational and economic conditions as well as their benefits and to the financial resources provided by public funds as concerns infrastructure investments;
- [redacted] As multimodal services effectively concern at least two modes of transport the intermodal industry needs a dedicated regulatory framework taking into account the specific roles and conditions of the modes of transport involved and make sure that the multimodal door-to-door transport can be performed as if it were a single mode. Depending on the country-specific policy on goods transport the regulations could relate to licenses, tariffs, working times, transport documents or transport of hazardous goods;
- [redacted] States are used to provide and maintain public transport infrastructure by their own means. This refers to roads, rail lines or – if applicable – inland waterways. The same principle should be applied to intermodal transport. Therefore governments should finance the construction of intermodal terminals provided that they are not dedicated to a single, private enterprise but constitute public infrastructure and guarantee the free access of any eligible user;
- [redacted] With an aim to support the implementation of intermodal services, governments may consider to provide financial aid. Based on our experience from Europe, we strongly suggest focusing on investments for the building of terminals as explained under (3). This is of major importance as every user can take advantage of the provision of public infrastructure at the same scale as it reduces the handling and, consequently, the total transport costs. Too, the financing of terminals is a very sustainable incentive since the benefits will remain over the whole lifetime of the infrastructure. Operational subsidies for running trains, in contrast to that, typically will only benefit the train operator during the period of validity and thus may distort competition if another supplier of intermodal services can't take advantage of a similar aid. Moreover, direct financial aids tend to support inefficient operations, which are often stopped when the subsidy has terminated;

- Governments can clearly display if they give high priorities to logistics and the intermodal industry by creating a dedicated department in the Ministry for Transport.

As concerns the area of **infrastructure and rolling stock** we suggest to put the priority on the following actions:

- The intermodal rail transport of freight containers or other load units such as semi-trailers for continental cargo does require for a significantly higher service level than the movement of bulk commodities as concerns transit time and reliability. Only if the intermodal service matches customer requirements and the service quality of road hauliers intermodal service providers will get the opportunity to catch volumes. Therefore, they need a rail infrastructure, which ensures smooth and efficient operations. As the rail infrastructure in many OIC Member States has been neglected since years resulting in a poor state of maintenance and a non-competitive quality of service, it is key to rehabilitate the existing network and implement modern operational technologies;
- The same requirement applies to railways' rolling stock. Rehabilitated or new locomotives and intermodal wagons have a significantly higher performance than ageing, poorly maintained equipment. They are faster, more reliable and have a much higher rate of availability thus rising the number of effective roundtrip. Examples from OIC countries deliver evidence that the investment in state-of-the-art rolling stock pays. Unit transport costs decline and revenues will grow when customers recognize that they receive a reasonable and economic service;
- Today's intermodal container hinterland services often suffer from a poor rail access of container ports or of a lack of a "last mile" of rail tracks. In order to compete with road haulage it is fundamental to close those missing links and improve the tracks.
- Further it is strongly recommended to set up dedicated near-dock intermodal terminals thus avoiding the interference of the loading/unloading of containers on trains with ship-to-shore and internal handlings on the container terminal. The intermodal rail facility should provide for train-long tracks to avoid costly and time-consuming shunting operations;

- In order to ensure an efficient port-to-door container hinterland transport by rail it needs well-performing intermodal terminals at both ends. Therefore the OIV countries should put an emphasis on establishing modern handling facilities at inland locations as well. This calls for ensuring, if possible, a direct access of the terminal tom the main line, a good road access and handling equipment with a high rate of availability. With an aim to enable deploying standard train sets it is also suggested to harmonize the length of the handling tracks across all terminals;
- Where possible and economically feasible new rail lines should be built to accommodate double-stack container trains. For this purpose it needs a minimum axle load of about 30 to 32 tonnes and, in the best case, an upper loading gauge (clearance) for carrying two 9'6" high-cube containers. Only in those cases when an existing rail line has to be completely modernized it may be economic to upgrade the infrastructure correspondingly;

The survey has shown that intermodal service providers in OIC countries generally have recognized the benefit of dedicated intermodal systems. Since this seems to be state-of-the-art wherever the market and economic situation allows such operations we just suggest the following measures on the area of **intermodal services and operations:**

- The competitiveness of intermodal services often suffers from too many interfaces, which are leading to poor transit times, causing delays and incurring extra cost. Railways therefore should reduce interfaces such as shunting operations, exchange of wagons, interim stops for changing locos or loco drivers to the absolute minimum. This can be achieved by the deployment of well-maintained rolling stock, good planning and co-ordination of operations and the implementation of standard train sets;
- A competitive intermodal transport offer relies both on efficient rail and terminal services and reliable regional collection and distribution trucking services by road. Those who are responsible for developing intermodal transport services are called on to contract a fleet of experienced road hauliers at an early stage of the project or carry out training programs. Moreover the on-time pick-up or delivery of full containers and the quick return of empty containers to container depots also depend on the deployment of technically reliable trucks.

As concerns the area of **cross-border intermodal services** we recommend to focus on the following actions:

- If railways collaborate in cross-border intermodal services they should conclude agreements which enable to reduce the border stops to the minimum, most typically changing locomotives and engine drivers. But they should aim at carrying out safety and security checks at the inland terminals. Both European and North American railways have developed standard agreements, which permit to operate cross-border trains "under mutual confidence" and avoid regular border checks. If the national regulatory frameworks do not allow such a procedure, railways should request for a change of provisions and the conclusion of international agreements;
- The same proposal refers to customs checks. Customs authorities should be requested to transfer regular controls to inland destinations - there are many good practice in Asia, Europe and North America – and only carry out random checks at borders;
- International intermodal services are often confronted with a break of gauge at the border between two countries. At some borders it has been proved that the transfer of containers between trains is the technology, which seems to entail the least cost for bridging the break of gauge. Others technologies such as the change of axles or the transshipment of cargo are more costly or take much more time. Against this background it is suggested to investigate the comparative economics of the transport of bulk goods such as minerals in freight containers instead of conventional wagons.

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List of Abbreviations

ABD	Asian Development Bank
ACCHC	Alexandria Container & Cargo Handling Company
ACT	Aqaba Container Terminal
AICT	Alexandria International Container Terminals
ARC	Aqaba Railway Corporation
BR	Bangladesh Railway
CAP	Consortium Anwerp Port
CAREC	Central Asia Regional Economic Cooperation
CCECC	China Civil Engineering Construction Corporation
COMCEC	Committee for Economic and Commercial Cooperation
COMESA	Common Market for Eastern and Southern Africa
COTIF	Convention concerning the International Organization for international Carriage by Rail
CPA	Chittagong Port Authority
CT	Container Terminal
DCT	Doraleh Container Terminal
DCHC	Damietta Containers and Cargo Handling Company
ECO	Economic Cooperation Organization
ESCWA	Economic and Social Commission for West Asia
ESCAP	Economic and Social Commission for Asia and the Pacific
GCC	Cooperation Council for the Arab States of the Gulf
HPH	Hutchison Port Holdings
ICD	Inland Container Depot
JNRP	Jordan National Railway Project
JRC	Jordan Railway Corporation
KTMB	Keretapi Tanah Melayu Berhad
KTZ	Kazakhstan Temir Zholy
MFT	Multimodal Freight Transport
MoU	Memorandum of Understanding
NPO	Nigerian Port Authority
NRC	Nigeria Railway Corporation
OIC	Organisation for Islamic Cooperation
ONCF	Office National des Chemins de Fer (ONCF)
PPP	Public Private Partnership
PTKA	PT Kereta Apu
RVR	Rift Valley Railways
SASEC	South Asia Sub-regional Economic Cooperation
SCCT	Suez Canal Container Terminal
SETV	Societé d'exploitation du terminal de Vridi
SRO	Saudi Railways Organization
TAR	Trans-Asian Railway
TCDD	Turkish Railway Company
TEU	Twenty Foot Equivalent Units
TIF	Transit International Ferroviaire
TRACECA	Transport Corridor Europe-Caucasus-Asia
UAE	United Arab Emirates
WB	World Bank

Appendix 1: Classification of OIC Member States

OIC African Group	OIC Arab Group	OIC Asian Group
Benin	Algeria	Afghanistan
Burkina Faso	Bahrain	Albania
Cameroon	Comoros	Azerbaijan
Chad	Djibouti	Bangladesh
Cote d'Ivoire	Egypt	Brunei
Gabon	Iraq	Indonesia
Gambia	Jordan	Iran
Guinea	Kuwait	Kazakhstan
Guinea-Bissau	Lebanon	Kyrgyz Republic
Mali	Libya	Malaysia
Mozambique	Mauritania	Maldives
Niger	Morocco	Pakistan
Nigeria	Oman	Tajikistan
Senegal	Palestine	Turkey
Sierra Leone	Qatar	Turkmenistan
Togo	Saudi Arabia	Uzbekistan
Uganda	Somalia	Guyana
	Sudan	Suriname
	Syria	
	Tunisia	
	United Arab Emirates	
	Yemen	